Survey on the Attitudes of Pharmacy Students in Japan toward Doping and Supplement Intake

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Doping is one of the most serious problems for athletes, and it is important that pharmacists have more interaction with athletes to ensure safer drug usage. Education is one of the most important roles of sports pharmacists, who are specialists regarding drug usage for athletes. We investigated pharmacy students’ interests and comprehension regarding drug usage, doping and supplement intake by using the form of a questionnaire, since it is important to know how they understand these subjects as part of their greater educational program. The subjects were sophomore and junior pharmacy students at three universities. It was revealed that most of the students have negative images regarding doping violation, and they answered that they are familiar with doping. However, only sixteen percent of the students had attended lectures by specialists on doping. In addition, one third of pharmacy students did not know that some over-the-counter (OTC) drugs might contain doping substances. With regard to supplement intake, approximately two thirds of the respondents had an interest in and positive image of supplement intake. However, it was revealed that only one third of them recognized supplements as food, and their information regarding supplements was obtained from uncertain media. It was suggested that it is important for pharmacy students to have more opportunities to learn about what doping is. More education and enlightenment by sports pharmacists would be effective for pharmacy students as well as athletes, and it would help us to broaden the scope of what we can do for athletes and society.

Key words doping; sports pharmacist; pharmacy student; sport; education; supplement

Doping is not only the administration or attempted administration of prohibited substances or methods to athletes but is also an action in which someone assists, encourages, aids, abets or covers up the doping rule violation or any other type of complicity involving the violation or any attempted violation, and it is strictly prohibited by World Anti-Doping Code (WADC). However, doping violation shows no sign of significant decline in recent athletic meetings, including the Olympic Games. Doping consists of two violations: one is intentional and the other is unintentional doping in which athletes take prohibited substances due to lack of knowledge regarding doping. Doping substances are classified into three categories: one is permanently prohibited substances such as anabolic androgenic steroids or peptide hormones, growth factors and related substances; another is substances prohibited in competition, such as all stimulants including both optical isomers or glucocorticosteroids; and the other category includes substances that are prohibited in particular sports, such as alcohol or beta-blockers. Since ephedrine and pseudoephedrine, which are components of Ma Huang, are prohibited in competition and are often compounded in combination cold remedies, athletes should take extra care regarding their usage. However, some doping violations occur because of ephedrine or pseudoephedrine, since the athletes do not fully understand matters regarding doping violation. Although all athletes are expected to comprehend and recognize WADC, it is sometimes very difficult for them to do so. Therefore, pharmacists are required to help them.

A six-year undergraduate pharmacy education system was introduced in Japan from the 2006 academic year, and six-year educated pharmacists are expected to gain more advanced skills and knowledge than before. Educational programs that make pharmacy students aware of the hazards of doping and supplement intake are one of the most important...
ways of helping talented sports pharmacists to become influential pharmacists in the future.9)

In this study, to obtain new information regarding tendencies of knowledge and awareness of appropriate drug usage, including doping and supplement intake, among pharmacy students in Japan, we carried out an investigation based on these categories and we analyzed data obtained from questionnaires.

MATERIALS AND METHODS

The survey was conducted in the form of a questionnaire consisting of three sections. The first section was about the intake of drugs (Fig. 1, Q1–3), the second section was about knowledge and awareness of doping (Fig. 2, Q4–8), and the third section was about intake, knowledge and awareness of supplements (Fig. 3, Q9–14). Questionnaires were given to sophomore and junior pharmacy students at three universities (162 sophomores, 408 juniors). Number of the gender of the students was that, 176 males (30.9%), 362 females (63.5%), and 32 gender unknown respondents (5.6%). Data of the answers was analyzed by using chi-square test or Mann–Whitney *U* test. The *p* values of less than 0.05 were regarded as statistical significant. Responses were obtained from all of the students, and their prior permission was obtained to use the data for analysis.

RESULTS AND DISCUSSION

**Questionnaire about the Intake of Drugs (Fig. 1)** In response to Q1, only eighteen percent of the students claimed they would seek active medical treatment by going to a hospital or a pharmacy, while approximately eighty percent claimed they would seek inactive treatment, such as taking over-the-counter (OTC) drugs at home or doing nothing, in the event of a minor injury or ailment. In response to Q2 and Q3, slightly less than thirty percent of the respondents said that they would seek advice about medicine from pharmacists at a pharmacy, although about sixty percent responded that they wanted to do so. There is an antinomy between their answers, suggesting that they might hesitate to ask pharmacists about their health or medicine even though they are pharmacy students. Further studies are needed to reveal this reason.

**Questionnaire Regarding Knowledge and Awareness of Doping (Fig. 2)** It was revealed that ninety percent of the pharmacy students have negative images regarding doping violation, and almost all of them answered that they are familiar with doping, including eighty two percent who claimed to know what doping is in detail (Q4, Q5). Moreover, it was suggested that respondents had great awareness regarding doping since approximately eighty percent of them replied that they would seek advice about medicine from pharmacists at a pharmacy, although about sixty percent responded that they wanted to do so. There is an antinomy between their answers, suggesting that they might hesitate to ask pharmacists about their health or medicine even though they are pharmacy students. Further studies are needed to reveal this reason.
(Q7). In addition, one third of the pharmacy students did not know that some OTC drugs might contain doping substances, even though half of them replied that OTC drugs would be their first choice if they had a minor injury or ailment, as in Q1 (Q8). It appears that pharmacy students have a positive attitude and motivation regarding doping but that they need to be educated more about the topic.

**Questionnaire with Regard to Intake, Knowledge and Awareness of Supplements (Fig. 3)** It was revealed that approximately two thirds of the respondents had an interest in supplements and their intake (Q9), and more than eighty percent answered that they had taken some supplements, including about thirty percent who are taking them at present (Q10). However, while approximately seventy percent of the respondents answered that they use supplements in a positive manner (Q11), it became apparent that there were some problems. The first problem was that only approximately one third of the pharmacy students correctly claimed that supplements were
classified as food (Q12). The second problem was that about seventy percent of them said that they emphasized efficacy the most, and approximately ten percent of them claimed that an affordable price was important, while only seventeen percent of them answered that they were concerned most about adverse effects when purchasing supplements (Q13). The third problem was that pharmacy students tended to get information from uncertain sources such as television, family or the internet, and it was very difficult to determine whether or not the information was reliable (Q14).

The questionnaires suggested that pharmacy students do not have sufficient recognition of which supplements are originally “foods” in order to compensate for a lack of nutrition. It was also revealed that they tend to emphasize positive aspects such as efficacy or affordability rather than adverse effects caused by supplement intake and that they might not know that supplements can lead to adverse effects even if they are ingested in the right way as with drugs and that, therefore,
users should take care. It was also revealed that their comprehension might be from uncertain media and they have to review a lot of original information. Finally, pharmacy students do not appear to have sufficient knowledge about supplement intake, as is seen in the questionnaires regarding doping, even though most of them have an interest in and have taken supplements.

Differences of Knowledge and Awareness of Drug Usage, Doping, and Supplements between Grades or Genders of Pharmacy Students (Fig. 4) We investigated the differences of the answers between grades or genders of the pharmacy students. There was no difference between the grades of the students about knowledge and awareness of these subjects (data not shown). This result also suggests that pharmacy students have few opportunities to learn about these topics. On the other hand, there were some differences in the answers between males and females. It was revealed that male students had more interest and accurate knowledge regarding doping.
than females, meanwhile, female respondents had more exact knowledge about supplements, and concern with regard to supplement intake and drug usage. It is speculated that these differences of the answers between genders of the students were caused since their life style and interest in health-conscious were different between males and females. This result suggests that it is important for sports pharmacists to consider the differences of the knowledge and awareness between genders of the pharmacy students and design the lecture format, for example, deliver the gender-segregated lectures.

CONCLUSION

Now that a six-year pharmacy student educational system has been introduced in Japan, it is imperative that pharmacists have a closer relationship with society and the general public. It is also important that pharmacists have more specialized knowledge and skills as specialists of medication therapy. The sports pharmacist accreditation program began in 2009 with the aim of producing pharmacists who have more comprehension about doping, supplement intake, and appropriate drug usage for athletes. The expected roles of sports pharmacists currently are providing information services and educational activities for 1) athletic associations, athletes and coaches at international meetings and national athletic meets, 2) junior high or high school students and their teachers or coaches, 3) pharmacists and pharmacy students, and 4) the general public. It is important for sports pharmacists to have a direct relationship not only with athletes or coaches but also with pharmacists and pharmacy students since there will be a need in the future for general pharmacists to have knowledge of doping and supplement intake. Lectures for the general public are also valuable since correct knowledge of anti-doping activities will contribute to the formation of public opinion and to the significance of the pharmacist’s role.

In this research, it was revealed that pharmacy students, on the whole, do not have opportunities to learn about doping and supplement intake even though most of them have an interest in the subject, and the basic knowledge they have might cause confusion. It is necessary for them to attend lectures given by sports pharmacists, and these lectures will be effective in helping pharmacy students acquire a much better understanding and awareness regarding correct drug usage, doping and supplement intake.9) Further studies are needed to elucidate how aware incumbent pharmacists are of doping, supplement intake and the sports pharmacists accreditation program.

The sports pharmacists accreditation program is just getting started, and it is important to expand what sports pharmacists can do9–14) and propose how we can contribute to society. For example, it could be possible for us to participate in medical practices as members of a medical sports team in addition to anti-doping activities such as lectures or on-site information services in the sporting field. It is also important for us to make anti-doping activities closer work with society since doping applies not only to top-level athletes but all athletes.

To summarize, the findings obtained in this study indicate how pharmacy students acquire knowledge and interest regarding general drug usage, including doping and supplement intake.

The results also provide good suggestions for us to consider when reaffirming that pharmacists’ work is wide-ranging and there are many practices in which pharmacists are able to participate.

REFERENCES