

Research Article

Knowledge, Attitude and Practice of Doping Among Athletes of Amhara Region, Ethiopia: Cross-Sectional Study

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Abstract

Introduction: Doping is the use of prohibited substances or methods to unfairly improve athletes' sporting performance. It's one of the greatest threats to fair sports competition as it is cheating and is contrary to the spirit of sport. This study assessed the knowledge, attitude, and practice of doping among athletes of the Amhara region, Ethiopia.

Methods: A cross-sectional study was conducted from November to December 2020, and simple random sampling was used to select 155 participants who were on training. The attitude and practice of doping were assessed using the Performance Enhancement Attitude Scale and Doping Use Belief respectively. Descriptive and multiple logistic regression analyses were computed using the statistical package for social sciences version 20.

Results: The study revealed acceptable reliability. Nearly two-third (59.2%; 95% CI: 52.5%, 67.1%) and below half (42.1%; 95% CI: 35.4%, 50.8%) of participants had knowledge on specific areas of doping and positive attitude on the effect of doping. 19 (10.5%; 95% CI: 6.5%, 15.2%) of participants had doping personal experience. Factors associated with knowledge were less than a year (AOR: 3.16, 95% CI 1.21-8.22) and 2-3 years of training (AOR: 2.03, 95% CI: 0.88-4.70), short (AOR: 0.24, 95% CI: 0.06-0.83) and medium distance runners (AOR: 0.46, 95% CI: 0.21-0.97). Age <18 (AOR: 0.37, 95% CI: 0.10-0.82) and 19-22 years (AOR: 0.82, 95% CI: 0.36-1.88) were associated with attitude. Being male (AOR: 0.16, 95% CI: 0.03-0.82), and single (AOR: 10.12, 95% CI: 2.35-43.50) were associated with doping practice.

Conclusion: Few study participants had a personal experience with banned performance-enhancing drugs. A high and moderate proportion of participants had good doping knowledge and attitude, respectively. Education, testing and, the punishment of offenders are recommended as doping prevention programs.

Keywords: Doping; Knowledge; Practice; Attitude; Ethiopia

Abbreviations

(AOR) Adjusted Odds Ratio; (CI) Confidence Interval; (COR) Crude Odds Ratio; (DUB) Doping Use Belief;

(IAAF) International Association of Athletics Federations; (PEAS) Performance Enhancement Attitude Scale; (SD) Standard Deviation; (WADA) World Anti-Doping Agency

Introduction

The use of drugs in sports goes back centuries, about at the very beginning of the concept of sports [1]. Despite fit-test of a nation athletes in ancient times were fed diets and given treatments [2], athletes were engaged in using drugs that were banned by world-wide national rules, international sport governing bodies, and World Anti-Doping Agency (WADA) to artificially enhance their performance [1]. However, the ultimate objective of the Olympic Games is not to win but to take part. The most important thing is not to have conquered but to have fought well [3].

Doping is the use of prohibited substances or methods to unfairly improve athletes' sporting performance. It is commonly practiced by breaking anti-doping rules. It's one of the greatest threats to fair sports competition as it is cheating and is contrary to the spirit of sport [4,5] According to WADA, doping is the occurrence of one or more of the eight anti-doping rule violations stipulated in the WADA code 2011 [6].

In recent years, due to a highly competitive sporting environment, athletes and athlete support personnel are under increasing pressure to win the competition in whatever means. The problem worsens due to the high availability of performance-enhancing substances and methods. Advancement in science and technology made an entry of new drugs into the market to treat ailments and improve health

conditions [7]. Unfortunately, some athletes try to gain an advantage by using performance-enhancing drugs. However, the phenomenon is not limited to elite athletes; young and amateur sports were also being practicing [8-10].

In track and field, Russia was the pioneer to receive a ban from international competition after the WADA results from an investigation of proven doping allegations. But now, the focus is shifting to other countries suspected of administering banned substances to better performance in athletics [11]. Kenya, Morocco, Ethiopia, Ukraine, and Belarus were such examples [12].

Four senior Kenyan track officials were suspended by the International Association of Athletics Federations (IAAF) in danger of a similar sanction after pending investigations into allegations they sought to cover up doping. A recent report revealed that positive drug tests began to report from top Ethiopian athletes next to Russians and Kenyans. The widespread doping and corruption also could shift the attention of the IAAF to the East African countries [13].

Recently, a positive test for banned substances was reported among Ethiopian athletes [14]. Ethiopia is one of the most dominant countries in the world of athletics [15]. After the evidence of loose anti-doping practices, the country is under the radar of international doping authorities [14].

Previous research reported many possible risk factors for illegal drug use. Doping is used to gain a competitive advantage over the opponent [16,17], speed recovery from or pain relief during injuries [18], improving the appearance [19], and knowledge about doping [20], doping attitude [17], and poor economic situation [21].

Athletes who were found using banned substances will receive a competition ban for a length of time which reflects the severity of the infraction. Moreover, athletes who are found to have banned substances in their possession, or refuse to submit to drug testing will also ban from the sport. Athletes who test positive for prohibited recreational drugs or minor stimulants which serve little performance-enhancing effects for competitors in athletics sports will result in short competitive bans [22]. Besides, doping jeopardizes the moral and ethical basis of sport [23] and produces long term medical problems [1]. Furthermore, it will spoil the integrity of the sport in the country, which has been the source of national pride for a long time. Therefore, this study assessed the knowledge, attitude, and practice of doping among athletes of the Amhara region, Ethiopia.

Methodology

Study area and period

This study was conducted from November 2020 to December 2020 at the Amhara region athletics training centers and clubs, North-East Ethiopia. Amhara National Regional State is one of the regions in the country with a high concentration of athletes training centers. This has been attributed to a good training environment characterized by hilly terrains and areas of high altitude. Yet, there are 2 athletics training centers and 4 athletics clubs in the region.

Study design

The institutional based cross-sectional study design was conducted at the Amhara region athletics training centers and clubs.

Sources and study population

This study enrolled all athletes who were registered and being trained under Amhara region athletics training centers and clubs. The scope of the events ranged from 800 to 10,000 meters of track races, cross country, and marathons.

Inclusion criteria and exclusion criteria

All athletes who gave their consent to participate were included in the study. Athletes who refused to participate in the study and not available during data collection were excluded. Participants who had not participated in a competitive game or competition in the past year were also excluded.

Dependent variables

The dependent variable of the study was knowledge, attitude, and practice of doping.

Independent variables

The independent variables of this study were the socio-demographic characteristics of athletes.

Sample size determination and sampling procedure

The sample size was determined by using a single proportion formula using 50% prevalence, 95% confidence level, 5% tolerable sampling error, and a 10% non-response rate. There were 258 registered athletes under Amhara region athletics training centers and clubs, the sample size was adjusted, and finally, 155 participants were included in this study. Simple random sampling was used to select the study participants.

Data collection tools and procedures

An interviewer administered questionnaire was used to collect the data. To measure the knowledge of the doping, a 16 item questionnaire was used to test different aspects of doping which included; knowledge of prohibited substances, doping procedures, and risk of using nutritional supplements. The questions were adapted from WADA [1,4].

The attitude of athletes towards doping was assessed using the Performance Enhancement Attitude Scale (PEAS) developed by [24,25]. The attitude statements are measured by a 6 point Likert-type scale with points ordered from strongly disagree (1), disagree (2), slightly disagree (3), slightly agree (4), agree (5) and strongly agree (6). There were no neutral scores and all items scored in the same direction, in favor of doping.

Athletes' doping practice was assessed by Doping Use Belief measures (DUB). Doping Use Belief measures expressed the presumed opinion regarding doping use whether doping should be allowed for top and all level athletes or not [25]. Participants were asked to select one of the 3 responses: 'yes, without restrictions', 'yes, with restrictions,

and ‘absolutely not’.

The questionnaire was translated into the local language (Amharic) and then back translated to English to check message consistency. Two pharmacists from Wollo University did the forward translation. Then, the Amharic version of the questionnaire was sent to three-sport sciences professionals, who translate it back to the English language. Finally, the researchers made the comparison. The discrepancy was resolved through discussion among the two translating groups.

Data management and analysis

The pretest test was carried out in 5% of athletes to test study tools and instruments in a setting other than the study area. All collected data were examined for completeness, accuracy, and consistency during data collection, analysis, and interpretation. There was no missing data. Data were entered and analyzed using the Statistical Package for Social Sciences version 20. Cronbach’s alpha was calculated to determine the internal consistency of the questionnaires. Reliability was considered to be good if $\alpha > 0.70$. Exploratory factor analysis was computed using principal factor analysis and Maximum Likelihood factor analysis to test construct validity.

Multiple linear regressions were computed for variables with a p -value < 0.25 in bivariate logistic regression analyses, and variables with a $p < 0.05$ were taken as statistically significant for the association between predictor variables and HRQoL. Results were presented as standard deviation (SD), percent, adjusted odds ratio (AOR), crude odds ratio (COR), 95% Confidence interval (CI), and p -value. Analyses of subgroups and interactions were not done.

Each section was marked independently out of 100% and the total score for all the sections was computed and an overall mean score was then calculated. The frequency and percentage of each item on the PEAS scale were also computed. The higher score indicated a more positive attitude toward doping.

Ethics approval and consent to participate

The study was approved by the Ethics Review Committee of the college of medicine and health science, Wollo University (406/13/13). The study participants involved in the study were informed about the nature and objectives of the study. Adult athletes gave their informed consent, while parental consent was obtained for adolescent athletes. Then, the study was conducted after the participant confirmed their willingness to take part in the study. Confidentiality was maintained throughout the study using codes instead of personal identifiers.

Results

Psychometric characteristics of the tools

The internal consistency of the scale for the knowledge questions (Cronbach $\alpha = 0.67$), PEAS (Cronbach $\alpha = 0.52$), and DUB (Cronbach $\alpha = 0.43$) was below the customary

cutoff value (Cronbach $\alpha = 0.70$). Results of the exploratory factor analyses were summarized in the supplementary file. Knowledge questions (16 items) factor loadings ranged between 0.40 and 0.88. Factor loadings on the 6 items of the DUB ranged between 0.30 and 0.68. Factor loadings on the 17 items of the PEAS ranged between 0.47 and 0.79. The mean PEAS scores were above the theoretical mid-point (64.0 with a 6-point scale) indicating a favorable explicit attitude toward doping in the study setting (Table S1).

Socio-demographic characteristics of participants

The response rate of this study was 98.7% due to refusal. Nearly two-thirds of the study participants (63.8%) were male. The majority of the participants were above the age of 22 years (43.4%). Participants were ranged from 16-37 years of age with a mean age of 20.9 ± 3.7 . More than half of the participants completed secondary education (55.3%). Concerning athletics discipline, 59.2% were long distance runners. Nearly half (48.0%) of the participants were on training for 2-3 years. The average length of training was 2.62 ± 1.6 . Only 13.8% and 14.5% of participants were taken training and undertake doping tests (Table 1).

Table 1: Socio-demographic characteristics of participants (n=252)

Variables	Frequency	Percentage	
Sex	Male	97	63.8
	Female	55	36.2
Age	<18	50	32.9
	19-21	36	23.7
	>22	66	43.4
Educational status	Primary	25	16.4
	Secondary	84	55.3
	College and above	43	28.3
Marital status	Single	138	90.8
	Married	14	9.2
Duration of training in the center	<1	41	27
	02-03	73	48
	>4	38	25
Athletics discipline	Short	15	9.9
	Medium	47	30.9
	Long	90	59.2
Training	Yes	21	13.8
	No	131	86.2
Doping test	Yes	22	14.5
	No	130	85.5

Doping knowledge

The administration of banned substances was answered by 78 (51.3%) of participants. Only 38 (25.0%) of participants knew about trafficking in prohibited substances. Two-third (66.6%) of participants knew the announcement of special financial rewards (Table 2)(Table S2). Over half (53.3%; 95% CI; 45.9%, 61.2%) of participants knew the definition of doping.

Table 2: Participants knowledge on the definition of doping (n=152)

Variables	Frequency	Percentage
Administration of banned substances	78	51.3
Announcement of special financial rewards	101	66.6
Enhancing performance with high altitude training	112	73.7
Inadvertent use of prohibited drugs	70	46.1
Power enhancement using special nutritional supplements	78	51.3
Presence of prohibited substance in doping urine sample	79	52
Refusing to undergo doping sample collection	64	42.1
Tampering with doping sample collection	62	40.8
Trafficking in prohibited substances	38	25

Nearly two-thirds (59.2%; 95% CI; 52.5%, 67.1%) of participants knew specific areas of doping. Prohibited substances and methods were answered by 91 (59.9%) of participants. Sanctions on anti-doping rule violations were correctly answered by two-third (65.8%) of participants. Over half of the participants knew supplements and the health consequences of doping (Table 3).

Table 3: Participants knowledge on specific areas of doping (n=152)

Variables	Frequency	Percentage
Prohibited substances and methods	91	59.9
Testing procedures	61	40.1
Supplements	82	53.9
Health consequences of doping	81	53.3
Sanctions on anti-doping rule violations	100	65.8

Doping attitude and belief

Below half (42.1%; 95% CI; 35.4%, 50.8%) of participants had a positive attitude on the effect of doping. Concerning athlete doping beliefs, the majority of the participants believe that athletes at any level should not allow using performance-enhancing drugs/methods (Table 4).

Table 4: Participants belief in doping (n=152)

Variables	Frequency	Percentage	
Performance-enhancing drugs should be allowed for top-level athletes	Yes, without restrictions	4	2.6
	Yes, but with restrictions	16	10.5
	Absolutely not	132	86.8
Performance-enhancing drugs should be allowed for all athletes	Yes, without restrictions	3	2
	Yes, but with restrictions	7	4.6
	Absolutely not	142	93.4

Doping practices

19 (10.5%; 95% CI; 6.5%, 15.2%) of participants had a personal experience with banned performance-enhancing

drugs. 19 (12.5%) of the participants had ever been offered a doping agent/methods by their colleagues, a member of the coaching staff, or a member of the family. Moreover, 15 (7.9%) of the participants stated usage of a banned performance-enhancing drug/method in their life, with 7(4.6%) of them admitting to current use. Thirty-one (20.4%) of participants reported that they knew someone in the sports community who has used doping substances, while 29 (19.1%) stated they knew someone who has used doping substances or methods but was not certain (Table 5).

Table 5: Participants doping practice (n=152)

Variables	Frequency	Percentage	
Personal experience with banned performance-enhancing drugs	Yes	15	7.9
	Yes, but only for treating a medical condition	4	2.6
	No	118	77.6
	I do not wish to answer	18	11.8
Current use of banned performance-enhancing drugs	Yes	7	4.6
	Yes, but only for treating a medical condition	1	0.7
	No	139	91.4
	I do not wish to answer	5	3.3
Offered doping agents	Yes	19	12.5
	No	133	87.5
doping	Yes, Certainly	31	20.4
Know people in the sports community who have used doping	I believe so, but I'm not sure	29	19.1
	No	92	60.5

In the backward multiple linear regression, duration of training and athletics discipline was significantly associated with knowledge on doping. Age and receiving training on doping associated with an attitude of doping while participants' sex and marital status had a statistically significant association on the practice of doping. Participants who had less than a year and 2-3 years of training were 3.16 times (AOR: 3.16, 95% CI 1.21-8.22) and 2.03 times (AOR: 2.03, 95% CI: 0.88-4.70) to have a better knowledge on doping as compared to participants who had more than 4 years of training. Short and medium distance runners were 76% (AOR: 0.24, 95% CI: 0.06-0.83) and 54% (AOR: 0.46, 95% CI: 0.21-0.97) less knowledge on doping respectively. Participants less than 18 and 19-22 years of age were 63% (AOR: 0.37, 95% CI: 0.10-0.82) and 18% (AOR: 0.82, 95% CI: 0.36-1.88) less attitude on doping respectively. Male participants were also 84% (AOR: 0.16, 95% CI: 0.03-0.82) less likely to practice doping than female counterparts. Single participants practiced doping 10.12 times (AOR: 10.12, 95% CI: 2.35-43.50) as compared to married participants (Table 6).

Table 6: Factors associated with knowledge, attitude, and practice of doping (n=152)

Variables	Doping		COR,95%CI	AOR,95%CI	P-value
	Yes N (%)	No N (%)			
Duration of training in the centera					
<1	18 (43.90)	23 (56.10)	2.45, 0.98-6.11	3.16, 1.21-8.22	0.01
02-03	38 (52.05)	35 (47.95)	1.77, 0.78-3.99	2.03, 0.88-4.70	0.09
>4	25 (65.78)	13 (34.22)	1	1	
Athletics discipline ^a					
Short	11 (73.33)	4 (26.67)	0.30, 0.09-1.02	0.24, 0.06-0.83	0.02
Medium	29 (61.70)	18 (38.3)	0.51, 0.25-1.06	0.46, 0.21-0.97	0.04
Long	41 (45.55)	49 (54.55)	1	1	
Age ^b					
<18	14 (28.0)	36 (72.0)	0.38, 0.17-0.85	0.37, 0.10-0.82	0.14
19-21	17 (47.22)	19 (52.78)	0.89, 0.39-2.01	0.82, 0.36-1.88	0.04
>22	33 (50.0)	33 (50.0)	1	1	
Receiving training ^b					
Yes	5 (23.80)	16 (76.20)	2.62, 0.90-7.58	0.36, 0.12-1.06	0.05
No	59 (45.03)	72 (54.97)	1	1	
Sex ^c					
Male	14 (14.43)	83 (85.57)	0.22, 0.04-1.02	0.16, 0.03-0.82	0.02
Female	2 (3.63)	53 (96.37)	1	1	
Marital status ^c					
Single	11 (7.97)	127 (92.03)	6.41, 1.82-22.49	10.12, 2.35-43.50	0.01
Married	5 (35.71)	9 (64.29)	1	1	

Discussion

This study assessed the knowledge, attitude, and practice of doping in the Amhara region using a uni-dimensional WADA knowledge question, PEAS, and DUB with lower internal consistency and acceptable reliability. The present study revealed that over half (53.3%; 95% CI; 45.9%, 61.2%) of participants knew the definition of doping. The proportion of participants who knew doping definition was higher than Ugandan athletes where 10% of the athletes acknowledged a knowledge deficit [26]. The discrepancy was attributed to the type of included sport in the study. The present study only included short to long distance runners while, the Ugandan study addressed four contact team sports (basketball, football, handball, and rugby).

In this study, we observed that nearly two-thirds (59.2%; 95% CI; 52.5%, 67.1%) of participants knew specific areas of doping. This finding compared with previous findings reported from Uganda [26]. The proportion of participants who knew about specific aspects of doping was even higher (39%) according to another study from Korea [27]. Another qualitative study also reported a moderate level of doping knowledge among junior athletes [20]. The difference might be due to the differences in the composition of study subjects. Athletes commonly described receiving insufficient doping education during adolescence for the knowledge gap [28].

The present study reported that below half (42.1%; 95% CI; 35.4%, 50.8%) of participants had a positive attitude on the effect of doping. A study from Korea reported that higher proportions of participants (53.4%) had permissive

attitudes toward doping compared to those who were unaware [27]. The overall mean PEAS score among Ugandan study participants was also 39.8 ± 14.8 [26]. Another study reported a non-significant association of athletes' win and goal orientation and competitiveness on doping behavior, but win orientation affects doping attitude [25]. The difference in culture among countries was the reason for the discrepancy among findings.

19(10.5%; 95% CI; 6.5%, 15.2%) of participants in the present study had a personal experience with banned performance-enhancing drugs. The proportion of doping practice was consistent with Uganda athletes where 9.3% of the study participants had been offered a doping agent at some point [26]. However, another study from Korea also reported lower practice of doping among adolescent and adult athletes regarding inadvertently (1.5 and 3.6%, respectively) or knowingly (1.0 and 2.8%, respectively) usage of banned performance-enhancing substances [27]. Satisfactory consumer behavior was also reported among West-Austrian junior athletes' [29]. The prevalence of blood doping in samples collected from international athletics competitions ranged from 1% to 48% for subpopulations of collected samples and a mean of 14% for the entire study population [30]. The possible explanation for this difference might be due to variation in the study area and composition of study participants.

This study further revealed that over half (53.3%) of participants knew the effects of the drugs. Previous research has shown that many supplements in the market contain banned substances such as stimulants, hormones, and

pro-hormones [31]. Athletes look for this substance as a means of enhancing their hormone levels for better performance [32]. As a result, these substances are prohibited as they are considered to be unfair means of winning against those who exhibit their natural potential in sports performance [33,34].

This study found that duration of training and athletics discipline was associated with the knowledge of athletes on doping. Male parents demonstrated significantly better knowledge about doping and its side effects [35]. Beyond the use of doping, very little is known regarding the use, safety, and efficacy of performance-enhancing drugs and nutritional supplements [36].

The present study reported that the age of participants was significantly associated with attitude toward doping. Males [37] and parental pressure [38] tended to express a more permissive attitude toward performance-enhancing methods. The strong moral stance against cheating, an identity beyond sport, self-control, and resilience to social group pressures will promote moral decision making and assist the development of anti-doping attitudes. However, due to complex behavior, it cannot be prevented by focusing on the individual athlete solely. Thus, contextual factors beyond the athlete's control should be controlled [20]. Hence, an anti-doping culture in the athletes' environment was considered responsible for an anti-doping stance [16].

In this study, we found that the sex and marital status of participants were associated with practice doping. Doping is associated with long term side effects [17] especially when used in combination [39]. Doping even harms non-doping athletes and society [33]. A holistic approach to doping choices, health issues, and life goals is needed to make informed decisions about athletes' performance enhancement [40]. Moreover, developing intervention skills and increasing awareness of reporting lines could enhance community responsibility for doping prevention [41].

The individual interest and the associated commercialism surrounding the game forced athletes to use performance-enhancing drugs. Prohibited drugs are a form of cheating [1] and affect the moral and ethical basis of sport and the health of those involved in it [8,9]. It also produces long term medical problems for the athletes who use them [42]. Athletes should rely on diet, effort, and lifestyle for success [13,43]. As athletes intentionally or unintentionally exposed this substance, identification of performance-enhancing drugs and assessment of the possible means of exposure could be the major areas that need immediate action to tackle the problem that our athletics sport is currently facing.

The present study has associated limitations. As the study participants were requested to respond practice of doping based on their life experience, recall bias was introduced. The very sensitive nature of the study might also result in social desirability bias. The cross-sectional nature of the study hinders temporal relationships. Despite the present study has limitations, the finding can be generalized to larg-

er population.

Conclusion

In this study, nearly two-third and below half of participants had good doping knowledge and attitude, respectively. A few study participants had a personal experience with banned performance-enhancing drugs. Duration of training and athletics discipline was significantly associated with knowledge on doping. Age and receiving training on doping associated with an attitude of doping while participants' sex and marital status had a statistically significant association on the practice of doping. The Ethiopian Athletics Committee, Ethiopian Olympics Federation, IAAF, and WADA in collaboration should take the most active measures to remove drugs from training and competition through education of coaches and athletes, testing of athletes and, the punishment of offenders.

Consent for Publication

None

Availability of Data and Materials

All relevant data are within the manuscript.

Competing Interests

The authors have declared that no competing interests exist.

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Authors' Contributions

SAM analyzed and wrote the manuscript. All authors proof-read and approved the final version of this manuscript.

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