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Anti-Doping Knowledge, Attitude, and Experience of General Practitioners in Kenya

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Abstract

General practitioners are regarded as athletic support personnel as they are involved in delivering supportive services such as treating athletes participating in or preparing for sports competitions. General practitioners play a vital role in influencing athletes to fulfill their mandate to adhere to clean sports and therefore, their additional knowledge in sports is required to comprehensively address their health needs without affecting the integrity of rules that govern fair play. General practitioners require sufficient doping knowledge to provide athletes with health needs consistent with anti-doping regulations. In Kenya, no studies have investigated or reported the doping knowledge, attitude or experience of General Practitioners, thus leaving a knowledge gap on their ability to treat competitive athletes harmonious with WADA requirements. Therefore, the study sought to unearth General Practitioners' doping knowledge, attitude, and experience in Kenya. The study's findings have implications on doping knowledge, attitude, and experience of Kenya General Practitioners' essential to inform the current status of the concept. A cross-sectional analytical study design was selected because of its robustness in describing general practitioners' current doping knowledge, attitude, and experiences. Data was collected using a self-reported and validated questionnaire where 250 General practitioners completed the survey. Findings revealed that Kenyan general practitioners are well aware of doping regulatory agencies of WADA and ADAK. The findings demonstrated that General Practitioners had an average doping knowledge (47.77 ± 14.03) punctuated with limited knowledge of prohibited substances, methods, and substances in certain sports. Work experience significantly influenced General Practitioners knowledge, $F_{(4,245)} = 10.852$, $p < .001$. General Practitioners had a negative doping attitude of 45.23 ± 13.64. As many as 22% (55) General Practitioners received doping requests for the last 12 months, where 35.7% (89) of requests are about drugs to aid recovery. Anabolic steroids, corticosteroids, and peptide hormones were among the most sought-after PEDs. General Practitioners in Kenya have inadequate doping knowledge, which could limit their efficacy in treating professional athletes in line with WADA guidelines. Additional anti-doping training could benefit them address this limitation. Although General Practitioners demonstrated a negative attitude, expanding their involvement through active participation in doping seminars, and programs can enhance their understanding of the doping concept necessary to develop and maintain a strong negative attitude.

Keywords: Doping attitude, General practitioner, Knowledge, Doping regulation in Kenya, Doping experience

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INTRODUCTION

Doping refers to the use of restricted drugs, treatments, or approaches that aim to promote athlete performance. World Anti-Doping Agency (2021) dictates that doping violates one or more anti-doping rules outlined in Article 2.1. Doping remains a significant threat that denies athletes a fair display of their sporting abilities and exposes them to myriads of health problems such as heart disease, stroke, liver cancer, and many others. Doping regulating agencies such as World Anti-Doping Agency (WADA) have made great strides in ensuring fair play through anti-doping education and sanctions. Evidence shows that all relevant personnel involved in an athlete's life need to work together to fight against doping in sports effectively (Backhouse & McKenna, 2011; El-Hammadi & Hunien, 2013; Jaber et al., 2015; Starzak et al., 2016). Athlete support personnel (ASPs) which includes General Practitioners can educate, monitor, and advise athletes to prevent deliberate or unintentional doping from promoting clean sports (Swiss Sports Integrity, 2022). In the concept of athlete doping, the mandate of General Practitioners is to treat patients and refer them to specialized treatment if the need arises (Chinen et al., 2021), and similar expectations are held in the realm of sports. General Practitioners treating athletes should prioritize preventing, diagnosing, and developing care that promotes athletes' health. The doping regulatory agencies such as WADA expect medical practitioners to treat athletes in compliance with its regulations to control doping and by extending doping liabilities to the health practitioners. However, for this approach to be practical, Kenya General Practitioners' doping knowledge and attitude need to meet the anti-doping agencies' expectations outlined under article 2.10 in WADA 2021 anti-doping regulations.

General Practitioners are perceived as key to doping prevention because of their roles. However, General Practitioners have been reported to possess insufficient knowledge to impact the fight against doping in sports (Auersperger et al., 2012; Dikic et al., 2014; Starzak et al., 2016). For example, a survey conducted with 276 General Practitioners from Serbia revealed that only a tiny proportion of 10.5% and 8% of the participants had good knowledge of the list of prohibited substances and the methods and the law on doping prevention (Antic, 2017). In the reviewed studies, it is precise that General Practitioners ascribed their low doping knowledge to absence or inadequate education and training (Antic, 2017; Auersperger et al., 2012; Dikic et al., 2014; Starzak et al., 2016). The current status of Kenya General Practitioners is unclear, making it imperative to establish if Kenya General Practitioners' doping knowledge is in a way influenced by limited anti-doping education, absence of supporting resources, or lack of interest of the practitioners in anti-doping. Starzar and Derman (2016) reported that low interest in doping among South African General Practitioners and non-existent doping studies in the country were the major contributors to low doping knowledge among the participants.

The consequences of General Practitioners' inadequate doping knowledge are apparent in athletes' positive doping cases and sanctions. Team doctors have been blamed for a series of doping cases primarily because of their poor judgment in relation to performance-enhancing substances (PEDs), especially those that require therapeutic use exemptions (TUEs) (Dikic et al., 2014). For example, in Kenya in 2019, a medical doctor treated an athlete for Malaria a

few days before the competition leading to the athlete testing positive for doping and subsequently receiving two years ban from WADA (Sports Resolutions, 2019). In a previous year, another Kenyan athlete was given by a medic, Tramadol, and Diprofos, for a back injury to manage pain. However, the drugs are on the WADA prohibited list (ADAK, 2018). The two cases demonstrate the ignorance of General Practitioners about doping despite them being a potential tool in promoting clean sport.

World Anti-Doping Agency extended doping liabilities to medical practitioners as a prevention approach to doping. The strategy can deter General Practitioners from assisting athletes with doping practices, but the practitioners' doping attitude influences their doping compliance (Gucciardi et al., 2011). Donavan et al. (2014) hypothesized that how a General Practitioner perceives the threat of sanctions due to ethical misconduct and the supposed benefits determine their doping attitude and, consequently, their intention to support it. Although many studies show General Practitioners to have a negative doping attitude, there are still a few medical practitioners who sympathize with dopers (Backhouse & McKenna, 2011; Erickson et al., 2015; Domagala et al., 2018). For example, a study on the doping attitude of medical doctors in the Balkan region (i.e., Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Albania, Macedonia, Greece, Bulgaria, and Romania) revealed that 14% of the participants agreed that doping could be safely used by athletes (Nenad et al., 2007). Another study suggested that General Practitioners' positive doping attitude premise is ignorance of the health risks associated with PEDs (Laure et al., 2003). Educating General Practitioners in Kenya about doping and its health and moral concerns would possibly make the practitioners proactive in doping matters and potentially change their doping attitude.

General practitioners' experience with doping and its related issues, such as athletes' requests for doping information and substances, is relatively low but demonstrates doping existence in sport (Auersperger et al., 2012). Indeed, out of 645 General Practitioners from Slovenia, 4% reported having encountered athletes who used PEDs, while Auersperger et al. (2012) established that 37% of General Practitioners received requests for doping information from athletes in the past 12 months. The evidence points to General Practitioners as an essential asset to anti-doping regulation agencies which they need to optimize to curtail doping. The practitioners can play a core part in educating athletes about the danger of PEDs and cut off the link as a source of doping substances (Nakajima et al., 2020). A study involving medical doctors from Iraq reported that 37.5% (24) participants had interacted with athletes with a history of doping (Salih & Abd, 2021). Some earlier studies by Wood and Moyinan (2009) reported that one in four, 28% (217) of Ireland medical doctors who took part in their studies had been approached for doping assistance by athletes. Dikic et al. (2014) reported that 80% of the doctors from the Balkan region had received a request for doping information, and 25% received a request for PEDs prescriptions. The evidence from the above studies suggests that General Practitioners receive requests from athletes or ASPs on doping. While the role of Kenya General Practitioners in the context of sport is to treat athletes, they may encounter athletes seeking doping assistance, which presents a critical window of opportunities for General Practitioners in Kenya to assist athletes from engaging in doping.

The above evidence demonstrates that General Practitioners encounter doping requests, and some treats athletes with doping-related health issues. Doping encounters make General Practitioners fundamental in the fight against doping in Kenya hence the need to involve them practically. However, their doping knowledge, attitude, and experience are unknown, making it difficult to have a robust anti-doping front not only in Kenya but globally from General Practitioners. In light of this knowledge, the study explored doping knowledge, attitude, and experience of General Practitioners in Kenya to establish their efficacy in promoting anti-doping campaigns in Kenya.

METHODS

Research Model

The study used a cross-sectional analytical study design targeting 5099 General practitioners from the 7 out of 47 purposively selected athletic-rich counties in Kenya of Nairobi, Nandi, Uasin-Gishu, Elgeyo-Marakwet, Nakuru, Bomet, and Laikipia. The survey was conducted between October and December 2021. A cross-sectional analytical study design is a quantitative non-experimental study design that collects data from a defined population at a particular time (Scmidt & Brown, 2021). The goal of the cross-sectional analytical study design was to concurrently describe General practitioners' doping knowledge, attitude, and experience.

Participants

A stratified random sampling method was used to determine the participants from the target population, 5099 General Practitioners from seven selected counties acquired from the Kenya medical practitioners and dentist's council database. An invitation to participation request was sent via email and a text message to randomly selected General Practitioners working in the hospitals and health clinics in the selected counties.

Follow-up was made via a phone call upon which the background, objective, and purpose of the survey were explained. Participation in the study was voluntary, and participants were informed that they were free to withdraw from the survey without any prejudice or coercion. Once participants agreed to participate in the study, a physical meet-up was arranged. Afterward, the researcher or the research assistant met and issued the survey questionnaire once the participants signed the consent form. A total of 250 out of the targeted 478 General Practitioners from the seven counties responded and completed the survey questionnaire.

Data Collection Tools

The study used a modified self-reported questionnaire developed by the investigator and composed of four sections (A, B, C, D) derived from previously validated self-report questionnaires. To ensure the face and content validity of the survey instrument, a pilot study was conducted using 15 general practitioners from Baringo Level Five hospital in Baringo County in Kenya. Baringo County has renowned athletes and is home to some international athletes. The response from the pilot study guided a few changes to the survey tool relating to the length of the instrument, ambiguity, and irrelevant questions. The test-retest reliability

was done with a time interval of two weeks. The test-retest yielded a high correlation Cronbach alpha of 0.87, indicating good reliability $p<.001$ of all three sections (B, C, and D) of the research instrument.

The reliability of sections B (doping knowledge) and D (doping experience) was reviewed by experienced supervisors in doping research to ensure the sections addressed the intended objectives. In relation to Section C, evidence from previous studies that have used the PEAS reported that the tool is reliable, with Cronbach alpha above .70 (Petróczi & Aidman, 2009; Petróczi, 2007). The present study's internal consistency of the PEAS (Section C) was acceptable, with a reliability coefficient of $\alpha = 0.79$.

Section A of the questionnaire collected General Practitioners' demographic information age, gender, county of residence, level of formal education, occupation, and work duration/ experience. Section B investigated General Practitioners doping knowledge. The section had six items retrieved from the WADA athletes' online resources (WADA, 2019). General Practitioners' doping knowledge was assessed by responding to questions related to knowledge of anti-doping agencies (items 1 and 2) and ranking how informed they were on matters of doping (item 3).

General Practitioners' Familiarity with doping codes and related issues was assessed using 17 statements that were measured using a five-point Likert scale. The scale ranged from 1-not at all familiar, 2-slightly familiar, 3-somewhat familiar, 4-moderate familiar, and 5-extremely familiar. The possible cumulative maximum score on doping Familiarity for General Practitioners was 85, indicating that the General Practitioners was extremely familiar with doping codes and related issues. A score of 42.5 and below demonstrated an average to poor knowledge of doping codes and related issues, whereas a score above 42.5 indicated good doping familiarity. Item 5 of section B sought to investigate the General Practitioner's knowledge of the prohibited classes of substances or methods and classes of prohibited substances in certain sports using a seven-point Likert scale. The scale ranged from 1-100% correct, 2-60% correct, 3-30% correct, 4-neither correct nor incorrect, 5-30% incorrect, 6-60% incorrect, and 7-100% incorrect. Finally, item 6 of section B sought to determine the GP's sources of knowledge about doping and performance-enhancing drugs. They were expected to identify from a list of possible sources identified in the literature.

The third section, C, investigated the GP's attitudes toward doping in sports in Kenya. It sought to find out what the General Practitioners' thought about doping. The section (item 7) comprised 17 statements adapted from Folkerts et al. (2020). General Practitioners' doping attitude was assessed by a seven-point Likert scale with values assigned as follows; 1-Strongly Disagree 2-Somehow Disagree, 3- Disagree, 4-Neutral 5-Agree, 6- Somehow Agree, **7** -Strongly Agree. The minimum score per statement was 1, and the maximum was 7. A maximum cumulative score would have been 119, implying a positive doping attitude. The doping attitude score of 59.5 and below denoted a negative to strong negative doping attitude (Petróczi & Aidman, 2009). In addition, the section also sought to find out the practitioners'

thoughts on the source of PEDs to the athletes (item 8). A list of the probable sources was provided for them to choose from.

Finally, section D had seven items (9-15) that examined the doping experience of general practitioners on doping. The items were adapted from Woods and Moynihan (2009). Questions in this section assessed whether general practitioners had ever been approached by athletes seeking doping information or drugs, the frequency at which athletes confronted them for information, some the drug information athletes often sought, the kind of drugs athletes requested for prescription, whether they had received any request for information or doping substances or treatment for the past one year and what they thought compelled some general practitioners and pharmacists to assist athletes in doping. When responding to this section, the General Practitioners were presented with options to choose from in the various items.

Research Ethics

The survey was conducted in accordance with guidelines of the Kenyatta University Ethical Review Board (KUERB) research protocol no. PKU/2307/11448, Research approval was obtained from Kenyatta University Graduate School and National Commission for Science, Technology, and Innovation (NACOSTI) license no. NACOSTI/P/21/12371 as well as County Commissioners and County Directors of education from each selected county. The objectives and background of the study were explained, and consent was obtained before commencing data collection. The permission to involve General Practitioners in the study and access their contact details was obtained from Kenya Medical Practitioners and Dentist Council (KMPDC) data base. All data were collected and analyzed anonymously.

Collection of Data

The researcher and the research assistants contacted the selected General Practitioners via a phone call, a text message, or email where the study's purpose and nature were explained before requesting their consent to participate in the study. Once the individual agreed to participate in the study, the investigator made an appointment for the questionnaire to be delivered for data collection. To ease data collection, the participants were classified according to counties and then to their working station, where each county was assigned a timeline of 4 days. In a case where several General Practitioners work in the same station, data was collected at once for those respondents. The travel arrangement to each selected county was only made if 70% of the participants accepted to participate and provided the researcher with appointment details, that is, the date and their actual location.

After an appointment was made, the questionnaire was delivered to the respondent. The researcher or the research assistant explained the scope and importance of the study and further assured confidentiality of the information given and the individual participating in the study. Once the individual agreed to be a respondent in the study, they signed an agreement or consent form before a questionnaire was issued. The participant was then given the questionnaire and requested to respond as honestly as possible and return it to the researcher or research assistant once completed.

Analysis of Data

All data collected were analyzed using IBM SPSS version 25. Descriptive statistics of percentages, frequencies, means, and standard deviations were used for demographic data and General Practitioners' familiarity with doping substances and methods, doping attitude, source of PEDs, and doping experience. One-way Analysis of Variance (ANOVA) was used to assess the effect of work experience on General Practitioners' doping knowledge. Shapiro-Wilk was used to evaluate the assumption of normality. Boxplot was reviewed for outliers and Levene's test for homogeneity of variance. Tukeys HSD was applied to examine pairwise differences among the age group means to establish where a significant difference in doping knowledge existed. Non-parametric test Kruskal-Wallis was used to identify a possible influence of work experience on General Practitioners' doping attitude. All statistical level of significance was evaluated at $p < .05$.

FINDINGS

Participant's Characteristics

Two hundred and fifty General Practitioners participated in the study, with 60.4% (151) male and 39.6% (99) female General Practitioners. The age distribution of the participants 20-30 years, 38% (95), 30-40 years, 38% (95), 40-50 years, 15.6% (39), and above 50 years 8.4% (21). The results revealed that the majority of the General Practitioners, 38.4% (96), had less than 5 years of work experience. Twenty-eight percent (70) General Practitioners had 6-10 years of work experience, whereas 16% (40) had 11-15 years of work experience. General Practitioners with 16-20 years of work experience (duration of work) was 8% (20) compared to 9.6% (24) with above 21 years of work experience.

Table 1. Participants characteristics (N=250)

Variables	F	%
Gender		
Males	151	60.4
Females	99	39.6
Age		
20-30 Years	95	38
30-40 Years	95	38
40-50 Years	39	15.6
>50 Years	21	8.4
Work duration/Experience		
≤5 Years	96	38.4
6-10 Years	70	28
11-15 Years	40	16
16-20 Years	20	8
≥21 Years	24	9.6

Kenya general practitioners doping knowledge

The General Practitioners were asked about their familiarity with doping regulatory agencies to assess their eagerness in doping matters and learning. The result showed that the majority, 70.8% (177), knew WADA, but a few, 29.2% (73), stated they were unaware of WADA. When asked about their knowledge of the local doping regulatory body, Anti-Doping Agency

of Kenya (ADAK), more than half, 69.2% (173) General Practitioners indicated they were familiar with the anti-doping agency, while 30.8% (77) General Practitioners had never heard about ADAK.

The General Practitioners were also asked to rate how informed they felt in relation to doping on a five-point Likert scale. Results (Figure 1) showed that around half, 50.8% (127) of the participants reported their doping knowledge as average, with only 16.4% (41) stating they were excellently informed about doping. A considerable number, 32.8% (82), reported their doping knowledge to be between below average and poor, as shown in Figure 1.

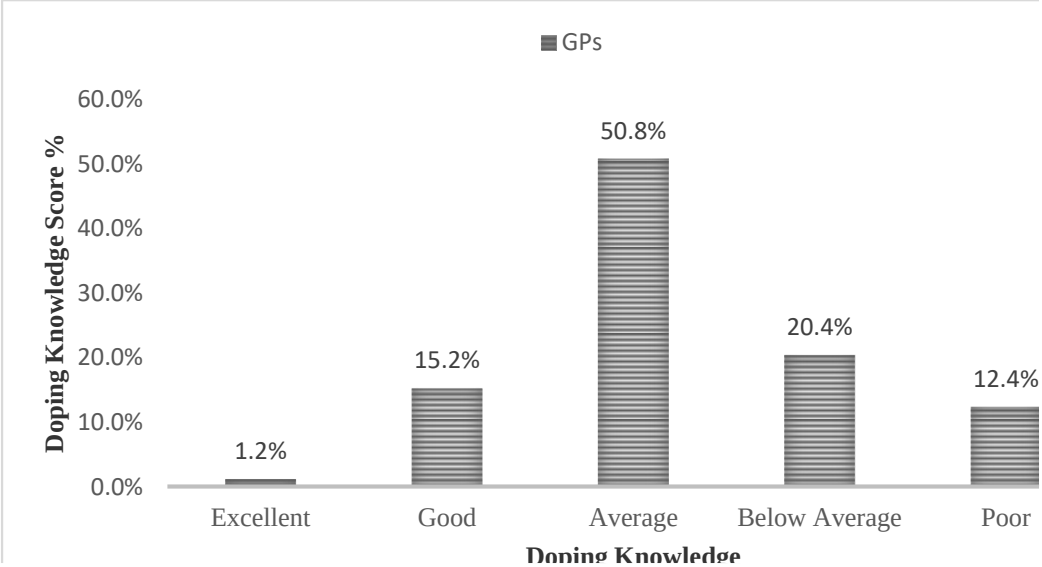

Figure 1. General practitioners' self-assessment on how informed they felt regarding doping

The study further examined the General Practitioners' detailed knowledge of WADA prohibited class of substances, methods, and a class of substances prohibited in a specific sport. On the prohibited class of substances, General Practitioners demonstrated low knowledge of anabolic agents 5.04 ± 1.18, narcotics 4.98 ± 1.16, and peptide hormones, mimetics, and analogues as prohibited substances, 4.84 ± 1.22. Results (Table 2) reveal that GP's knowledge of diuretics and masking agents as prohibited substances were relatively high, 4.53 ± 1.35 and 4.69 ± 1.27, respectively.

General Practitioners in Kenya revealed low knowledge of prohibited methods in sport, gene doping 5.03 ± 1.29, pharmacological, chemical, and physical manipulation 5.02 ±1.3. The General Practitioners, however, had better knowledge of enhancement of oxygen transfer as a prohibited method compared to the other two methods, 4.82 ± 1.34.

The General Practitioners were also asked about their familiarity with substances prohibited in certain sports. Beta-blocker was more identified as 4.69 ±1.21, followed by alcohol, 4.82 ± 1.18, and local anesthetics, 4.83 ± 1.19. Cannabinoids were least identified in this category, 5.04 ± 1.11, as a prohibited substance in certain sports.

Table 2. General Practitioners Self-Report on their level of knowledge about various doping categories

Doping Substances Category	Mean	Stds.
Prohibited Class of Substances		
Anabolic Agents	5.04*	1.18
Narcotics	4.98	1.16
Peptide hormones, mimetics, and analogues	4.84	1.22
Masking agents	4.69	1.27
Diuretics	4.53	1.35
Prohibited Methods		
Gene doping	5.03	1.29
Pharmacological, chemical and physical manipulation	5.02	1.3
Enhancement of oxygen transfer	4.82	1.34
Prohibited substances in certain sports		
Cannabinoids	5.04*	1.11
Local anesthetics	4.83	1.19
Alcohol	4.82	1.18
Beta blocker	4.69	1.21

*The higher the score the lower the participants familiarity with the doping substance

When work experience was assessed if it influences general practitioner' doping knowledge, results Table 3 revealed that General Practitioners with considerable work experience, over 21 years, had high doping knowledge compared to the other four work experience categories, 59.42 ± 2.19.

General Practitioners with 16-20 years showed an excellent doping knowledge of 56.15 ± 2.92 compared to participants with 11-15 years, 49.30 ± 1.83. General Practitioners with five and below years of work experience had average doping knowledge of 42.5 ± 1.31, while participants with 6-10 years had slightly above average doping knowledge, 47.69 ± 1.75. One-way ANOVA established that work experience significantly affected General Practitioners' doping knowledge, F (4,245) = 10.852, $p < .001$. Pairwise comparison using Tukey'sTukey's HSD revealed the difference in doping knowledge occurred between General Practitioners with work experience of over 21 years and those with less than five years, where General Practitioners with over21 years demonstrated high doping knowledge, 59.42 ± 2.19.

A significant mean difference in doping knowledge ($p < .001$) was also identified between General Practitioners with 16-20 years of work experience and General Practitioners with less than five years of work experience, where General Practitioners with 16-20 years of work experience reported high doping knowledge, 56.15 ± 2.92. A significant difference in doping knowledge ($p = .049$) was also noted between General Practitioners with less than five years and General Practitioners with 11-15 years of work experience.

A statistical mean difference in doping knowledge between General Practitioners with over 21 years and 6-10 years of work experience was established ($p = .049$), where General Practitioners with over 21 years of work experience demonstrating good doping knowledge, 59.42 ± 2.19. A similar observation was made where General Practitioners with over 21 years of work experience had a significant mean difference in doping knowledge ($p = .024$) when compared with General Practitioners with 11-15 years of work experience where the latter had reported high doping knowledge, 59.42 ± 2.19.

Table 3. Work duration/ Experience and doping knowledge of General Practitioners in Kenya

Work duration/ Experience	≤5 Years	6-10 Years	11-15 Years	16-20 Years	≥21 Years
Mean	47.69	42.5	49.30	56.15	59.42*
Stds.	1.75	1.31	1.83	2.92	2.19

*High scores depict high doping knowledge

Source of Doping Knowledge

Figure 2 shows Kenya General Practitioners' report on their primary source of doping learning. Figure 2 indicates that General Practitioners learn about doping mainly from the internet 61.4% (153), TV/Radio 51.4% (128), WADA 42.2% (105), ADAK 40.6 while seminars and friends were the least preferred source of doping information, 8.4% (21) and 16% (40) respectively.

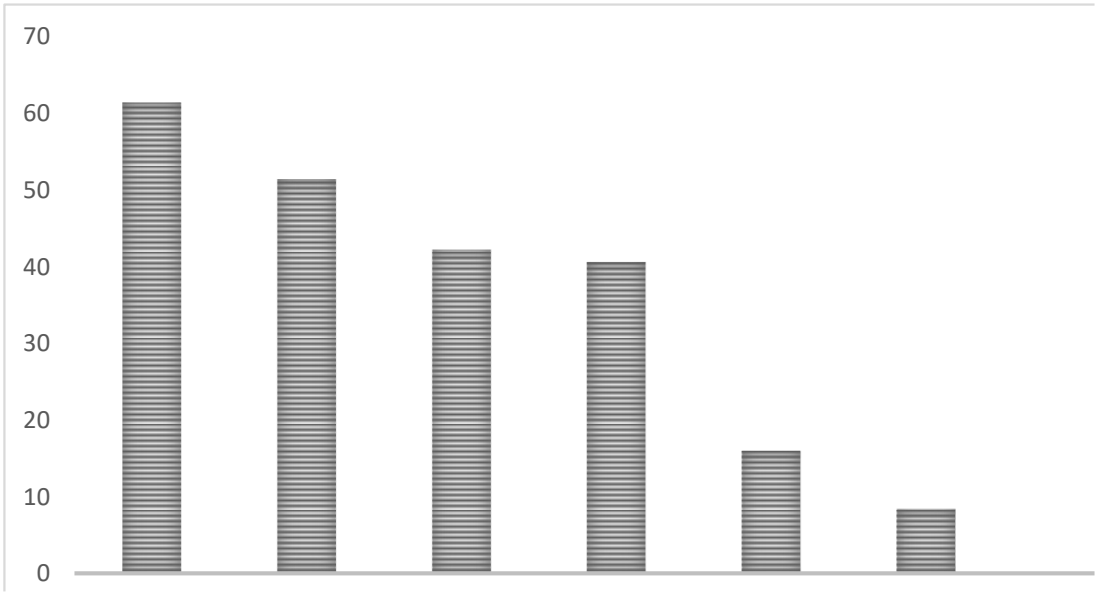

Figure 2. General practitioners' source of doping knowledge

General Practitioners' Attitude towards Doping in Kenya

A PEAS was used to examine General Practitioners' attitudes towards doping. Results from the 17 PEAS statements measuring doping attitude showed Kenya General Practitioners have a negative doping attitude of 45.23 ± 13.64. Click here for attitude results. The doping attitude questions were measured on a six-point Likert scale starting from; 1-strongly disagree to 7-strongly agree. The maximum score participant could score was 119, meaning a strong positive doping attitude. A score of 59.5 and below indicated a negative to strong negative doping attitude.

Results (Table 4) revealed that General Practitioners with 16-20 years' work experience had a strong negative doping attitude compared to the other four work experience categories, 40.30 ± 3.01. General Practitioners with over 21 years of work experience also showed a strong negative doping attitude of 40.33 ± 2.23. Notably, General Practitioners with less work experience, less than 5 years of work experience demonstrated a weak negative doping

attitude among the four work experience categories, 48.45 ± 1.24. Further investigations established work experience to significantly affect General Practitioners' doping attitude H (4) = 13.865, p = .008.

Table 4. Work experience and doping attitude of general practitioners

Work Experience	≤5 Years	6-10 Years	11-15 Years	16-20 Years	≥21 Years
Mean	48.45*	43.77	45.48	40.30	40.33
Stds.	1.24	1.65	2.62	3.01	2.23

*The higher the attitude scores the more doping positive orientation the General Practitioners is.

General Practitioners doping experience in Kenya

When asked if they have ever been approached for doping information for the last 12 months, results (Figure 3) show as many as 22% (55) General Practitioners affirmed. A few, 1.6% (4) General Practitioners reported they frequently or 70% chances of encountering athletes seeking information or prescription of banned substances. However, a large number, 82% (215), denied ever receiving a request for such assistance from athletes.

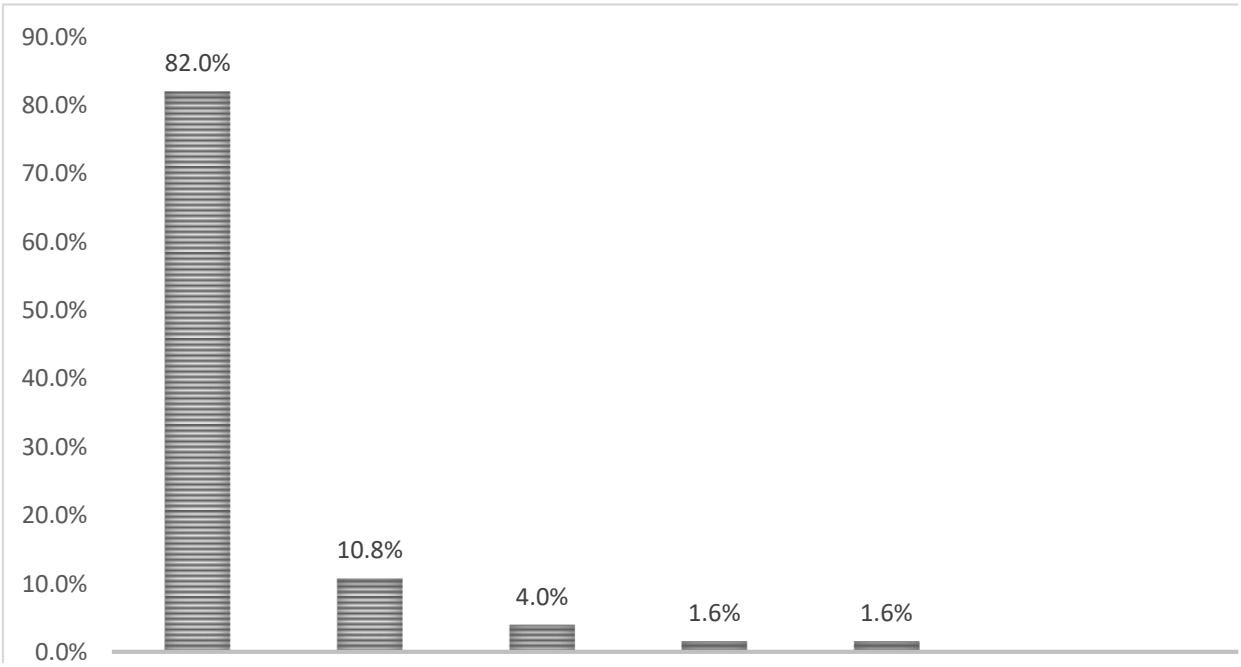

Figure 3. General Practitioners and Ps encounter with athlete seeking doping information/substances

Some of the information on doping that athletes were seeking commonly from General practitioners was about drugs to aid recovery 35.7% (89), drugs that shorten recovery after injury 26.1% (65), side effects of PEDs 20.1% (50), right dosage 13.3% (33), and additional laboratory information 4.8% (12).

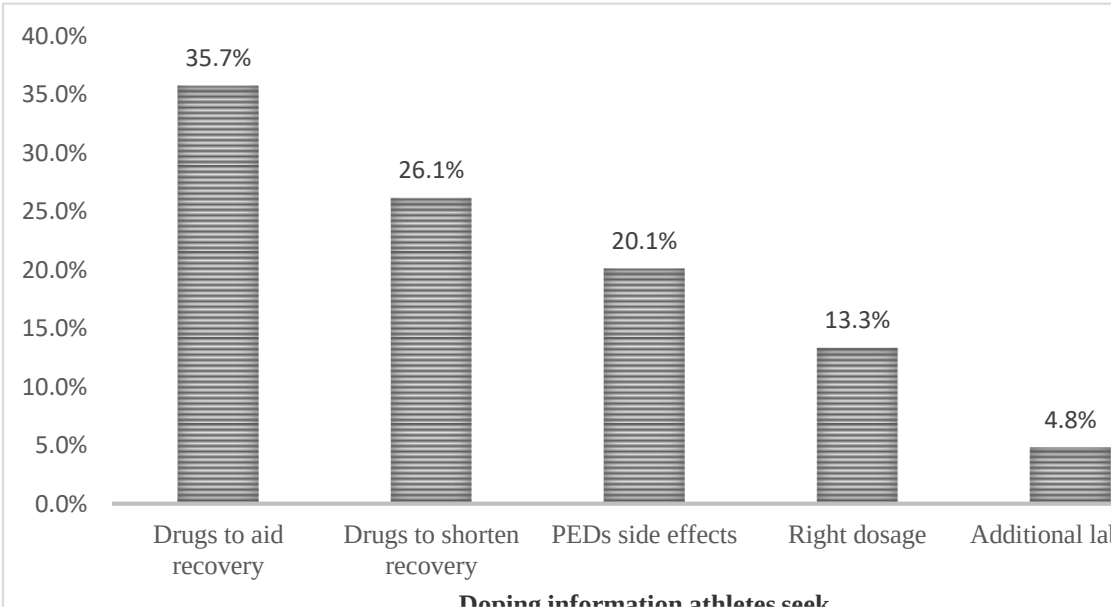

Figure 4. Doping related information athletes seek from general practitioners

In relation to types of performance-enhancing drugs athletes often seek, the General Practitioners revealed most are anabolic steroids 68.6% (59), followed by corticosteroids and peptide hormones as among the top sough of PEDs 54.7% (47) and 52.3% (45) as shown in Figure 5. While stimulants and masking agents were reported among the lowest sought PEDs, 40.7% (35) and 25.6% (22), respectively, diuretics were the least doping substance sought for prescription by athletes, 17.4% (15).

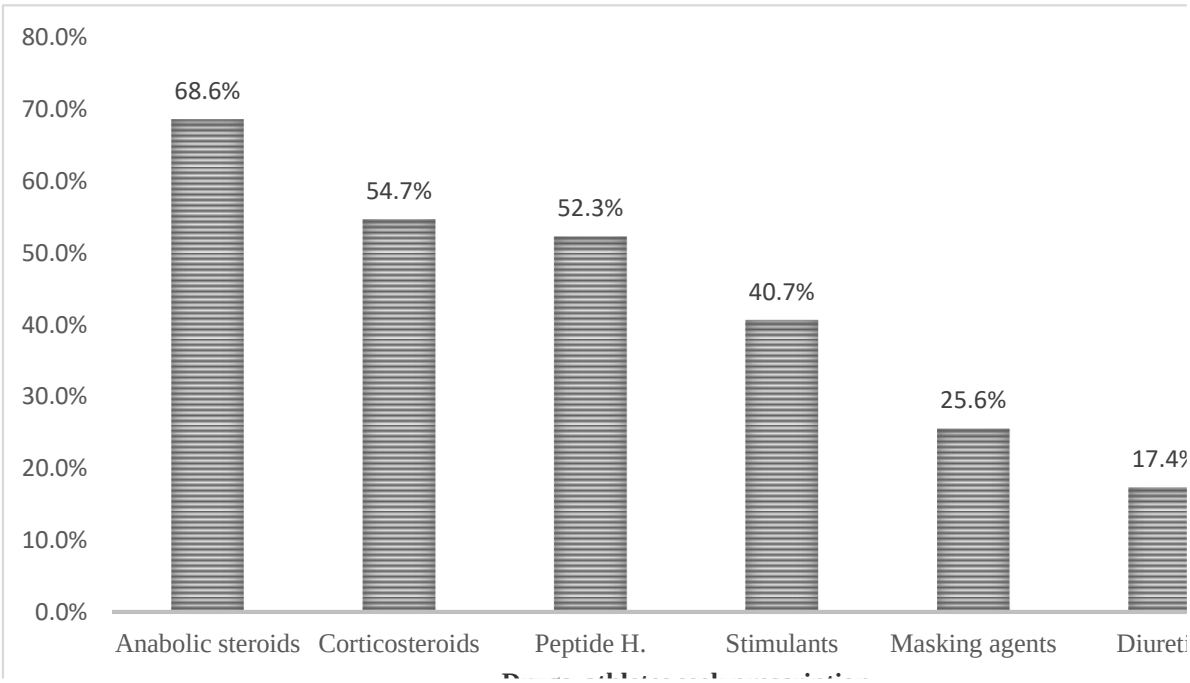

Figure 5. Drugs athletes often seek from general practitioners

Source of Drugs

Based on General Practitioners' perspective, pharmacists are the main source of PEDs for athletes in Kenya, 52.4% (131), followed by dealer suppliers 44.8% (112). Other mentioned source of PEDs as shown in Figure 6, were General Practitioners 40.4% (101), clinical officers 36% (90), internet 30% (75), athletes' technical staff 27.6% (69), Gym trainers 26% (65), team members 18.4% (46), sport scientist 16.8% (42), researchers 7.2% (18), and athlete family 9.3% (34).

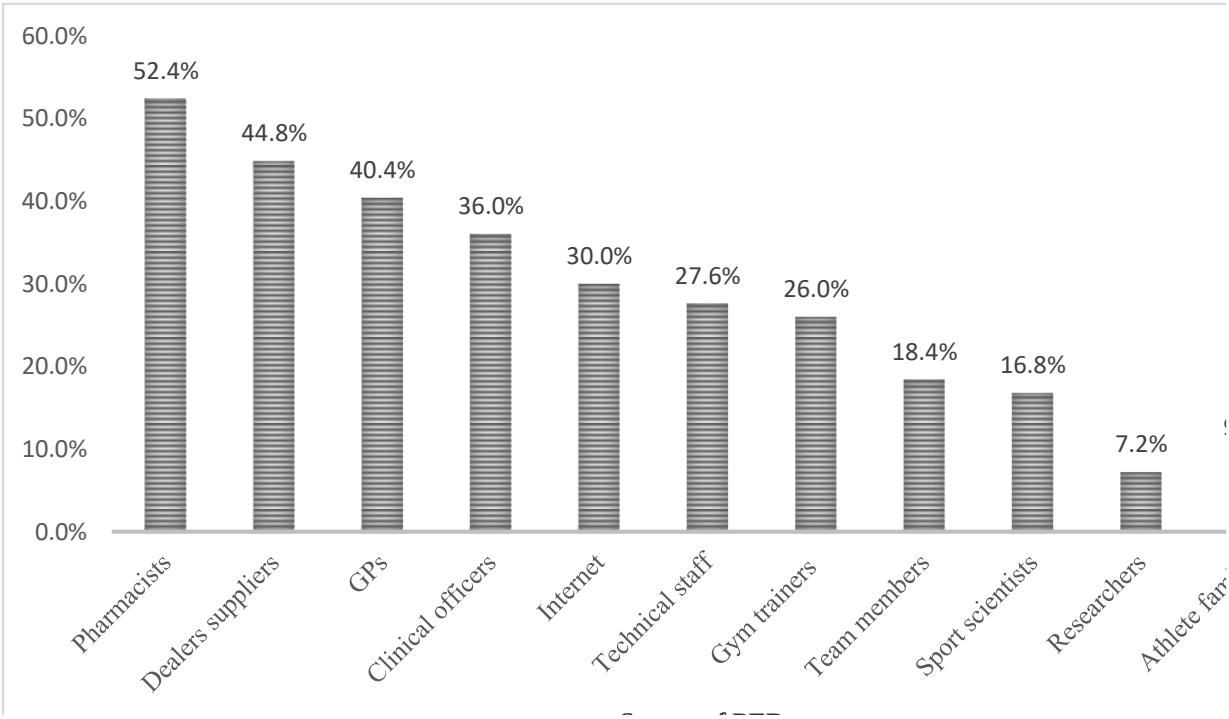

Figure 6. GP Opinion about source of doping substances

Views on what motivate General Practitioners to help athletes to dope

The study revealed money as a significant cause for Kenya General Practitioners for assisting athletes in doping 86.1% (210). Other reported motives for General Practitioners helping athletes in doping includes weak doping regulations, 29.5% (72), ignorance 27.9% (68), ease of accessibility of doping agents 18.9% (46), and self-satisfaction, 15.6% (38), Figure 7.

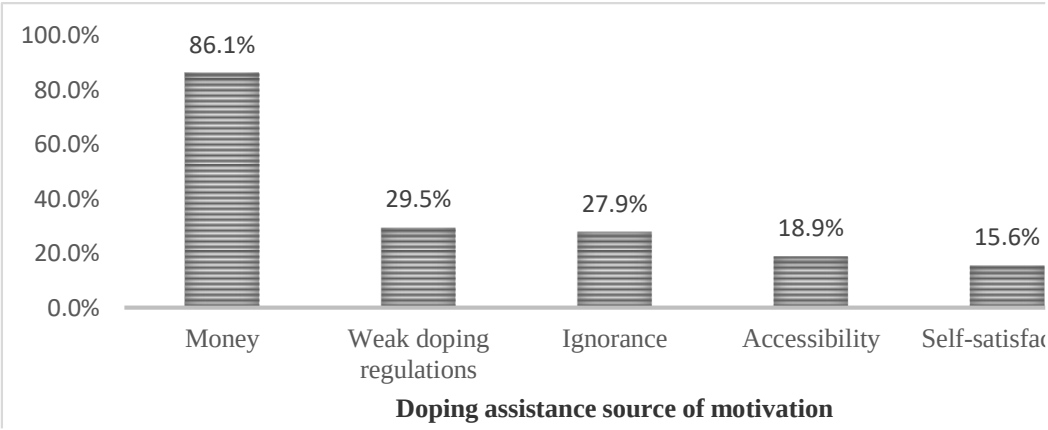

Figure 7. General practitioners' views on what motivate some to assist athletes' dope

DISCUSSION and CONCLUSION

This study aimed to establish Kenya's General Practitioners' knowledge of doping aspects such as prohibited substances, methods, and related issues. Our study further investigated the General Practitioners' attitude and experience with doping, including the source of doping substances.

The findings revealed that General Practitioners in Kenya were aware of WADA and ADAK as Kenya's central anti-doping regulatory bodies. Kenya's doping regulatory agencies, such as ADAK, have engaged in rigorous doping campaigns that involve anti-doping education and awareness, targeting athletes, coaches, medical practitioners, and athletes' immediate family members in Kenya. Specifically, ADAK has collaborated with KMPDC and athletic federations such as Athletic Kenya (AK) to pursue clean sports (ADAK, 2021). For example, in 2017, AK set up a Kenyan Doctor Network (KDN) to ensure its members (primarily athletes) do not engage with unethical doctors who may lure them into doping. The proactive involvement of the anti-doping agencies in Kenya is key to their popularity among the Kenya General Practitioners.

The General Practitioners, when asked to self-rate how informed they feel about doping, more than half, 50.8%, indicated their doping knowledge is average. In 2018 WADA listed Kenya in the "Category A" group implying Kenya athletes are at high risk of committing doping offenses (Athletic Kenya, 2022). As a member federation and signatory to the 2005 UNESCO Convention against doping, Kenya is placed with a huge responsibility to curb doping cases. This is only possible if all stakeholders, including general practitioners, are involved and have excellent doping knowledge. A concerning number, 32.8%, said their doping knowledge was below average and poor. Other studies have reported that medical practitioners possess insufficient doping knowledge necessary to treat and guide athletes on doping matters (Dikic et al., 2008; Yee et al., 2020). Overall, our findings revealed WADA and ADAK as a consequential source of doping information for the General Practitioners and can be utilized to foster their doping knowledge and regulations.

Worls Anti-Doping Agency (WADA) and ADAK have online platforms that aim to provide anti-doping education to all participants (WADA, 2021). While the Kenya General Practitioners can use this avenue to improve their doping acumen, the lack of proper quantifications such as attached value and ideal follow-up explains General Practitioners' low doping knowledge.

On knowledge of prohibited substances, methods, and substances prohibited in certain sports, our findings established that General Practitioners have inadequate knowledge. In the three categories, the General Practitioners reported insufficient knowledge of prohibited methods followed by the prohibited class of substances. General Practitioners in Kenya had little knowledge about cannabinoids being prohibited in specific sports, gene doping being a prohibited method, and anabolic agents being in the prohibited class of substances. The paucity of doping knowledge in these aspects limits the Kenya General Practitioners'

competence in treating athletes in compliance with WADA requirements. Similar findings were reported among Serbian general practitioners, and medical practitioners from the Balkan region (Bulgaria, Greece, Romania, Serbia, and Turkey), and South African general practitioners, where low doping knowledge was linked to a lack of doping topics in college, lack of interests in doping, and insufficient training (Dikic et al., 2008; Antic, 2017; Dorota & Derman, 2016; Starzak et al., 2021). In sports, low and even average doping knowledge incapacitates General Practitioners' ability to treat competitive athletes in line with anti-doping agencies' requirements and effectively contribute to the fight against doping. Antic (2017) acknowledges that General practitioners dealing with athletes require additional knowledge on drugs that are harmful to and prohibited for athletes. General Practitioners need decisive doping knowledge and its aspects, such as methods and regulations, to fully participate in anti-doping campaigns, promote fair play, and avoid sanctions from WADA and KMPDC.

The findings revealed that the work experience of General Practitioners mediated their doping knowledge, $p<.001$ (Table 3). General Practitioners with over 21 years of work experience demonstrated a higher doping knowledge compared to General Practitioners with a few years of work experience. The positive influence of work experience on the General Practitioners' doping knowledge could be attributed to the extended exposure to doping information and experience (Dikic et al., 2008). While there is no evidence to support this claim among our investigated General Practitioners, the trend from the collected data supports this view. A significant difference ($p< .001$) in doping knowledge was established between the different age categories, such that General Practitioners with over 21 years of work experience had more doping knowledge than General Practitioners with 11-15 years of work experience.

In terms of doping attitude, General Practitioners demonstrated a negative doping attitude. During their systematic review, Backhouse et al. (2016) made a similar observation that athlete support personnel, including General Practitioners, had a negative attitude toward doping. Poland physicians also reported a negative attitude that is vital in curbing doping (Domagala et al., 2018). These findings are linked to the recent doping criticisms and calls for healthcare providers to participate in anti-doping fights (Backhouse & McKenna, 2011). Kenya's general practitioners doping attitude is fundamental in the fight against doping because it determines their behaviors in doping matters and their willingness to support the course. In an earlier study conducted in France, General Practitioners supported using prohibited drugs that could cause athletes' addiction to the prescriptions (Laure et al., 2003). Such a report affirms the positive impacts of doping sensitization and sanctions involving healthcare providers. The findings revealed that most General Practitioners believed doping could be avoided and unnecessary. The doping attitude status of General Practitioners is essential because it guides their perceptions, ethics, and responsibilities in treating athletes and educating them against doping.

Work experience significantly influenced General Practitioners' doping attitude ($p = .008$), while General Practitioners with less work experience demonstrating some leniency towards

doping practices. General Practitioners who have been active for many years have experience with doping and its consequences for athletes (Lemettila et al., 2021). Similarly, more experienced General Practitioners are conversant with sanctions and may be more concerned with their moral value than relatively inexperienced General Practitioners. Donovan et al., (2014) suggests that if the threat of sanctions or rules is perceived as weak, General Practitioners may support athletes with doping because the weak regulations and lack of strong individual ethics facilitate a positive attitude towards doping. To counter doping support from General Practitioners, evidence suggests increasing doping awareness, including its health threats to athletes among healthcare providers (Backhouse & McKenna, 2011). Kenya's anti-doping agencies need to ensure active involvement of General Practitioners besides doping awareness education to foster their alertness in doping, which is pivotal in altering potential positive doping attitudes.

Our findings demonstrate that as many as 22% of General Practitioners were approached for doping information in the last 12 months. Athletes seek information such as drugs to aid and shorten recovery that is prohibited for athletes or require Therapeutic Use Exemption (TUE). Comparable findings were made with the physicians from the Balkan region, where 25% of the participants stated they had received doping requests for the past 12 months (Dikic et al., 2008). Our findings reveal how crucial it is to involve General Practitioners in anti-doping education. General Practitioners can be a great source of athletes doping education, an opportunity they can exploit when athletes reach out for doping assistance or treatment.

The findings showed anabolic steroids, corticosteroids, and peptide hormones as among the main PEDs substances athletes seek from General Practitioners. The findings support the WADA 2018 report on Kenya's anti-doping status, which revealed that Kenyan athletes' most commonly used PEDs are Nandrolone, corticosteroids, and EPO (WADA, 2018). Anabolic steroids or corticosteroids are allowed under TUEs because of their potential to stimulate muscle growth and enhance endurance (Huang & Basaria, 2018; Thorsby & Gjelstad, 2021). This capability makes anabolic steroids a significant target for athletes in resistance sports such as distance running, which Kenya is recognized for. Athletes can abuse corticosteroids to numb pain and inflammation that may be associated with some sports, such as marathons (Thorsby & Gjelstad, 2021).

The General Practitioners revealed that money, poor and weak doping regulations in Kenya are the main contributors to healthcare providers assisting athletes in doping. Chebet (2014) reported that ignorance and money are the leading cause of doping cases experienced in Kenya. The limited doping familiarity of Kenya General Practitioners reported demonstrates how reluctant General Practitioners are towards doping measures which inform the capacity of some unethical General Practitioners to abet doping. The lack of robust doping regulations and sanctions for General Practitioners in Kenya may appeal to the ethical behaviors of some General Practitioners to assist athletes' dope (Donovan et al., 2014; Mazanov et al., 2014). A case example of how General Practitioners in Kenya is ignorant of doping and its concept is from the medical practitioner who prescribed a Kenya 100m sprinter with prohibited drugs, Tramadol and Diprofos, leading to a positive doping test (ADAK, 2018). There is a chance

the involved medical practitioner was testing the effectiveness of Kenya's anti-doping regulations, ignorance, or motivation for money. Nonetheless, our evidence indicates the need for proper doping education and regulations for General Practitioners in Kenya.

Conclusion

Based on our findings, Kenya General Practitioners have inadequate doping knowledge. Specifically, General Practitioners have low familiarity in identifying prohibited substances, methods, and prohibited substances in certain sports. Notably, Kenya General Practitioners' doping knowledge is related to their work experience, as General Practitioners with more work experience demonstrate good doping knowledge.

Our study concludes that Kenya General Practitioners have a negative doping attitude. The study further notes that, General Practitioners' work duration/ experience considerably affects their doping attitude, whereas General Practitioners with a few years of work duration/ experience demonstrated leniency towards doping. The study further concluded that Kenya General Practitioners encounter doping prescription and information requests, with anabolic steroids, corticosteroids, and peptide hormones being the most sought-after PEDs. Pharmacists, drug suppliers, and General Practitioners were the primary source of PEDs, where money, ignorance, and weak doping regulations were the primary motivation for General Practitioners to assist athletes in doping.

Our study recommends the need for reliable and robust anti-doping training for General Practitioners in Kenya and proactive involvement in doping seminars and training. A collaborative approach between ADAK, KMPDC, and sports organizations can initiate a workable long-term solution needed to control doping in Kenya. There is a need to develop practical and realistic anti-doping policies, structures, or regulations for Kenya healthcare providers that define appropriate actions against health providers involved in doping. We also recommend a survey involving General Practitioners pulled from all over the country to provide a closer reflection of the current doping knowledge, attitude, and experience of the Kenya General Practitioners.

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Research Ethic Informations

Ethics Committee:

Kenyatta University Ethical Review Committee (KUERC) approved the study protocol (PKU/2307/11448) on 3rd August 2021

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