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As a former collegiate athlete and recent pharmacist, I have a combined interest in sports medicine and pharmacy. With the practice of pharmacy rapidly changing, I am hoping this line of research presents opportunities for pharmacists to find niche roles in their practice.

Étant récemment devenu pharmacien et ayant été un adepte du sport à l'université, je m'intéresse à la fois à la pharmacie et à la médecine du sport. La pratique de la pharmacie évolue à grande vitesse, et j'espère que cette voie offrira aux pharmaciens des créneaux supplémentaires dans leur pratique.

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A questionnaire examining attitudes of collegiate athletes toward doping and pharmacists as information providers

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ABSTRACT



Background: Doping in sport has become an increasingly prominent topic. The decision to take part in doping practices is multifactorial and often based on many different information sources of varying reliability. This study sought to determine the attitudes of athletes at a Canadian Interuniversity Sport (CIS) university toward doping and to discover if pharmacists are perceived to be a valid information source on medication usage for these athletes.

Methods: CIS athletes competing in at least 1 of 8 sports were asked to complete a questionnaire. Participants were asked various questions regarding their perceptions of doping, medication use, information available to them regarding doping and the role of pharmacists in providing advice on medication usage.

Conclusions: It appears that doping is neither prevalent nor worth the risk for these CIS athletes. There also appears to be an opportunity for pharmacists to play a more prominent role in providing advice on medication use to high-performance athletes. *Can Pharm J (Ott)* 2014;147:352-358.

Results: In total, 92.7% (307/331) of questionnaires were at least partially completed. Generally, these athletes did not feel pressured to dope or that it was prevalent or necessary. The fear of doping violations largely did not alter the use of medications and supplements. The online doping education program administered by the Canadian Centre for Ethics in Sport was the most used information source (74.5%); pharmacists were used 37.7% of the time. Pharmacists were perceived to be a good source of information about banned substances by 75.6% (223/295) of participants, although only 35% (104/297) consulted a pharmacist each time they purchased a nonprescription medication.

Background

Doping and the use of performance-enhancing drugs in athletes have become hot topics in recent years, particularly in high-profile sports such as cycling and major league baseball.^{1,2} Several highly publicized sanctions have been handed out to both amateur and professional athletes and sports clubs.¹⁻⁴ With the fame that

comes with being a high-performance athlete and the potential financial reward for reaching professional levels, the lure of performance-enhancing substances could be very high for some. Inadvertent doping violations may also occur, as apparently happened at the 2014 Olympic Winter Games, when a Swedish hockey player was forced to miss the gold medal final

due to excessive levels of pseudoephedrine in his system from an allergy medication he had taken for years.⁵

Despite the pressures that are ever-present and evolving, athletes still uphold some traditional values within sport. A study of British athletes suggested that values and the concept of shame influenced an athlete's decision to use banned substances.⁶ Gucciardi et al.⁷ found similar factors at play in elite Australian athletes, with morality and self-esteem playing roles. Goulet et al.⁸ showed that behavioural intention was the most critical component to predicting doping behaviour. Ultimately, there seem to be many factors that will influence whether one will opt to use a banned substance.

Experts are pushing for more public prosecution of offenders, as well as more testing and better testing methods.⁹ However, there is a gap in the literature describing who is providing educational interventions to athletes about doping and substances. A cross-sectional study of National Collegiate Athletic Association (NCAA) athletes and personnel in the United States examined medication and dietary supplement inquiries and concluded that educational programs are necessary.¹⁰ By better educating athletes about the risks of doping and possible outcomes, along with what medications can and cannot be used, there may be a decreased risk of doping violations. Pharmacists are trained in medication management and are health care professionals who have the skills necessary to not only help athletes avoid crippling doping violations but also ensure the safe and effective use of their medications.^{10,11}

There does not appear to be any information in the literature regarding how Canadian Interuniversity Sport (CIS) athletes perceive doping and performance-enhancing drugs. Furthermore, given the recent attention to both intentional and inadvertent doping violations, it is unclear where these athletes are turning for information. Given pharmacists' expertise in medications, they could undoubtedly play a role in helping high-performance athletes avoid doping infractions. This study aimed to determine the attitudes of athletes at a CIS university toward doping, to see if doping influences medication and supplement use, to rate sources of information on doping and performance-enhancing drugs and to discover if pharmacists play a role in the drug information process for athletes.

KNOWLEDGE INTO PRACTICE



- Pharmacists are perceived to be a good information source on medications that could cause athletes to have a doping infraction.
- Pharmacists are consulted less than physicians and physiotherapists about what medications can be used by elite athletes.
- For pharmacists looking to fill a niche market, significant opportunity exists to provide medical information to elite athletes on what medications can and cannot be used.

Methods

A questionnaire was developed to assess athletes' perceptions of doping, the substances being used and the information about doping they receive. A literature search did not reveal an existing instrument to meet the purpose of this study, so one was developed by loosely adapting the "Dietary Supplementation Questionnaire, Version 2.0"¹² and a questionnaire used by Petroczi.¹³ The final version was a 17-item tool written in English. This questionnaire was developed by the investigators with input from the university athletic director. A 5-point Likert scale was used for all questions, where participants were instructed to respond if they strongly agreed, agreed, disagreed, strongly disagreed or had neutral feelings to the question. Participants were asked a variety of questions pertaining to their perceptions of doping in collegiate athletes, where they receive information regarding doping, what medications they do or do not use and if they consult with pharmacists when deciding to use over-the-counter (OTC) or prescription medications.

The questionnaire was administered between August and October 2012. Participants were eligible if they were part of a University of Saskatchewan CIS athletic team competing in 2012-13. The questionnaire was made available to athletes participating in at least one sport: football, soccer, wrestling, track and field, basketball, volleyball, hockey or cross-country. Both male and female athletes for all programs were included.

A brief verbal information session about the study was held during the mandatory medical day in which all athletes must participate. After this information was provided, a consent letter and corresponding questionnaire were distributed to all athletes in attendance. If an athlete did not wish to participate, he or she was asked to

MISE EN PRATIQUE DES CONNAISSANCES



- On estime que les pharmaciens possèdent des renseignements sur les médicaments qui pourraient causer à un athlète une infraction pour dopage.
- Or, les médecins et les physiothérapeutes sont consultés davantage que les pharmaciens sur les médicaments que peuvent prendre les athlètes de haut niveau.
- Les pharmaciens qui cherchent un nouveau marché pourraient envisager d'offrir des renseignements médicaux aux athlètes de haut niveau sur les médicaments qu'ils peuvent prendre et ceux qu'ils doivent éviter.

submit a blank questionnaire to help maintain anonymity. All of the returned questionnaires were sealed in an envelope and returned directly to one of the study investigators; the questionnaires were totally anonymous. Basic, descriptive statistics were performed and ethics approval

was granted by the University of Saskatchewan's Behavioural Research Ethics Board.

Results

A total of 331 questionnaires were distributed, of which 307 were at least partially completed (92.7% response rate). The lowest number of responses for any one question was 89.1% (295/331).

Attitudes and awareness of banned substances

Table 1 outlines the respondents' answers about their attitudes and awareness of banned substances. Generally, most athletes felt they had good awareness of the substances whose use was not permitted both in and out of competition. A majority of participants (82.9%, 252/304) believe that most of their colleagues and competitors do not use banned substances. In contrast, 32.9% (101/307) of participants indicated that they believe anabolic steroids are used by

TABLE 1 Attitudes and awareness of banned substances

Statement	Responses, <i>n</i>	Strongly agree, <i>n</i> (%)	Agree, <i>n</i> (%)	Disagree, <i>n</i> (%)	Strongly disagree, <i>n</i> (%)	Unsure, <i>n</i> (%)
I am aware of the substances I cannot use in competition	305	70 (23)	202 (66)	13 (4)	2 (<1)	18 (6)
I am aware of the substances I cannot use out of competition	304	68 (22)	186 (60)	20 (7)	1 (<1)	29 (10)
Most athletes competing in the CIS are not using banned substances	304	48 (16)	204 (67)	16 (5)	1 (<1)	35 (12)
Doping is necessary to achieve the best results	304	14 (5)	24 (8)	89 (29)	168 (55)	9 (3)
Doping gets too much attention from sports organizations	305	6 (2)	49 (16)	167 (55)	40 (13)	43 (14)
My performance would be improved by banned substances	305	27 (9)	73 (24)	80 (26)	78 (25)	47 (15)
I feel pressure to use banned substances	307	1 (<1)	7 (2)	94 (31)	203 (66)	2 (<1)
Recreational drug use is prevalent in high-performance athletes	304	1 (<1)	42 (14)	122 (40)	67 (22)	72 (24)
Anabolic steroids are used by some high-performance student athletes	307	5 (2)	96 (31)	74 (24)	30 (10)	102 (33)
When using a medication or supplement, I am concerned about the possibility of a doping violation	306	35 (11)	170 (56)	71 (23)	6 (2)	24 (8)
Doping is not worth the risk	307	202 (66)	91 (30)	12 (4)	0 (0)	2 (<1)

CIS, Canadian Interuniversity Sport.

TABLE 2 Substance use and fear of doping violations

Medication or supplement	Responses, <i>n</i>	Have used in last year, <i>n</i> (%)	Have not used in last year, <i>n</i> (%)	Did not use for fear of doping, <i>n</i> (%)
Cough and cold medications	306	236 (77.1)	70 (22.9)	14 (20)
Pain medications	306	244 (79.7)	62 (20.3)	1 (1.6)
Allergy medications	306	108 (35.2)	198 (64.8)	2 (1)
Asthma medications	306	40 (13.1)	266 (86.9)	5 (1.9)
Insulin	304	7 (2.3)	297 (97.7)	0 (0)
Birth control medications	304	72 (23.7)	232 (76.3)	0 (0)
Antidepressants	305	10 (3.3)	295 (96.7)	0 (0)
Thyroid medications	305	5 (1.6)	300 (98.4)	1 (0.3)
Diuretics	305	4 (1.3)	301 (98.7)	0 (0)
Caffeine	306	228 (74.5)	78 (25.5)	1 (1.3)
Protein supplement	306	169 (55.2)	137 (44.8)	14 (10.2)
Multivitamin	306	177 (57.8)	129 (42.2)	2 (1.6)

some high-performance student athletes. The general attitudes of respondents towards banned substances are that they are unnecessary (84.5%, 257/304) and a risk not worth taking (95.4%, 293/307). Most do not feel pressured to use banned substances (96.7%, 297/307). It appears these athletes are not entirely confident about what they are or are not allowed to take regarding typical pharmacy medicines, as 67% (205/306) indicated they are concerned about a doping violation when using a medication or supplement.

Medication usage and fear of doping violation

Participants were asked to record what medications or supplements (from a provided list) they have used in the previous 12 months (Table 2). Birth control (23.7%) and asthma medications (13.1%) were the most commonly used prescription medications. The most commonly used over-the-counter medications were for pain (79.7%) and cough and cold (77.1%). Overall, very few participants indicated that they did not use a specific medication/supplement out of fear of a doping violation, other than cough and cold medications (14/70; 20%).

Sources of doping information

A list of information sources for doping information was provided to participants, from which they were asked to rate the quality of

the information source (Table 3). Most of the responses ranked the sources 3 or greater on a 5-point scale. Participants indicated that they had not used many of the information sources, including the team binder (72% had not used). In contrast, 74.5% had used the Canadian Centre for Ethics in Sport (CCES) online education site. Physicians were the most used health care professional resource (48.5%), followed by physiotherapists (42.5%), pharmacists (37.7%) and other health care professionals (30.2%). The CCES resource had the most participants rate it as 4 or higher (73.4%), whereas among health care professionals, physicians were perceived to be the best source of information, with 69.9% of participants rating them 4 or higher, followed by physiotherapists (68%). Pharmacists received a score of 4 or higher 61.9% of the time. The majority of participants (86.8%) indicated that they believe they receive adequate information on doping.

Pharmacists as an information source

Table 4 shows the results of questions that focused on drug information from a pharmacist. The majority (65.3%) of participants indicated that they often seek information from the pharmacist when receiving a prescription medication, whereas only 35% indicated they consult a pharmacist each time they purchase

TABLE 3 Sources of substance and doping information

Source	Responses	Very poor			Very good		Have not used
		1	2	3	4	5	
Coach	301	4 (1)	13 (4)	39 (13)	53 (18)	37 (12)	155 (52)
Student trainer	300	2 (<1)	9 (3)	42 (14)	62 (21)	44 (15)	141 (47)
Teammate	299	5 (2)	22 (7)	72 (24)	50 (17)	34 (11)	116 (39)
Doctor	301	4 (1)	9 (3)	31 (10)	49 (16)	53 (18)	155 (52)
Pharmacist	300	4 (1)	15 (5)	24 (8)	35 (12)	35 (12)	187 (62)
Physiotherapist	301	9 (3)	11 (4)	21 (7)	42 (14)	45 (15)	173 (58)
Other health care professional	298	7 (2)	14 (5)	30 (10)	25 (8)	14 (5)	208 (70)
WADA website	300	10 (3)	9 (3)	24 (8)	46 (15)	63 (21)	148 (49)
CCES website	299	13 (4)	8 (3)	25 (8)	60 (20)	95 (31)	98 (32)
Other website	295	19 (6)	15 (5)	26 (9)	22 (8)	22 (8)	191 (65)
CCES Doping Online Education*	298	7 (2)	10 (3)	42 (14)	67 (23)	96 (32)	76 (26)
Team binder	297	14 (5)	12 (4)	22 (7)	20 (7)	15 (5)	214 (72)
Product label	294	21 (7)	24 (8)	47 (16)	37 (13)	17 (6)	148 (50)

WADA, World Anti-doping Agency; CCES, Canadian Centre for Ethics in Sport.

*Online Doping Education Program administered by the Canadian Centre for Ethics in Sport.

TABLE 4 Doping and drug information

Statement	Responses, <i>n</i>	Strongly agree, <i>n</i> (%)	Agree, <i>n</i> (%)	Disagree, <i>n</i> (%)	Strongly disagree, <i>n</i> (%)	Unsure, <i>n</i> (%)
Huskie Athletics provides adequate doping information	297	80 (27)	178 (60)	15 (5)	4 (1)	20 (7)
When getting a nonprescription medication or supplement, I consult a pharmacist each time	297	16 (5)	88 (30)	133 (45)	24 (8)	36 (12)
When getting a prescription medication, I often seek information from the pharmacist	297	32 (11)	162 (55)	78 (26)	7 (2)	18 (6)
A pharmacist would be a useful source of information about banned substances	295	54 (18)	169 (57)	32 (11)	1 (<1)	39 (13)

a nonprescription medication or supplement. Most feel a pharmacist would be a useful source of information on banned substances (75.6%).

Discussion

This study captures the opinions of the vast majority of CIS athletes at a major Canadian university. The general perception among

participants is that the use of banned substances is neither worth the risk nor widespread. Similar results were found in the United Kingdom, where social and moral expectations along with the resultant guilt and shame offered pressures not to dope.⁶ These results are good news for large academic and athletic institutions in that it appears as if the values of fair sport are being

respected. Participants also feel as if they receive enough information to ensure a doping infraction does not occur. However, they do not consult with a pharmacist a large percentage of time when they receive both prescription and nonprescription medications.

Overall, it appears as if these athletes are satisfied with the information they receive about using performance-enhancing drugs, and they perceive the information to be reputable. These athletes tend to rely mainly on the CCES guidelines and less so on health care professionals or other sources. It is important that athletes have access to accurate information and multiple sources so as to be well equipped to avoid any possible unintentional infractions. During the 2012 Olympic and Paralympic games, a Pharmacy Planning Committee (PPC) was established to provide pharmacy services to the athletes. Over 100 pharmacists and pharmacy technicians were responsible for dispensing 5200 prescriptions and were required to complete a learning program on the use of drugs in sport.¹⁴ Such learning activities are available to pharmacists looking to become more involved with high-performance athletes.

It is encouraging to see that pharmacist consultation is often sought by the majority of athletes for prescription medications, yet still about one-third do not do so. In addition, it appears as if pharmacists are not routinely consulted for advice on OTC products, which are often culprits of inadvertent doping infractions. One well-publicized case featured Canadian rowers who mistakenly used pseudoephedrine—a team physician had recommended Benadryl, but Benadryl Decongestant Allergy was purchased by mistake.¹⁵ It does require some skill to read product labels.¹⁶ Why pharmacists are not routinely consulted could be due to a variety of reasons that are beyond the scope of this article, but it is clear that there is an opportunity for pharmacists to become more involved in dispensing advice to high-performance athletes. There are many products sold in pharmacies for common ailments that may produce a positive result for banned substances and thus accidentally cause damaging repercussions.

A large percentage of the athletes surveyed feel that pharmacists could be a good source of doping information, and so it seems that the profession has an opportunity to play a more active role in helping high-performance athletes

BOX 1 How pharmacists can advise athletes

- Pharmacists do *not* need to know every medication or substance that is banned from competition for athletes. Rather, understanding that some medications and substances can have a significant impact on athletes and their careers is paramount.
- More information regarding banned substances and doping can be found at the World Anti-Doping Agency website at www.wada-ama.org, as well as in the Drug Use and Abuse in Sports chapter of the *Compendium of Therapeutics for Minor Ailments*.¹⁷

use medications safely within the confines of the rules laid out before them. With the current anti-doping culture, it would seem intuitive that athletes would welcome any resource that would aid in the prevention of inadvertent violations. It is interesting that physicians and physiotherapists were consulted more frequently than pharmacists, but this may be due to access to these health care professionals and the absence of a pharmacist on their medical team. Pharmacists are useful in helping patients decipher information about medications and could be equally adept at helping athletes to adhere to guidelines and rule-books set out by bodies governing doping.

Limitations

The major limitation of this study is that we were unable to separate responses based on sex or sport. It was important from an institutional point of view to try to maintain anonymity as much as possible. Second, this was a self-administered, nonvalidated questionnaire, so all of the inherent limitations of this design exist with this study. Furthermore, since the questions contained sensitive information, it is impossible to know how truly the participants really answered. This survey was administered at one university in Canada, so it is unknown if these results are applicable to other major university sport programs across the country. As well, this study explored how athletes perceived pharmacists as a source of advice about medications, yet it is unknown how confident pharmacists themselves are about providing information on what medications are safe to use in sport to avoid doping infractions.

Conclusions

In general, the CIS athletes who were surveyed appear to believe that doping is neither prevalent

nor worth the risk. The university athletics program appears to be doing a good job, in that athletes feel well informed about what they can and cannot take. However, pharmacists, long considered the medication experts, are not being

sought out by these athletes for advice. There seems to be an opportunity for pharmacists to play a more prominent role in providing advice on medication use to high-performance athletes. ■

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