

ORIGINAL RESEARCH**Knowledge and attitude of medical interns about doping and its regulations**

Mohammad Hassabi¹, Shahin Salehi², Mehrshad Poursaeidesfahani², Amir Hosein Abedi Yekta², Ali Parsoon³, Behnaz Mahdaviani^{4*}

1. Assistant Professor of Sports Medicine, Taleghani Hospital Research Development Committee, Department of Sports Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2. Assistant Professor of Sports Medicine, Department of Sports Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
3. Medical Doctor, Department of Sports Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
4. Sports & Exercise Medicine Resident, Department of Sports Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

*Corresponding Author:

Address: Department of Sports Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Email: behnazmahdavian@gmail.com

Date Received: November, 2019 Date Accepted: February, 2020 Online Publication: February 15, 2020

Abstract

Objective: Doping is known as an important public health problem. Prominent sports events can be blemished due to doping. The role of general practitioners as an important part of the health system in the prevention of doping is obvious. Previous studies have shown they have been presumed themselves ill-prepared in dealing with this topic. This study set out to investigate the amount of knowledge and attitude among medical interns toward doping.

Materials and Methods: This cross-sectional study was conducted on 100 medical interns in Taleghani hospital, Tehran, Iran. Subjects were asked to complete a 35-item questionnaire. The questionnaire consisted of four parts: demographic data, status of physical activity, knowledge, and attitude. Knowledge was measured by questions regarding identifying prohibited drugs, adverse effects of banned drugs, WADA as an original source of published list of prohibited drugs, and regulations related to anti-doping rules violation. The attitude was measured based on a 5-point Likert scale. The more negative attitude toward doping was shown by higher scores.

Results: The mean age was 25.39±1.43. Only 8% of students were familiar with WADA as an original source of doping. Approximately 90% of students were not aware of sanctions of anti-doping rules infraction. 65%, 33% and 2% of our subjects had poor, good and very good knowledge respectively. The mean score of attitude was 19.68±2.88.

Conclusion: Our findings revealed, the senior medical students had negative attitudes toward doping and also their level of knowledge was poor in this regard.

Keywords: Doping in sports; Attitude, Knowledge; Students; Medical

Introduction

The socio-economic and political benefits of sports have been evident worldwide (1). The use of illegal substances to enhance performance (doping) is known as an important public health problem (2), which can lead to several health problems for the athletes (3, 4). The origins of doping in sports go back to the creation of the sport itself (5, 6). The prominent sports events can be blemished due to doping, such as the Tour de France (7, 8). World Anti-Doping Agency (WADA) publishes a list of banned drugs and techniques annually in order to deal with this issue (7).

Drugs have been widely used in order to enhance the performance (9, 10), especially in athletes. Ephedrine has been reported to be used by 2.8 million US athletes to provide additional stimulation (1). It has also been demonstrated that most of the general practitioners (GPs) has been faced with doping cases (11). GPs are known as an important part of the health system in dealing with doping (12). However, they have poor knowledge on doping (11, 13).

Previous studies have shown GPs has been presumed themselves ill-prepared in dealing with this topic, however most of them have considered their important role to cope with doping (13).

Prescribing Neurofen, over-the-counter stimulants containing ephedrine, in Sydney Olympic is a good example of the poor knowledge of physicians, which resulted in the revocation of a gold medal in Gymnastic. Also, physicians had their licenses suspended for two years (14). According to the WADA, the development of anti-doping contemplation and accomplishment can be achieved through qualified educational planning (13). Only a small number of GPs have noted that they were provided with courses on doping in their higher education curriculum (7). This study aimed at determining the level of knowledge and attitude of medical interns on doping as senior medical students.

Materials and Methods

This cross-sectional study was conducted on 100 medical interns in Taleghani hospital affiliated to the Shahid Beheshti University of Medical Sciences from October to December 2019. The Institutional Review Board of the Shahid Beheshti University of Medical

Sciences approved the study protocol. Subjects who agreed to participate in the study were asked to complete a 35-item questionnaire. The questionnaire consisted of four parts assessing different characteristics of the subjects: 1) demographic data (4 items), 2) status of physical activity (1 item), 3) knowledge (25 items), and 4) attitude (5 items). Its validity was calculated in a previous study (15). The status of physical activity was defined as active and inactive. Subjects were classified as active by doing at least 150 min of physical activity per week.

Knowledge was assessed by 25 questions regarding identifying prohibited drugs, adverse effects of the banned drugs, WADA as an original source of a published list of prohibited drugs, and regulations related to an anti-doping rule violation. The total score was measured by counting the correct answers.

Knowledge scores were categorized in three classes, including poor ($\leq 60\%$), good (61–83%), and very good ($\geq 84\%$) as described by Auersperger et al. (13) and Wanjek et al. (16).

The attitude was evaluated via a 5-point Likert scale. Considering 5 attitude questions, its score ranged 5-25 and high scores indicated more negative attitude toward doping.

The questionnaire was tested with 30 students before the study and the questions were corrected, if needed. For statistical analysis, IBM Statistical Package for Social Scientists (SPSS) Version 23 was used. Independent-Sample T-Test and one-way analysis of variance (ANOVA) test were used to compare the means of quantitative variables. A P value of less than 0.05 was regarded significant.

Results

The statistical population consisted of 100 medical interns with female to male ratio of 48:52. The mean age of participants was 25.39 \pm 1.43 years and 30% of them resided in dormitories, where as others lived in their own houses. In addition, 14, 30, 31, and 25 subjects were studying in the 1st, 2nd, 3rd, and 4th semesters of the internship, respectively. Moreover, 23% of the interns stated that they had regular physical activity.

Based on the obtained results, 65%, 33%, and 2% of our subjects had poor, good and very good knowledge regarding doping, respectively. Table 1 demonstrates the frequency of students who were familiar with

different banned drugs. Chi-square test results showed no significant difference in knowledge score between male and female students who resided in the dormitory and the others who studied in the 1st, 2nd, 3rd and 4th semesters (p -value=0.736, 0.489, and 0.71, respectively). As shown in figure 1, the difference between active and inactive subjects was statistically significant ($p= 0.004$). A considerable fraction of our samples (92%) were not familiar with WADA as a primary source of information about doping. Only 9% of the students knew sanctions for anti-doping rules violation committed by the athletes. This number increased to 11% when they were asked for the penalty for the team physicians. In addition, 39% of the subjects were classified in the poor category in terms of knowledge about the adverse effects of banned drugs. The mean score of attitude was 19.68 ± 2.88 . Based on the results, 65% and 34% of medical students selected strongly agreed and agreed with choices, respectively, when they were asked about the role of the physician in the prevention of doping. As seen in table 2, attitude was not affected by sex, the semester of internship, place of living, and the status of physical activity.

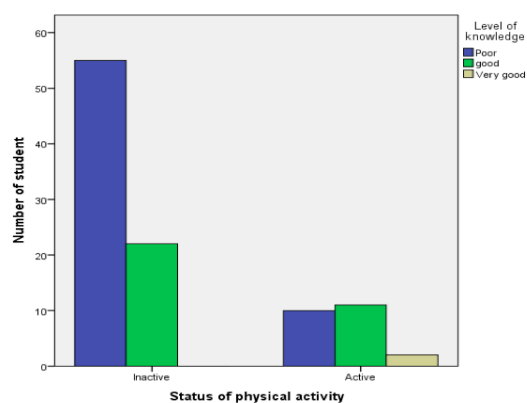


Figure1. Level of knowledge and physical activity

Drug	Percentage of students answered correctly (n=100)
Salbutamol inhaler	66
Lidocaine Topical	73
Erythropoietin	64
Furosemide	49
Prednisolone	31
Ibuprofen	72
Beclomethasone inhaler	69
Hydrocortisone Topical	36
Buprenorphine	62
Acetaminophen Codeine	55
Tamoxifen	34
Insulin	47
Nandrolone	68
Somatropin	72
Diclofenac Jel	87

Table 1. Percentage of students were familiar with different prohibited drugs

	Mean of Attitude
Male	19.44
Female	19.94
<i>p</i> -value	0.393
Home	19.83
Dormitory	19.33
<i>p</i> -value	0.433
1 st Semester	20.00
2 nd Semester	19.87
3 rd Semester	19.74
4 th Semester	19.20
<i>p</i> -value	0.836
Active	19.00
Inactive	19.88
<i>p</i> -value	0.139

Table 2. Mean of attitude score among different groups of students.

Discussion

Although some athletes are exposed to doping unconsciously (1), performance enhancement is a common cause to use illicit drugs by some athletes (17). In this study, we aimed at determining the level of knowledge and attitude of the medical interns toward doping.

According to the obtained results, 99% of medical students believed that physicians had a substantial role in the prevention of doping. This finding is consistent with that of Woods and Moynihann (91%) (18) and Laure et al.(89%) (11) studies. However, it was reported 69% by Auresperger et al.(13).

Our findings revealed that only 8% of the students were aware that WADA publishes a list of prohibited drugs. In a study in Greece, 25% of the subjects were informed about the WADA role (19).

In a review article (2011), the knowledge score of the physicians was poor(20). In this study, approximately two-thirds of the students had poor knowledge, as well. Most of the subjects had a negative attitude toward doping, which is consistent with a review of six studies on the attitude of the European GPs(20). As mentioned above, one of the biggest doping scandals in Olympics history occurred at the 2000 summer Olympics in Sydney. It showed that the lack of knowledge in physicians can make such problems both for themselves and the athletes. Another important finding was that most of the students scored over 60% in the knowledge about adverse effects. This finding further supports the idea of Auersperger et al. (13) who reported that the lack of knowledge in medical students was due to more specific ambiguities regarding doping and its regulations and rules.

The level of knowledge was not statistically different between male and female students, which was consistent with the findings of the study by Auersperger et al.(13). We found that students who had regular physical activity were more familiar with doping. However, further studies are needed to confirm this result.

Our subjects were selected from undergraduate students that can be regarded as both the strength and weakness of the study. Studying interns as senior medical students can represent the advantages and disadvantages of their university curriculum. However, it can be a source of bias owing to the underestimating the level of knowledge.

References:

1. Awaisu A, Mottram D, Rahhal A, Alemrayat B, Ahmed A, Stuart M, et al. Knowledge and Perceptions of Pharmacy Students in Qatar on Anti-Doping in Sports and on Sports Pharmacy in Undergraduate Curricula. *Am J Pharm Educ.* 2015;79(8):119.
2. Catlin DH, Fitch KD, Ljungqvist A. Medicine and science in the fight against doping in sport. *J Intern Med.* 2008;264(2):99-114.
3. Momaya A, Fawal M, Estes R. Performance-enhancing substances in sports: a review of the literature. *Sports Med.* 2015;45(4):517-31.
4. La Gerche A, Brosnan MJ. Cardiovascular Effects of Performance-Enhancing Drugs. *Circulation.* 2017;135(1):89-99.
5. Giraldi G, Unim B, Masala D, Miccoli S, La Torre G. Knowledge, attitudes and behaviours on doping and supplements in young football players in Italy. *Public Health.* 2015;129(7):1007-9.
6. Barroso O, Mazzoni I, Rabin O. Hormone abuse in sports: the antidoping perspective. *Asian J Androl.* 2008;10(3):391-402.
7. Poussel M, Laure P, Latache C, Laroppe J, Schwitzer M, Koch J-P, et al. Specific teaching about doping in sport helps medical students to meet prevention needs. *Science & Sports.* 2013;28(5):274-80.
8. Baron DA, Martin DM, Abol Magd S. Doping in sports and its spread to at-risk

Conclusion

The most important finding of this study is that the senior medical students had negative attitudes toward doping and also their level of knowledge was poor in this regard. Appropriate educational planning is necessary to achieve a higher level of knowledge. In addition, knowledge enhancement prevents many probable difficulties for physicians and athletes.

Conflict of interest

Authors declare no conflict of interest.

populations: an international review. *World Psychiatry.* 2007;6(2):118-23.

9. Prakash K. Performance enhancing drugs in sports and the role of doctors: are there guidelines? *Indian J Med Ethics.* 2013;10(2):115-7.
10. Dawson RT. Drugs in sport - the role of the physician. *J Endocrinol.* 2001;170(1):55-61.
11. Laure P, Binsinger C, Lecerf T. General practitioners and doping in sport: attitudes and experience. *Br J Sports Med.* 2003;37(4):335-8; discussion 8.
12. Hoberman J. Sports physicians and the doping crisis in elite sport. *Clin J Sport Med.* 2002;12(4):203-8.
13. Auersperger I, Topic MD, Maver P, Pusnik VK, Osredkar J, Lainscak M. Doping awareness, views, and experience: a comparison between general practitioners and pharmacists. *Wien Klin Wochenschr.* 2012;124(1-2):32-8.
14. Dikic N, McNamee M, Gunter H, Markovic SS, Vajgic B. Sports physicians, ethics and antidoping governance: between assistance and negligence. *Br J Sports Med.* 2013;47(11):701-4.
15. Keshavarz F. Validity and Reliability of Knowledge and Attitude Questionnaire of Interns of Shahid Beheshti University of Medical Sciences about Unauthorized Drugs in Sport [dissertation]. Shahid Beheshti University of Medical Sciences; 2018
16. Wanjek B, Rosendahl J, Strauss B, Gabriel H. Doping, drugs and drug abuse among adolescents in the State of Thuringia (Germany): prevalence, knowledge and

attitudes. *International journal of sports medicine*. 2007;28(04):346-53.

17. Al Ghobain M, Konbaz MS, Almassad A, Alsultan A, Al Shubaili M, AlShabanh O. Prevalence, knowledge and attitude of prohibited substances use (doping) among Saudi sport players. *Subst Abuse Treat Prev Policy*. 2016;11:14.

18. Woods CB, Moynihan A. General practitioners knowledge, practice and training requirements in relation to doping in sport. *Ir Med J*. 2009;102(1):8-10.

19. Panagiotis G. OD, Christos F., Jannis, P. S. Knowledge on and attitudes of doping in sport, of young trainees in internal and general-familial medicine. *Pharmacologyonline*. 2006;2:1-5.

20. Backhouse SH, McKenna J. Doping in sport: a review of medical practitioners' knowledge, attitudes and beliefs. *Int J Drug Policy*. 2011;22(3):198-202.