

Knowledge, attitude, and behaviour regarding doping in sports among physicians and pharmacists: a questionnaire-based study

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ABSTRACT

Doping is a very commonly reported issue among athletes. The World Anti-Doping Code (WADC), published by the World Anti-Doping Agency (WADA) has laid down the guideline to be followed in order to avoid anti-doping rule violation (ADRV). To explore the knowledge, attitude, and behavior of the physicians and pharmacists in relation to doping in sports.

In this cross-sectional prospective questionnaire-based study the participants (after obtaining consent) were asked to fill in an electronically sent (online) questionnaire anonymously. Out of 159 participants, the majority (47.2% and 73.6%) had knowledge of past cases of doping and knew the word “doping” ($p=0.026$). 56.10% of the male participants and 28.8% of the female participants opined that they have knowledge of past cases of doping ($p = 0.002$). Most respondents (57.2%) knew that over the counter medicines and dietary supplements might contain prohibited substances and 49.1% participants were aware that the name of prohibited substances might not appear on ingredients label ($p=0.038$). There was a significant difference in the physicians’ and pharmacists’ responses toward who should be mainly as advisor of dietary supplements ($p<0.001$). Despite small number of participants, our study has underlined the need for conducting awareness program at regular intervals regarding doping among the physicians and pharmacists in our country. However, more studies on this topic with larger sample size are required to actually gauge the knowledge, attitude, and behavior of the physicians and pharmacists in this regard.

Keywords: Doping, Knowledge, Attitude and behavior, Physicians, Pharmacists

Introduction

Despite the obvious responsibilities of the physicians, and pharmacists, towards the athlete as well as the entire sports community, there has always been a dearth in the studies exploring the knowledge, attitude, and behavior of the said person dealing with doping and anti-doping [1-5].

Thus, they are exposing themselves as well as the athletes to sanctions. They lack in their knowledge regarding their responsibilities as per the World Anti-Doping Code (WADC) [6]. Both prescribing physicians and pharmacists fall under the category of Athlete Support Personnel (ASP) as per to the WADC. An ASP is described as “any coach, trainer, manager, agent, team staff, official, medical, paramedical personnel, parent or any other person working with, treating or assisting an athlete participating in or preparing for sports competition” as per the WADC [6-10].

Thus, both the physicians and pharmacists associated with athletes clearly fall under the category of ASP [11]. Under Article 21.2, the roles and responsibilities of an ASP including both physicians and pharmacists have been clearly defined [6, 7]. As per the said rules the responsibilities of ASP (both physicians and pharmacists) include being aware of and being able to comply with the rules without being cooperative with testing of athletes,

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and fostering anti-doping attitude in the athletes associated with him or her. Any deviation (anti-doping rule violation; ADRV) from the rules laid down by the WADC means sanctions (which could mean life time ban under specific circumstances) for both the concerned athlete and the ASP.

There is a specific rule regarding circumstances under which sanctions are decided for ASPs (Article 2.8 WADA, 2009, p 25); these are “administration, attempted administration, assistance, encouragement, aiding, abetting, covering up, or any other type of complicity involving an attempted or actual ADRV” [6]. There are widely publicized cases where ASPs were sanctioned therefore underlying the fact that national and international anti-doping organizations took the guidelines and recommendations laid down by the WADA regarding ADRV seriously [8, 12, 13]. In the USADA (United States Anti-Doping Agency) three ASPs, two physicians and one trainer were suspended in relation to ADRV in the year 2012 [12, 13]. There are other instances of similar banning which include banning of coaches, agents of players, physicians, and ASPs around the world.

Thus, keeping in mind the serious consequences of ADRV, the ASPs should be adequately trained and informed about their specific duties as per the WADC. Thus, in order to promote doping free sports, avoid sanctions/penalties owing ADRV especially due to lack of awareness, it is of utmost importance to gauge the extent to which sports physicians and the pharmacists associated with athletes are aware of the WADC.

Literature review reveals that studies exploring the knowledge, attitude and behavior of physicians and pharmacists regarding doping and ADRV are seriously lacking. Majority of the published reports are from the Western countries except for few [14-18]. Data from the Middle East countries are very meager [18]. Keeping in mind the trend of participation of athletes from our country in various international events, understanding and abiding by the rules of WADC is of utmost importance. Therefore, the physicians and the pharmacists as the members of the ASP team bear the responsibility of making the other members (besides the athletes) like the coaches, trainers, etc. aware of the dope drugs and the ADRVs.

Thus the physicians and the pharmacists must have adequate and up to date knowledge on this topic. Again exploring the existing knowledge of the physicians and the pharmacists in this regard is also very important as it would help in planning the awareness programs required to both brush up and keep the awareness of the physicians and the pharmacists up to date.

In this prospective cross-sectional electronic questionnaire-based study we have explored the knowledge, attitudes, and behavior of the physicians and pharmacists using the platforms of Iraqi Medical Association and Iraqi Syndicate of Pharmacists in relation to doping in sports, and the individual and social factors involved.

Materials and Methods

This was a prospective cross-sectional anonymous study carried out among physicians and pharmacists. It was designed in the form of questionnaire-based survey. The questionnaire was

published online through the Iraqi Medical Association and Iraqi Syndicate of Pharmacists. Any member of either of the organizations was capable of participating in the study. The duration of data collection was from March 23rd to April 7th, 2020.

This study aims to explore the knowledge, attitude, and behavior in relation to doping in sports and to understand the individual and social factors involved in it. The participants who agreed to take part in this phase of study, were required to give their consent first.

The questionnaire included five sections. Basic understanding of doping was considered under the first section, knowledge about previous doping cases comes under the second, basic understanding of restricted ingredients in the composition of over the counter (OTC) medicines and dietary supplements comes under the third, the practitioner-athlete relation concerning anti-doping activities was fourth and finally the fifth section was about dealing with predisposition while attending a lecture on doping.

159 health care professionals (physicians and pharmacists) took part in the study voluntarily, anonymously. They chose their gender and profession in the first two questions (Q 1 and 2). For Q3 to Q10 except for Q7 and for Q13 there were two options “yes” and “no”. For Q 7 and Q 11 and Q12 there were more than two options.

All the participants included in the study, filled in the questionnaire electronically and submitted it.

Statistical analysis

This study used IBM SPSS v.22 software to perform all the statistical analysis. Demographics and respondents’ responses were illustrated by descriptive statistics. As categorical variables, these data were presented in percentages and frequencies. The association/difference between categorical variables were evaluated by Chi-square test (where, $p < 0.05$ was considered to be statistically significant).

Results and Discussion

In total 159 respondents were included in our online survey. The number of responding males was 107 (67.3%) and the number of responding females was 52 (32.7%). The number of responding males was higher than the responding females. There were 64 physicians (40.3%) and 95 (59.7%) pharmacists (**Table 1**).

Table 1. Sociodemographic Characteristics

Variable	N (%)
Gender	
Male	107 (67.3)
Female	52 (32.7)
What is your profession?	
Physician	64 (40.3)
Pharmacist	95 (59.7)

Table 2 reflects the frequencies and percentages of participants' responses to the rest of questions included in the questionnaire. In total, 75 (47.2%) respondents had knowledge of past cases of doping. Most respondents 117 (73.6%) knew the word "doping". However, a little percentage (20.1%) of respondents had attended a lecture on doping. On other hand, majority of the respondents (147; 92.5%) were interested to attend such lecture in future.

Item	N (%)
Do you know the word "doping"?	
Yes	117 (73.6)
No	42 (26.4)
Have you ever attended a lecture about doping before?	
Yes	32 (20.1)
No	127 (79.9)
Do you think that athletes are permitted to use the prohibited substance to improve their performance?	
Yes	43 (27)
No	116 (73.0)
Do you think athletes were never permitted to use the prohibited substance for medical treatment?	
Yes	76 (47.8)
No	83 (52.2)
How do you describe the doping violation in Iraq?	
Intentional doping	98 (61.6)
Unintentional doping	61 (38.4)
Do you know of any past cases of doping?	
Yes	75 (47.2)
No	84 (52.8)
Did you know that OTC medicines and dietary supplements might be containing prohibited substances?	
Yes	91 (57.2)
No	68 (42.8)
Did you know that the names of prohibited substance might not appear on the ingredient label on dietary supplement?	
Yes	78 (49.1)
No	81 (50.9)
Who do you think should mainly get involved in anti-doping activities for athletes?	
Doctor	57 (35.8)
Pharmacist	27 (17)
Nurse	1 (0.6)
Physical therapist	9 (5.7)
Nutritionist	19 (11.9)
Coach/trainer	45 (28.3)
All of them	1 (0.6)
Who do you think should be mainly as an advisor about dietary supplements?	
Doctor	40 (25.2)
Pharmacist	47 (29.6)
Nurse	2 (1.3)
Physical therapist	3 (1.9)
Nutritionist	58 (36.5)
Coach/trainer	8 (5)
All of them	1 (0.6)

Do you want to attend a lecture about doping in the future?	
Yes	147 (92.5)
No	12 (7.5)

Although a small percentage of respondents 43 (27.0%) had perception that athletes were allowed to use forbidden substances to enhance their performance, 116 (73.0%) participants had the correct belief that athletes are not permitted to use prohibited substances. 76 (47.8%) participants had perception that athletes were allowed to use such forbidden substances. 98 (61.6%) respondents indicated that most anti-doping violations were committed intentionally. However, most of the respondents (91 (57.2%)) had a knowledge about the restriction on OTC medicines and dietary supplements. 78 (49.1%) participants were aware that these substances are not clearly mentioned in the list of ingredients on product. Around one-third of them thought that the doctors should primarily get involved with anti-doping activities for athletes. However, 47 (29.6%) of the respondents thought that the pharmacists should primarily get involved in such advisory.

Table 3 presents the gender and profession distribution the respondents among each of these two groups. 60 (56.10%) males and 15 (28.8%) females indicated that they have knowledge of past cases of doping (significant difference $p = 0.002$). 51 (53.7%) pharmacists and 24 (37.5%) physicians had knowledge of past cases of doping indicating that pharmacists had participated in the survey had knowledge of past cases of doping more than the participating physicians.

Variable	Do you know of any past cases of doping?		P*
	Yes	No	
Gender			
Male	60 (56.1)	47 (43.9)	0.002
Female	15 (28.8)	37 (71.2)	
Profession			
Physician	24 (37.5)	40 (62.5)	0.065
Pharmacist	51 (53.7)	44 (46.3)	

*Chi-square test, $p < 0.05$ is considered statistically significant.

Table 4 represents the association between profession and thinking of who should be mainly as advisor of dietary supplements. The responded pharmacists indicated that pharmacists, nutritionists and physicians have the major involvement in advisor of dietary supplements for athletes, 44 (46.3%), 27 (28.4), 17 (17.9%), respectively. Whereas coaches, trainers and physical therapists have the lower involvement as advisor of dietary supplements 5 (5.3%) and 1(1.1%), respectively, only one pharmacist indicated that all of them get involved in advising dietary supplements.

Table 4. Association between Profession and Thinking of Who Should Be Mainly as Advisor of Dietary Supplements

Profession	How do you think should be mainly as an advisor about dietary supplements?							P*
	N (%)							
	Pharmacist	Physician	Nurse	Medical therapist	Nutritionist	Coach/trainer	All of them	
Pharmacist	44 (46.3)	17 (17.9)	0 (0.0)	1 (1.1)	27 (28.4)	5 (5.3)	1 (1.1)	<0.001
Physician	3 (4.7)	23 (35.9)	2 (3.1)	2 (3.1)	31 (48.4)	3 (4.7)	0 (0.0)	

*Chi-square test, p<0.05 is considered statistically significant.

The participating physicians indicated that nutritionists and physicians should have the major involvement as advisor of dietary supplements for athletes 31(48.4%) and 23(35.9%), respectively. Both coaches' trainers and pharmacists obtained three votes (4.7%) each, and physical therapists and nurses obtained two votes (3.1%) each. There was a significant difference in the physicians' and pharmacists' responses towards who should mainly be considered as advisor for prescribing dietary supplements (P <0.001).

17 (17.3%) of the respondents who thought that doping violation in Iraq is intentional had a perception that the athletes are allowed to use such forbidden substances to enhance their performance, whereas 81 (82.7%) of the participants had a perception that the athletes are not allowed to use such substances in order to enhance their performance. On the other hand, 26 (42.6%) participants who describe doping violation in Iraq as unintentional doping indicated that the athletes are allowed to consume the forbidden substances while 35 (57.4%) indicated that athletes aren't permitted to those substances.

There was a significant difference regarding the belief that the athletes are allowed to consume such products to enhance their performance and the doping violation in Iraq (p=0.001) (Table 5).

Table 5. Association between Description the Doping Violation in Iraq and whether Athletes Are Permitted to Use Prohibited Substances

How do you describe the doping violation in Iraq?	Do you think athletes are permitted to use prohibited substances to improve their performance?		P*
	N (%)		
	Yes	No	
Intentional	17 (17.3)	81 (82.7)	0.001
Unintentional	26 (42.6)	35 (57.4)	

*Chi-square test, p<0.05 is considered statistically significant.

There was a significant association between attending a lecture about doping and knowing the word doping (P=0.026). Twenty-nine (90.6%) of participants who had attended a lecture on doping knew the word "doping" (Table 6).

Table 6. Association between Knowledge about the Word "Doping " and Attending a Lecture about it before

Have you ever attended a lecture about doping before?	Do you know the word "doping"?		P*
	N (%)		
	Yes	No	
Yes	29 (90.6)	3 (9.4)	0.026
No	88 (69.3)	39 (30.7)	

Yes	29 (90.6)	3 (9.4)	0.026
No	88 (69.3)	39 (30.7)	

*Chi-square test, p<0.05 is considered statistically significant.

There was a significant association between attending a lecture and understanding the ethical concerns about the use of restricted OTC and other performance enhancing dietary supplements (P=0.038). Twenty-four (75.0%) of participants who have attended a lecture on doping know that the OTC medicines and dietary supplements might contain banned substances. Whereas, 67 (52.8%) participants who have never attended a lecture on doping know that OTC medicines and supplements might contain banned substances (Table 7).

Table 7. Association between Attending a Lecture about Doping before and Knowledge that OTC Medicine and Dietary Supplements Contain Prohibited Substances or Not

Have you ever attended a lecture about doping before?	Did you know that OTC medicines and dietary supplements might contain prohibited substances?		P*
	N (%)		
	Yes	No	
Yes	24 (75.0)	8 (25.0)	0.038
No	67 (52.8)	60 (47.2)	

*Chi-square test, p<0.05 is considered statistically significant.

In this study we have explored the understanding, viewpoint and behaviors of the physicians and pharmacists in relation to unethical use of drugs in sports, and to understand the individual and social factors associated with it.

In this questionnaire-based study, majority of the participants were males (107; 67.3%) and pharmacists (95; 59.7%) (Table 1). We could not find any apparent reasons for more male participation.

Most of the respondents (117; 73.6%) were aware of the term "doping"; although majority of them (127; 79.9%) did not attend any lecture regarding doping, most of them (147; 92.5%) wanted to attend such lectures in future. Thus it can be suggested that although there is insufficient awareness program on doping and anti-doping in our setting, the enthusiasm is high on the part of physicians and pharmacists regarding enriching their knowledge in this regard.

Although a small percentage of respondents (43; 27%) thought that the athletes were allowed for using banned substances to enhance their performance, it was nonetheless important enough

as an eye opener signifying the importance of awareness program in this regard. Again, many of the participants (76; 47.8%) thought that the athletes were restricted to consume such substances, even for medical reasons.

The majority of the respondents were of the opinion that in Iraq doping violations are intentional (98; 61.6%) and most of them opined (116; 73%) that the athletes are not allowed to consume banned substances to enhance their performance.

Although most of the respondents have not come across cases of doping among athletes (84; 52.8%), and many of them have past experience of such encounter (75; 47.2%); the difference was significant only for the first issue ($p < 0.002$) (**Table 3**). It is to be noted that male participants reported more number of encounters with cases of doping compared to their female colleagues.

Unintentional violation of rules is of serious concern as it might lead to life time sanctions to temporary ban depending upon the gravity of the circumstances. Majority of the participants (91; 57.2%) knew that OTC medicines and other dietary supplements might contain restricted substances and also that their inclusion might not appear on ingredients label (78; 49.1%).

Although majority (57; 35.8%) thought that doctors should primarily get involved in anti-doping activities for athletes, for advice regarding dietary supplements most of the participants opined that nutritionists should take major role (58; 36.5%). However, considering responses based on profession (physician or pharmacist) it is to be noted that physicians thought it is the nutritionist who should take major role regarding advice of dietary supplements but pharmacists responded that it is primarily their (pharmacists') responsibility (nutritionists' role came next to them); the difference of choice based on profession was significant ($p < 0.001$) (**Table 4**).

Again, analysis of the responses revealed that the association between describing doping violation (intentional or unintentional) in Iraq and whether the athletes are allowed to consume restricted substances was significant ($p < 0.001$) (**Table 5**). Out of the 98 respondents stating doping violation in Iraq to be intentional, 81 respondents opined that athletes were not permitted to use restricted substances to enhance performance and also among the 61 respondents stating doping violation in Iraq to be intentional, 35 respondents opined that athletes were not allowed to use restricted substances to enhance performance. In addition, the association between knowing the word "doping" and the experience of attending past lecture on the topic was effective ($p = 0.026$) (**Table 6**).

Again, there was also a significant association between attending a lecture about doping and knowing the fact that restricted substances are included in OTC medicines and dietary supplements ($p = 0.038$) (**Table 7**).

Literature search revealed that pharmacists play an important role besides physicians for providing the opportunity for common people including athletes regarding appropriate use of medicines [19].

Although it is the responsibility of all the ASPs to prevent ADRV as well as promote and foster anti-doping awareness among athletes, both the pharmacists and physicians as ASPs have special role in this regard because of their specific knowledge about medicines (mechanism of action, potential for abuse, ability to enhance performance and possible short term and long term adverse drug reactions) [20-22].

In a questionnaire-based study conducted by Shibata K and his colleagues regarding knowledge about doping and the need for education for the same among pharmacy students, they found that majority of the students (95%) were aware of the term similar to our findings (73.6%), although in their study (21%) as well as in ours (20.1%) a small number of participants attended any formal lecture in the subject [16]. This can be attributed to the fact that in today's world information is easily available especially through internet (on different web pages, social media platforms, news portals, etc.), television, and other media.

Moreover, in both ours and their study, the majority of the participants positively opined about attending a lecture on the topic, suggesting the desire among physicians and pharmacists to be able to perform their responsibilities as ASPs as per the guidelines of the WADC.

Other similar studies conducted in other parts of world reported similar results. A study conducted in France revealed that 83% of the participants (pharmacists) have considered doping to be unhealthy for everyone consuming it and also most of them opined that despite being poorly informed (58%) in this regard pharmacists (88%) are to play an important role in preventing doping [23].

Like our study, the study conducted by Japanese researchers also found wrong conception about use of prohibited substances among athletes; 15% of their participants had the misconception that prohibited drugs are allowed among athletes to enhance their performance, compared to 27% of our participants [16]. Similarly 28% of their participants thought athletes never use any prohibited substances despite clear medical indication, compared to 47.8% of our participants.

Both these wrong conceptions can impair professional capabilities of pharmacists and physicians and jeopardize health of athletes. Again, the basic anti-doping regulation laid down by the WADC strictly states that consumption of any prohibited substance can lead to not only ADRV leading to consequences also jeopardize the concerned athletes' health. On the other hand, sometimes the athlete might actually need the prohibited substance for the benefit of his or her health. As per WADC under these circumstances, consumption of such drugs is allowed under therapeutic use exemption (TUE) provided independent experts authorize such use based on legitimate medical requirement like [24]. Because of the technicalities involved in such process, athletes can always be best guided by physicians and pharmacists because of their knowledge in the subject.

Thus the need for appropriate education for both the physicians and pharmacists in regard to doping and anti-doping should be kept up to date and provided at regular intervals.

Knowing about past doping cases is of utmost importance as such knowledge would make physicians and pharmacists more cautious in this regard. However, both in our study (52.8%) as well as in the published Japanese study (34%) a large number of the participants did not know about past doping cases.

Unintentional consumption of prohibited substances remains as the most commonly reported cause of ADRV; Compared to the Japanese study (48%) in our study majority of the respondents (61.6%) knew that [25, 26].

Both in our study as well as in the Japanese study, majority of the participants (57.2% and 59%, respectively) knew about the restriction on OTC medicines and similarly prohibited dietary supplements. Although it is well known that such prohibited substances most of the times are not mentioned in the product label, majority of our participants (50.9%) were not aware of it compared to only 13% in the Japanese study [16].

Adequately and appropriately making both the physicians and pharmacists working as ASP is of utmost importance as they are the persons who would guide the athlete in choosing and ultimately consuming such OTC drugs and other dietary supplements.

In our study majority of the pharmacists (46.3%) thought it should be them who should mainly be the advisor for prescribing dietary supplements, whereas physicians thought nutritionists (48.4%) should take the major responsibility.

Similarly, in the study by Shibata K 76% of the participants (pharmacists) thought they should mainly be responsible in anti-doping activities [16].

Finally, it can be said that to improve the knowledge, attitude, and behavior of the pharmacists and physicians regarding doping and anti-doping as per the guidelines by the WADC, the need of conducting awareness program among them at regular intervals is of utmost importance. As attending these programs (lectures) would not only brush up their existing knowledge on doping and anti-doping regulations also would keep them up to date about the new additions (if any) to the existing guidelines laid down by the WADC.

There are certain limitations to our study. As per the initial plans, we at first decided to include participants from Al-Rasheed University College/Pharmacy Department and AL-Kindey College of Medicine and they were supposed to fill in the questionnaire in person physically (hard copies); however, because of the current ongoing COVID-19 pandemic we had introduced some modifications and electronic submission of the said questionnaire using the platforms of the Iraqi Medical Association and the Iraqi Syndicate of Pharmacists was decided. It could be the reason why participation was not as high as expected.

Conclusion

To conclude despite the limitations of our study (few participants), it has underlined the need for awareness program to be conducted at regular intervals regarding doping and ADRV among the physicians and pharmacists in our country. However,

more studies on this topic with larger sample size are required to actually gauge the knowledge, attitude, and behavior of the physicians and pharmacists in this regard.

Finally, future studies on this topic should include participants like coaches, trainers, dieticians, managers, agents of the athletes, even parents in case of minors as besides physicians and pharmacists they are also an integral part of the ASP team.

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