

Effect of Athletes' Attitudes, Beliefs, and Knowledge on Doping and Dietary Supplementation in Saudi Sports Clubs

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ABSTRACT

Objective: The objective of this study was to access the effect of athletes' attitudes, beliefs, and knowledge on doping and dietary supplementation in Saudi sports clubs so that the Saudi Arabian Anti-Doping Committee (SAADC) might be better prepared to address these issues with athletes. **Methods:** A cross-sectional prevalence type of study was conducted in Saudi sports clubs in six cities: Almadinah Almunawwarah, Jeddah, Abha, Tabuk, Dammam, and Riyadh. Athletes aged between 20 and 35 years were randomly selected by a systematic random sampling technique. We used a questionnaire that consisted of 55 questions divided into four categories: use of doping and dietary supplements, reason for consumption of doping and dietary supplements, personal beliefs about doping and dietary supplements, and behavior. **Results:** Of the 650 athletes surveyed, 155 were excluded due to incomplete data. The total number of completed questionnaires was 445 (68.5%). The survey results showed a high number of athletes reported that the main purpose of physical activity was for the health ($n = 292$; 65.6%), followed by to increase muscle size ($n = 282$; 63.5%), and weight loss ($n = 100$; 22.4%). Of the participants, 294 (66.1%) did not take dietary supplements, while 151 (33.9%) took supplements. Data also indicated that the highest percentage of respondents ($n = 376$; 84.5%) did not use doping, yet a small percentage ($n = 33$; 7.4%) still use doping. **Conclusion:** A majority of Saudi athletes in sports clubs indicated that the reason for their use of doping products and dietary supplements was to improve their health, increase muscle size, and improve their performance.

Keywords: Athletes' attitudes, beliefs, dietary supplements, doping, knowledge, Saudi sports clubs

INTRODUCTION

The use of expedient or prohibited substances, which are potentially harmful to athletes' health and/or capable of enhancing their performance, is known as doping.^[1] Doping products and dietary supplements are widely consumed by athletes both at the national and international levels in sports clubs.^[2-4] The problems of doping in sports and the increasing use of dietary supplements by athletes in sports clubs are the issues that intersect to the extent that a large number of supplements may contain banned substances as well as substances that are associated with significant health hazards.^[3,4] Athletes who consume such products may thus be inadvertently jeopardizing their athletic career as well as their health.

It is known that supplements are beneficial for athletes;^[4] however, some can be harmful because many of these supplement products contain banned substances typically

stimulants, hormone estrogen, and anabolic steroid precursors. Athletes in sports clubs need to be aware of the problems that can follow supplement use, and the Saudi Arabian Anti-doping Committee (SAADC) needs to ensure that nutrition, doping, and antidoping education for athletes is of the highest standard. The necessity for the appropriate regulation of dietary supplements is thus highly warranted.^[5] With the widespread growth of sports centers and clubs in Saudi Arabia, there has been a concomitant increase in the

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demand for supplements, particularly those supplements that are associated with the rapid results in muscle mass increase that is expected in the sport of bodybuilding, for example. Consumption of banned agents can cause or contribute to many diseases, including high blood pressure, high blood sugar, psychological disorders, sexual dysfunctional diseases, infertility, and heart and arterial diseases.^[6] Growth at the adolescence stage is the most responsive to and most affected by these products. Young people should have their nutritional needs met by eating a balanced diet of healthy food instead of supplements. Furthermore, regular exercise will lead to muscle growth without the need for proteins or hormones.

In recent years, sports clubs and gyms have become very popular for workout and for good general physical health through the use of both legal and illegal supplements.^[7,8] In Saudi Arabia, there is a plan underway to expand sports clubs for women to 35 sports clubs by 2020, which may lead to widespread use of dietary supplements among women also.

SAADC (2018) has pointed out that the Saudi Doping Control Program for preserving the basic values of sport, usually known as sportsperson-like behavior, is the core of the Olympic movement by prioritizing the principle of fair play. Thus, this behavior reflects what is inside the body and soul of the individual with regard to ethics, fair play, and honesty.^[7,9] The Saudi Committee for Doping Control (2015) also approved the implementation of the International Anti-Doping Regulations in line with the committee's responsibilities within the articles of this regulation, while continuing to strengthen efforts to eliminate doping in Saudi Arabia. SAADC's main objective is to support the international level sports achievements by athletes who have not participated in doping. As such, the committee is concerned with all scientific affairs, including studies and research pertaining to prohibited substances and methods in sports, in addition to other related scientific updates.^[10,11]

To ensure that participants in sports activities comply with the doping control regulations and laws that fall under the jurisdiction of the SAADC and continue their follow-up at the club level in Saudi Arabia, we were motivated to conduct this study about the attitudes of sports clubs participants in Saudi Arabia toward doping and dietary supplements. Therefore, the objective of this study was to access the effect of athletes' attitudes, beliefs, and knowledge on doping and dietary supplementation in Saudi sports clubs.

SUBJECTS AND METHODS

The survey method was shared with Saudi athletes in sports clubs, and the questionnaires were designed to glean an understanding of perceptions of doping and dietary supplements among Saudi athletes in sports clubs. The questionnaire was developed based on four categories: use of doping and dietary supplements, reason for consumption of doping and dietary supplements, personal beliefs about doping and dietary supplements, and behavior. Consent form for the

Research Ethics in Sports and health department policy on using human subjects was placed at the top of the survey along with a description of subjects' specifications and the nature of the survey. Each participant had the right to withdraw from the study at any time.

In the current study, we validated the questionnaire using the following approaches: (1) A scientific team in our group reviewed the questionnaire and provided feedback from the Department of Exercise Physiology, Riyadh, Saudi Arabia; (2) We asked experts ("SAADC") on the subject matter to review the items in the questionnaire and sought their opinion and input in developing/improving the items to ensure that we measured what we intended to measure; and (3) We compared our questionnaire and results with the results of a previous similar work.

The study population included 10,000 Saudi male athlete sports club members. The study sample consisted of 1000 male participants representing 10% of the study. A total of 650 questionnaires were returned, and 155 were excluded due to incomplete data. The total number of completed questionnaires totaled 445. Therefore, athletes in sports clubs were recruited as random subjects from six cities in Saudi Arabia: Almadinah Almunawwarah, Jeddah, Abha, Tabuk, Dammam, and Riyadh. We chose these sports clubs based on their location in Saudi Arabia, and all the subjects were male athletes between the ages of 20 and 35 who were both Saudis and nonSaudis. Each sports club was assigned a coordinator who was responsible for organizing recruitment efforts. The recruitment process included advertisement posters about the study that was announced at weekly training meetings. The date and location of the survey meeting were written in the poster and verbally announced.

A questionnaire was developed to collect data as per the objective. The questionnaire consisted of 55 questions divided into four categories: use of doping and dietary supplements, reason for consumption of doping and dietary supplements, personal beliefs about doping and dietary supplements, and behavior. Overall, the survey questions related to the frequency of doping and dietary supplements purchases as well as factors that might be considered by athletes when purchasing these products. Factors for the set of questions included accessibility, taste, cost/serving, total cost of the supplement, perceived results, grams of supplement/serving, and other nutritional content or whether products contained substances prohibited in sports – typically stimulants, estrogen hormones, anabolic steroid precursors, or other forms of dietary supplements such as proteins, fats, amino acids profile, and carbohydrates. The survey also asked the subjects' about the primary sources of information about doping and dietary supplements such as magazine advertisements, athletic trainers, or strength and conditioning coaches.

The original questionnaire was in English. However, most of the subjects in this study did not have the ability to read the English version. Therefore, the questionnaire was

translated into Arabic. The researchers traveled to six cities in Saudi Arabia to collect the data for this study. It took approximately 8 months to administer the surveys and collect the data from the participants. From May to December 2018, the surveys were distributed to each sports club. The date, time, and location for each survey were arranged and announced at least 3 weeks in advance. All athletes attended and participated in the survey that took place in the sports club classroom. Approximately 20 min was needed to distribute the questionnaire and provide information, while it took about 60 min to complete the survey questionnaires. A paper-based multiple-choice questionnaire was administered.

Statistical Package for the Social Sciences (SPSS) version 25 (IBM, SPSS) System program was used to compute the data for this study.

RESULTS

Of the 650 athletes surveyed, the total number of completed questionnaires totaled 445 (response rate of 68.5%). The sports clubs consisted of male athletes from six cities in Saudi Arabia [Figure 1].

Athletes from Almadinah Almunawwarah had the highest rate of participation ($n = 128$; 29%), followed by Tabuk ($n = 100$; 22%). The average age of participants in all study groups was in the age group 20–35 years; it is the most frequent age group going to health clubs, indicating their interest in health, bodybuilding, and their awareness of the importance of physical activity. The percentage of athletes who knew their weight was 90.1%, while the percentage of those who knew their height was 88.1%, affirming that most athletes were aware of the importance of their weight and height. Moreover, most of the participants were of Saudi nationality (81.1%), so the answers to the questionnaire largely reflect the views of Saudis. Concerning the work status of the participants, most were students (64%), followed by government employees and private sector employees at 14.8% and 14.4%, respectively.

With the majority of respondents ($n = 292$; 65.6%) indicating that health was the main objective for using dietary supplement. This was followed by muscle building ($n = 282$; 63.5%).

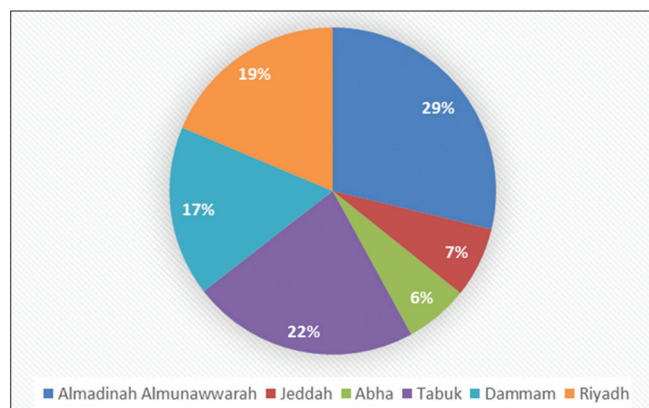


Figure 1: Shows the number of respondents from six cities in Saudi Arabia

Some participants ($n = 121$; 27%) chose more than one response [Table 1]. Participants spend most of their time (22.5%) exercising for more than 1–2 h per day, followed by 31–60 min/day (21.8%).

About 40% of participants indicated that they had a disease or a condition for which they needed to use some form of medications; 40.6% of them were obese ($n = 82$); other health issues reported by the study participants included hypertension, diabetes, and other diseases [Table 2].

Table 3 shows that the majority of the respondents ($n = 326$; 73.3%) focused on all types of nutrients in their diet.

The sources of information about supplements and doping varied slightly among the participants as follows: sports trainer, electronic social networking sites, family, nutrition specialist, food books and special sports, and internet sites at different rates. It is clear that sports trainers were an important source of nutrition information. The percentage of those who did not take supplements was 66.1%, while the percentage of those who took supplements in the study sample was 33.9%. Table 4 also shows participants' beliefs in terms of the prevalence of supplement use among colleagues, with $n = 357$ (80.2%) providing a positive response and $n = 88$ (19.8%) providing

Table 1: The objectives of the participants from joining sports clubs

Objective	<i>n</i> (%)
Health	292 (65.6)
Muscle building	282 (63.5)
Weight loss	100 (22.4)
Others: Entertainment, spending leisure time, work (Some participants ($n=121$; 21%) chose more than one response)	50 (11.2)

Table 2: Health conditions reported by study participants

Disease/condition	<i>n</i> (%)
Obesity	82 (40.6)
High blood pressure	20 (9.9)
Diabetes	8 (4.0)
Heart disease	2 (1.0)
Liver or kidney disease	3 (1.5)
Severe acne	60 (29.7)
Diseases not mentioned including asthma, poor vision, and joint pain	27 (13.4)
Use prescriptions for any disease	70 (25.5)

Table 3: Participants' present diet

Type of diet	<i>n</i> (%)
Fats	30 (6.7)
Carbohydrate	19 (4.3)
Protein	62 (13.9)
All	326 (73.3)
Nonrespondents	8 (1.8)
Total	445 (100.0)

a negative response regarding supplement intake and less positive regarding doping use.

Table 5 shows the frequencies and percentages of forms of dietary supplementation used by the participants, with the highest being the powders form ($n = 66$; 14.8%). The powder supplement refers to protein substances responsible for body and muscle growth, which corresponds with the sample of athletes at sports clubs. The percentage of doping use was found in the form of capsules ($n = 22$; 4.9%), followed by fluids ($n = 11$; 2.5%). Moreover, it was shown that the majority of participants ($n = 111$; 73.5%) perceived that they were still in good health and did not suffer from any symptoms despite the fairly recent intake of supplements and/or doping.

The most commonly used dietary supplements [Table 6] were protein supplements and amino acids ($n = 261$; 73.1%), followed by vitamins and minerals ($n = 84$; 23.5%). Anabolic

hormones (steroids) were commonly used ($n = 133$; 54.7%), followed by prohibited substances ($n = 70$; 30%).

When the athletes were asked about the reasons why they consumed nutritional supplements [Figure 2], the first reason was to increase muscle size ($n = 282$; 63.5%).

Most participants believed that the greatest pressure on athletes regarding dietary supplements was coming from trainers ($n = 192$; 43.1%), followed by the athlete's colleagues ($n = 137$; 30.9%) and friends ($n = 54$; 12.3%) [Table 7]. In terms of sports steroids, the pressure to consume prohibited products came mostly from trainers ($n = 153$; 34.8%), followed by fellow athletes ($n = 132$; 29.7%) and friends ($n = 110$; 23.8%).

DISCUSSION

This study focused on the attitudes, beliefs, and knowledge aspects of sports club athletes in Saudi Arabia toward doping and dietary supplements. The findings reported that the primary objective of the athletes' physical activity and joining sports clubs was health in 65.6% of the cases. These results indicate that the sample participants were aware of the importance of physical activity for maintaining health, as the World Health Organization (WHO) and the American College of Sports Medicine (ACSM) recommend 150–300 min of exercise per week.^[12] These results of the present study indicated that most sports club athletes enjoyed excellent to good health, which is also reflected in the athletes' answers to questions regarding exercise frequency that are consistent with the recommendations of the WHO and the ACSM.

In this study, 40% of the respondents were obese, which is consistent with the WHO statistics published in 2018,^[13] on the prevalence of obesity in Saudi Arabia for adults over 18 years

Table 4: Participants' intake of dietary supplements, doping, and belief in the prevalence of dietary supplements and doping among colleagues

Response	Taking supplements, <i>n</i> (%)	Using doping, <i>n</i> (%)
Yes	151 (33.9)	33 (7.4)
No	294 (66.1)	376 (84.5)
Taken before	0 (0.0)	36 (8.1)
Total	445 (100.0)	445 (100.0)

Response	Belief of the participants in the prevalence of supplement intake among colleagues, <i>n</i> (%)	Belief of the participants in the prevalence of doping intake among colleagues, <i>n</i> (%)
Yes	357 (78.5)	243 (54.6)
No	88 (19.8)	202 (45.4)
Total	445 (100.0)	445 (100.0)

Table 5: Participants' form of intake of supplements and doping

Delivery method	Supplement intake, <i>n</i> (%)	Doping intake, <i>n</i> (%)
Capsules	63 (14.1)	22 (4.9)
Powder (preparation)	66 (14.8)	0 (0.0)
Fluid	22 (4.9)	11 (2.5)
Injection	0 (0.0)	0 (0)
Total	151 (100.0)	33 (100.0)

Table 6: Types of dietary supplements and doping most commonly used by colleagues in the participant's viewpoint

Most commonly used supplements	<i>n</i> (%)	Most commonly used doping	<i>n</i> (%)
Protein supplements and amino acids	261 (73.1)	Hormones (steroids)	133 (54.7)
Vitamins and minerals	84 (23.5)	Prohibited substances	73 (30.0)
Herbs	12 (3.4)	Tranquilizers	32 (13.2)
Others: I don't know	0 (0.0)	Others: I do not know	5 (2.1)
Total	357 (100.0)	Total	243 (100.0)

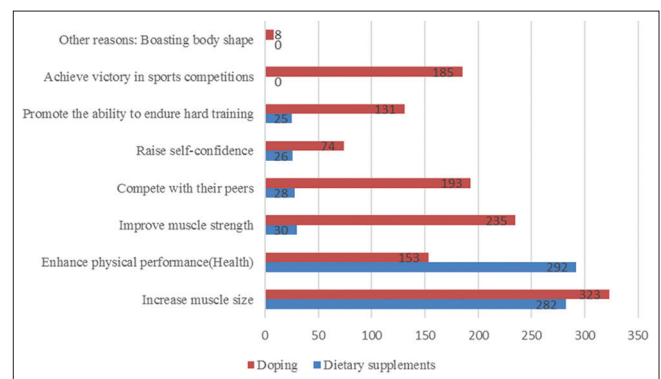


Figure 2: Reasons athletes take dietary supplements in order of priority

Table 7: Sources of pressure exerted on athletes regarding dietary supplements

Sources of pressure	Dietary supplements, n (%)	Doping, n (%)
Trainers	192 (43.1)	153 (34.8)
Team managers	26 (5.8)	28 (6.3)
Athlete colleagues	137 (30.9)	132 (29.7)
Nutrition specialists	18 (4)	4 (0.9)
Doctors	6 (1.4)	6 (1.3)
Friends	54 (12.3)	106 (23.8)
the family	10 (2.2)	4 (0.9)
Others: Unknown	2 (0.4)	12 (2.7)
Total	445 (100.0)	445 (100.0)

for the year 2016, which was determined to be 31% for males and 41% for females. A number of studies on obesity have been conducted in Saudi Arabia, including a study by Hamasha *et al.*^[14] in Asir region where the prevalence of obesity in adult males was reported to be 31.9%. The results also revealed that the majority of the respondents (73.3%) focused on all types of nutrients in their diet. This led the researchers to question why there was a high prevalence of obesity in the study sample; thus, it is presumed that the prevalence of obesity is due to unhealthy eating habits in terms of quantity, quality, and eating-time. This reflects the low level of nutritional awareness by the study participants. The high number of respondents who believed that their dietary habits were not healthy may also be due to the popularity of fast food that contains too many calories. Only 26.3% believed that their eating habits were healthy and that they had proper daily nutrition. The researcher attributed these results to a lack of awareness and attention to the nature of their eating habits. Similar results were also reported by Aljaloud.^[15,16]

With regard to doping intake, most of the participants ($n = 33$; 7.4%) responded that they were still healthy despite doping intake. Similar results were also reported by Hoffman *et al.*,^[17] where the number of students that self-reported doping use was 2.4% for males. The adolescents were also willing to take more risks with supplements to achieve their fitness or athletic goals, even if these risks harmed health or caused premature death.

About 80% of the respondents believed that the prevalence of dietary supplements and doping among colleagues was high. This is even more than what was reported in the study of Al Ghobain *et al.*,^[18] which indicated that the prevalence of the use of allowed dietary supplements was 38.4%, which was greater than the percentage (30%) of athletes who believed that such behavior ran counter to the spirit of sports. The responses of the participants for doping were 54.6% participants believed that doping use was common among their fellow athletes, whereas 45.4% participants responded negatively. These results would indicate that doping use needs to be examined much more thoroughly in all its aspects to eliminate it. Furthermore, these findings are consistent with the study of Saito *et al.*,^[19] which indicated that players were aware of doping use.

The present study results were very close to those of Bordin *et al.* study,^[20] which showed 20%–60% of testosterone intake. The results were also in agreement with the results of the study by De Rose,^[21] which affirmed the spread of doping among athletes. It was also in line with the study by Ama *et al.*,^[22] which stated that footballers were using prohibited and some restricted substances.

The most frequent response for the reason behind the use of doping agents was to increase muscle size and muscle strength, which is a typical reason for increasing muscle volume, followed by “to compete with their colleagues,” “to achieve victory in sports competitions,” and “to raise and improve physical performance.” These results corresponded with Al Ghobain *et al.* study,^[18] which pointed out that the reason for the use of banned doping agents was to improve performance by 69%. These reasons also coincided with Deligiannis *et al.* study,^[23] which indicated that many types of drugs were used by athletes to enhance performance, to reduce anxiety, to increase muscle mass, to reduce weight, or to hide other drugs during testing.^[24] Deligiannis *et al.* also reported that the reasons behind some athletes avoid taking dietary supplements are health side effects (47.6%), cost (31.7%), and shortage of quality and safety (13%). The most common reason athletes abstain from taking steroids is because of the side effects (44.3%). These results denote the participants’ awareness of the side effects of doping. The next reasons for abstaining from doping included penalties for doping (29.2%) and cost (25.2%). Regarding knowledge, education, and attendance at seminars on nutritional supplements and doping, the current study, which was inconsistent with the results of Aziz *et al.*,^[25] confirmed the athletes’ lack of knowledge about dietary supplements and sports doping. It is thus recommended that education initiatives related to dietary supplements and sports doping be significantly expanded for these athletes.

Most participants believed that the greatest pressure on athletes regarding the use of dietary supplements was coming from trainers, followed by the athlete’s colleagues and friends. This shows that trainers and fellow athletes greatly influence each other’s behavior. Therefore, the relevant bodies and associations must realize the importance of encouraging these groups to invest in education for athletes and nonathletes in society. In terms of sports steroids, the pressure to consume prohibited products came mostly from trainers (34.8%), followed by fellow athletes (29.7%) and friends (23.8%). The current study answered the question, “Do you think that supplementation compensates for any lack of training?” More than half of the participants (55.7%) responded negatively to this question and reported that “supplementation does not compensate for any lack of training,” which means that many athletes were not convinced that dietary supplements are a compensatory factor for lack of training. As for whether doping compensates for any lack of physical training, the majority also answered negatively (66.1%), indicating participants’ conviction that doping does not make up for any lack of training. The athletes’ background regarding international penalties imposed on any

player tested positively for doping in national and international competitions was clear. The results showed; Yes responses in $n = 238$ (53.5%) and No responses in $n = 207$ (46.5%). This points to the need for awareness-raising strategies to eradicate doping. The participants' responses to dietary supplements showed that 56.9% of participants indicated that trainers did not do enough to induce athletes to take supplements, while the remainder of participants (43.1%) indicated that the trainers did induce athletes to take supplements. As for sports steroids, the majority of participants (58.2%) responded that trainers did not do enough to prevent athletes from doping and did not warn them of the harm. This finding is consistent with Ayotte *et al.*,^[26] who noted that dietary supplementation had become part of the diets of many athletes, except caffeine and ephedrine, substances that are not banned and are promoted via the internet. With regard to sports doping, athletes were participating at high rates, and the sources were as follows: doping promoter (53.5%), trainers (25.4%), and fellow athletes (11.9%). Thus, we see the influential role of trainers and fellow athletes in facilitating the access and spread of doping among athletes, and these should be the target for SAADC to work on.

This study showed that the prevalence of dietary supplements among athletes was attributed to a lack of nutritional awareness (82.9%). As a result, it is that all concerned authorities study this phenomenon in all of its aspects to develop appropriate strategies to stop supplement abuse. The prevalence of doping among athletes is due to lack of awareness of its adverse effects (87.6%). Therefore, some intervention is urgently needed to channel more efforts into educating athletes and all relevant individuals to deter widespread supplement and doping abuse. A large percentage of participants (82.9%) agreed to the question of holding seminars, conferences, and awareness lectures on doping and its harmful effects, indicating the participants' preference for more doping education programs. Finally, the study pointed out respondents' answers to the question, "When you learn that one of your friends is doping, what you will do?" Most answers (83.6%) focused on the first option given, "*talking to him and advising him not to use them,*" indicating the participants' willingness to advise their peers. However, this situation raised this question about the best way to deal with these circumstances, so the responsibility turns to the concerned authorities to take a more proactive role in educating athletes on the optimal way of dealing with such sitting. The present study has some limitations. First, the study used a self-administered tool, which could have introduced self-presentation bias that might have influenced the results. In addition, the study did not give more details of the dietary supplements and doping products use among participants, such as contents and dosage. These areas are worth further investigation by researchers in the coming future.

CONCLUSION

Many athletes use doping and dietary supplements as part of

their regular training or competition routine. In the present study sample, two-thirds of the athletes took supplements. This study also indicated that majority of respondents did not use doping. Most athletes had unhealthy dietary habits, and athletes' sources of information about dietary supplements and sports doping often came from trainers. Enhanced muscle mass was shown to be the primary reason for taking dietary supplements and using sports doping.

Recommendations

1. It is essential to promote the role of the Saudi authorities for doping control, especially in sports communities
2. Paying more attention to educating trainers with regard to their important role as a source of information and access to nutritional supplements and sports-prohibited substances
3. Invoke harsher penalties for misusing banned doping among athletes to deter widespread use of these products when the principles of justice and sportsmanship are violated
4. Invoke harsher penalties for sports clubs and trainers getting involved in promoting or selling these prohibited products.

Ethical consideration

The approval of the study was obtained from Research Ethics from the Deanship of Scientific Research of King Saud University and the "SAADC" Ref. No.: KSU-SE-17-11.

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Conflicts of interest

There are no conflicts of interest.

Authors' contribution

SA, AG, and KK conceived and designed the study and provided research materials. MK and AM collected and organized data. SA and SW analyzed and interpreted data and wrote the initial and final draft of the article. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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