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Pharmacy services at the Tokyo 2020 Olympic and Paralympic Games: perspectives of the pharmacy workforce

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ABSTRACT

Objectives To evaluate the awareness of the volunteer pharmacy workforce of medication use and their satisfaction with the pharmacy services of the Tokyo 2020 Olympic and Paralympic Games from a pharmacist's perspective.

Methods A questionnaire was developed from related articles in published peer-reviewed journals and modified prior to distribution to the whole population of pharmacists serving at the Tokyo 2020 Olympic and Paralympic Games. Validity tests were conducted based on expert opinions and Cronbach's alpha (0.79). The questionnaire consisted of demographics (11 questions), knowledge of medication use in sports (8 questions) and satisfaction on the provision of the service (5 questions). Responses using a 5-point-Likert scale, from strongly agree (5) to strongly disagree (1), and two free text questions were analysed with descriptive statistics.

Results The response rate was 86% (n=32/37). Overall, the pharmacists reported a high awareness of medication use. Specifically, questions on the prohibited list of medications (mean 4.0±SD 0.7), COVID-19 policy (3.8±0.9), use of alternative non-prohibited medications (3.6±1.0) and therapeutic use exemptions (3.5±0.9). Moreover, they rated high satisfaction with the pharmacy service they provided. However, rates were ≤3 for knowledge of the International Olympic Committee Needle Policy (2.6±1.0), Medication Importation Declaration (2.9±1.0) and communication skills (3.0±1.0).

Conclusion Pharmacists were confident and satisfied with the pharmacy service at the games. The study confirms the importance of prior training and education. Game-specific policies and strategies to improve communication skills should be included in the pharmacy education for future Games.

WHAT ARE THE NEW FINDINGS?

⇒ Volunteer pharmacists responded that they were highly competent and satisfied with the pharmacy services provided by them.
⇒ The survey revealed some areas that should be updated for the next Olympic and Paralympic Games. These were enforcement of pre-Games education including specific policies, development of a strategy for better communication and preparation of infection control and prevention policies specific to pharmacy care.

HOW MIGHT IT IMPACT ON CLINICAL PRACTICE IN THE FUTURE?

⇒ Our findings would contribute to promoting high-quality sustainable pharmacy care at the Olympic and Paralympic Games.

INTRODUCTION

The Tokyo 2020 Olympic and Paralympic Games were finally staged from July to September 2021 after postponing for 1 year due to the global COVID-19 pandemic. The preparation of the pharmacy service was initiated in July 2017 following the pharmacy leadership formed by the Tokyo 2020 Organising Committee of the Olympic and Paralympic Games (The Organising Committee). The pharmacy leadership began the design and layout of the pharmacy, the selection and procurement of medications according to the Olympic and Paralympic Model Formulary and the development of a Pharmacy Guide with operating protocols (table 1).

The pharmacy was responsible for providing the pharmaceutical care service to athletes, team officials, workforce, the Olympic and Paralympic personnel and members of the broadcasting media. The numbers of accredited persons including spectators were decreased due to COVID-19, yet the pharmacy service was expected to handle a total of 11 417 athletes from 206 countries participating in the Olympic Games and 4403 athletes from 163 countries competing in the Paralympic Games.[1 2] Moreover, the pharmacy team had to deal with the additional challenge of adopting preventive measures against the spread of COVID-19.

The main stakeholders of the pharmacy service are volunteer pharmacists. Their readiness and competency are key to the success of the pharmacy services and, further, the satisfaction achieved from the experience of the service they provided would affect volunteer participation in the future. Despite their pharmacist credentials, they may face challenges related to the working environment of the Olympic and Paralympic Games. Volunteer pharmacists with various work backgrounds, from different regions, and with different levels of expertise in dealing with sport medications and pharmaceutical care at sports events were gathered. Most of them were new to the Games and new to each other, and information from the precedent Games was limited to the minimum essential aspects. To develop the competency of the pharmacists, Tokyo 2020 organising committees had established necessary

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Table 1 Pharmacy services at the Tokyo 2020 Olympic and Paralympic Games

Pharmacy service	Polyclinic pharmacy	Satellite pharmacy
Location	One main village	Four satellite villages (Sailing village, Cycling village, Track cycling accommodation, Road cycling accommodation)
Date	Olympics: 13 July to 11 August Paralympics: 17 August to 8 September	Varied per satellite village
Hour	7:00 to 23:00	Varied per satellite village
Shift	Two to three shifts a day	One shift a day
Other services	Orthopaedics, internal medicine, female athlete medicine, dentistry, ophthalmology, mental healthcare, dermatology, physical therapy, imaging, diagnostic testing, emergency services, fever clinic (24 hours a day)	Primary care, physical therapy, emergency services

educational and training programmes, consisting of lecture-based and onsite group training sessions, for the volunteer pharmacists prior to the Games. The preparation process of pharmacy services and activities of pharmacists at the Games have been reported.[3–6] A post-Games survey postulated that pre-Games education influences pharmacists' personal and professional benefits,[6] but pharmacists' preparation and service have not been studied from a pharmacist's perspective. It is vital to understand the pharmacy service needs considering the service providers' views to gather thoughts and opinions in order to improve future pharmacy care. Thus, this study aimed to identify areas for sustainable improvement in the pharmacy service and to increase pharmacists' satisfaction during the Games by assessing the volunteer pharmacists' opinions.

METHODS

Development of questionnaire

Possible items for inclusion in the questionnaire were derived from related articles published in peer-reviewed journals and modified to fit the aim of this study as appropriate.[3–7] The initially drafted questionnaire consisted of study information, consent for study participation, demographic characteristics of survey participants, questions on the pharmacists' awareness and knowledge of medication use at the Games (8 items of 5-point Likert scale) and questions on satisfaction with their provision of pharmacy service (5 items of 5-point Likert scale). The Likert scales were scored as strongly agree, agree, neutral, disagree

Table 2 Factor analysis of the 5-point Likert scale items of the questionnaire

(A) Results of the varimax rotation

	Initial Eigenvalues			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
I	4.453	34.253	34.253	2.762	21.247	21.247
II	2.236	17.203	51.456	2.706	20.816	42.063
III	1.682	12.936	64.392	2.565	19.727	61.791
IV	1.237	9.517	73.909	1.575	12.118	73.909

(B) Component matrix and internal consistency of each factor*

	Factor				Internal consistency
Item number	I (Medication use and pharmacy service)	II (Multidisciplinary roles and communication)	III (Policy and procedure)	IV (COVID-19 and privacy)	Cronbach's α
Q2	**0.825**	0.037	0.344	−0.181	0.833
Q9	**0.772**	0.182	−0.198	0.331	
Q1	**0.740**	0.036	0.326	−0.029	
Q3	**0.707**	0.313	0.414	0.123	
Q13	0.148	**0.770**	−0.091	−0.167	0.759
Q11	0.126	**0.765**	−0.079	0.326	
Q12	0.401	**0.704**	−0.016	0.143	
Q8	−0.296	**0.697**	0.376	0.086	
Q7	0.095	**0.593**	0.457	0.168	
Q4	0.300	−0.006	**0.860**	0.017	0.953
Q5	0.217	0.000	**0.847**	−0.029	
Q10	0.074	0.065	−0.078	**0.868**	0.517
Q6	−0.035	0.239	0.548	**0.687**	
KMO					0.596
Bartlett's Test of Sphericity				**Chi-square**	209.371
				df(p)	78(<0.001)

*Bolded values indicate item loadings greater than the threshold for assigning an item to a factor, which was set to 0.59.
KMO, Kaiser-Meyer-Olkin.

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Table 3 Demographics of respondents (n=32)

Item	Characteristic	Category	n (%)
1	Age (years)	31–40	16 (50)
		41–50	8 (25)
		>50	8 (25)
2	Sex	Male	12 (37)
		Female	20 (63)
3	Current employment	Community pharmacy	16 (50)
		Hospital pharmacy	14 (44)
		Pharmaceutical industry	0 (0)
		Academia	0 (0)
		Retired	0 (0)
		Others*	2 (6)
4	Years of experience as a pharmacist (years)	0–5	1 (3)
		6–10	9 (28)
		11–15	8 (25)
		16–20	8 (25)
		>20	6 (19)
5	Sites†	Polyclinic pharmacy	28 (76)
		Satellite pharmacy‡	9 (24)
6	Have you worked at other sporting events previously?	Yes§	10 (31)
		No	22 (69)
7	Do you have the JADA sports pharmacist certification?	Yes	32 (100)
		No	0 (0)
8	If you have JADA certification, how many times have you renewed the certification?	0	2 (6)
			11 (34)
		2	11 (34)
		3	5 (16)
		4	3 (9)
9	Do you have a sports pharmacy sports-related advanced degree or qualification other than a JADA certification?	Yes¶	3 (9)
		No	29 (91)

*Unemployed (n = 1), public health office (n = 1).
†Selection of both villages was allowed, and five worked at both polyclinic and satellite villages.
‡Satellite pharmacy includes Izu (n = 4), Lake Kawaguchi (n = 3) and Oiso (n = 2).
§Kudo International Federation, Four Continents Figure Skating Championships, Japan Professional Football League, National Athletic Meet Tokyo, World Women's Curling Championships, World Athletics Championships, World Wheelchair Rugby, Japan Taekwondo Championship, marathon events, and Skating Short Track Distance Championships.
¶Doping control officers (n = 2), Basic Surf Life Saver (n = 1).
JADA, Japan Anti-doping Agency.

and strongly disagree from 5 to 1. It also included questions about memorable and difficult experiences (2 items of free text response).

Validation of questionnaire

Content validity

The draft questionnaire was reviewed by a panel of five (MS, TT, HF, KK and SJR) pharmacy experts in the research team to evaluate the content of each question. Each expert had more than 10 years of experience in clinical practice, and four had worked in previous Olympic and Paralympic Games. They were asked to review the questionnaire, focusing on (1) how clearly the survey items were described and (2) how appropriate each item was to assess the topic. The collected comments were used to identify problems associated with the drafted questionnaire. These were resolved by replacing words, deleting irrelevant phrases and rephrasing sentences to improve the questionnaire.

Construct validity

Internal consistency of questions with a 5-point Likert scale was assessed using Cronbach's alpha, which describes the extent to which all the items in a questionnaire measure the same concept or construct. According to the guidelines, Cronbach's alpha is interpreted as unacceptable if <0.60, undesirable if 0.60 to <0.65, minimally acceptable if 0.65 to <0.70, respectable if 0.70 to <0.80, excellent if 0.80 to <0.90 and excessive consistency implying item redundancy if ≥0.90.[8] In this study, a reliability coefficient of≥0.70 was considered adequate.

Based on the responses from 32 survey participants, the estimated Cronbach's alpha value of the overall questionnaire was 0.793, and the calculated Cronbach's alpha value of factor I regarding Medication Use and Pharmacy Service at the Games was 0.833; for items in factor II addressing the Roles of the Multidisciplinary Team and Communication, the Cronbach's alpha was estimated to be 0.759; the Cronbach's alpha value for items in factor III addressing Policy and Procedure was 0.953. Overall, the calculated Cronbach's alpha values of factors I, II and III were in the respectable range, suggesting adequate internal consistency of the questionnaire. However, factor 4 did not, with the Cronbach's alpha estimated to be 0.517. The two items of factor 4 were Q6 (COVID-19 Policy) and Q10 (Athletes' Private Information), which were thought to have a low Cronbach's alpha value because they were topic items in different areas. However, these two questions were not deleted

Table 4 Volunteer pharmacists' perceptions of providing pharmacy services (n=32, 5-point Likert scale)

Item number	Question	Strongly agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly disagree n (%)	Mean (SD)	Median (IQR)
Knowledge and awareness of medication use								
1	I felt ready to provide my knowledge about the list of prohibited medications.	7 (21.9)	**21 (65.6)**	2 (6.3)	2 (6.3)	0 (0.0)	4.0 (0.7)	4 (4–4)
2	I felt ready to recommend alternatives if medication on the prohibited list were to be prescribed.	3 (9.4)	**18 (56.3)**	6 (18.8)	4 (12.5)	1 (3.1)	3.6 (1.0)	4 (3–4)
3	I felt ready to apply my knowledge about TUE Policy and Procedures.	4 (12.5)	**14 (43.8)**	9 (28.1)	5 (15.6)	0 (0file.0)	3.5 (0.9)	4 (3–4)
4	I felt ready to apply my knowledge about the IOC Needle Policy Declarations.	1 (3.1)	4 (12.5)	**12 (37.5)**	11 (34.4)	4 (12.5)	2.6 (1.0)	3 (2–3)
5	I felt ready to apply my knowledge about Medication Importation Declarations.	1 (3.1)	7 (21.9)	**14 (43.8)**	7 (21.9)	3 (9.4)	2.9 (1.0)	3 (2–3.5)
6	I felt ready to apply the COVID-19 Policy of the Tokyo 2020 Games to my service.	7 (21.9)	**15 (46.9)**	8 (25.0)	1 (3.1)	1 (3.1)	3.8 (0.9)	4 (3–4)
7	I felt ready to speak English fluently at the Games.	2 (6.3)	8 (25.0)	**12 (37.5)**	8 (25.0)	2 (6.3)	3.0 (1.0)	3 (2–4)
8	I felt competent in my ability to provide pharmacy services during the games.	4 (12.5)	**20 (62.5)**	8 (25.0)	0 (0.0)	0 (0.0)	3.9 (0.6)	4 (3.5–4)
Confidence and satisfaction of pharmacy services								
9	I am able to prepare and dispense medications for athletes.	12 (37.5)	**18 (56.3)**	2 (6.3)	0 (0.0)	0 (0.0)	4.3 (0.6)	4 (4–5)
10	I am able to protect the athletes' private information.	**21 (65.6)**	11 (34.4)	0 (0.0)	0 (0.0)	0 (0.0)	4.7 (0.5)	5 (4–5)
11	I am able to work closely With doctors/healthcare professionals.	15 (46.9)	**17 (53.1)**	0 (0.0)	0 (0.0)	0 (0.0)	4.5 (0.5)	4 (4–5)
12	I am able to work confidently in relation to anti-doping activities as a sports pharmacist.	11 (34.4)	**16 (50.0)**	5 (15.6)	0 (0.0)	0 (0.0)	4.2 (0.7)	4 (4–5)
13	I am satisfied with my role as a pharmacist and would be willing to contribute to future events.	9 (28.1)	**18 (56.3)**	4 (12.5)	1 (3.1)	0 (0.0)	4.1 (0.7)	4 (4–5)

Bolded numbers indicate modes.
IOC, International Olympic Committee; TUE, therapeutic use exemption.

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Table 5 Memorable experiences during the Tokyo 2020 Olympic and Paralympic Games (free text response)

Item	Content	Number of responses
Feeling of professional satisfaction	Providing information about medication use in sports	4
	When I found myself helping and prioritising athletes' health first	4
	Handling emergency medications	2
	Confirming of demands on pharmacy services at sports events	2
	Providing the services to athletes from developing countries	1
	Subtotal	13
Working as multidisciplinary team members	Working with a variety of healthcare professionals	9
	Working at Paralympic Games and Olympic Games	2
	Subtotal	11
Working under a global environment	Providing the services to people from all around the world	1
	Noticing different approval status in indications and doses from the medications in Japan	1
	Understanding quality gaps in healthcare between countries	1
	Communication with foreign languages	3
	Subtotal	6
Feeling of rewarding or being complemented	When pharmacists were acknowledged for their efforts in supporting athletes	1
	Noticing a patient was patiently waiting for the pharmacy services	1
	Subtotal	2
COVID-19 prevention and control	Frequent PCR tests	1
	Subtotal	1
Total		33

from the questionnaire because they were thought to be relevant to the special occasion of Tokyo 2020 Games (table 2).

Scale dimensionality

Factor analysis was performed to investigate the dimensionality of the scale. Principal component factor analysis with subsequent varimax rotation was used to derive factors potentially corresponding to the subscales for the questionnaire. Before extracting the factors, Kaiser-Meyer-Olkin (KMO) Measure of sampling adequacy and Bartlett's test of sphericity were performed to check whether the data were adequate.[9] The KMO index ranges from 0 to 1 and 0.50 or higher, and a significant level for the Bartlett's test of sphericity ($p<0.05$) suggests the appropriateness for factor analysis. The communalities, ratios explained by the extracted factors, with a value >0.5, are signifying ideal, so there are no variable to be deleted.[10]

The KMO measure was 0.596 with $p<0.001$ from Bartlett's test of sphericity, suggesting the appropriateness of conducting factor analysis. Factor loading of all items was greater than 0.59. Extraction of principal components using the normalised varimax rotation of variables revealed four factors with an initial eigenvalue >1 (eigenvalues for factors I, II, III and IV: 4.453, 2.236, 1.682 and 1.237, respectively), suggesting four dimensions of the scale terms. The items addressing Pharmacists' Awareness and Knowledge of Medication Use and Service were categorised by factors I and III; the items regarding patient satisfaction were mostly represented by factor II (table 2).

Questionnaire translation

The questionnaire was originally drafted in English, which was spoken by all members of the research team. The English version was written in short and concise sentences to facilitate translation. A Japanese pharmacist (KK) who has knowledge in sport pharmacy with English proficiency translated the questions into Japanese, and another Japanese pharmacist (AS) confirmed the translation. The questionnaire was piloted by two volunteer pharmacists. Minor alterations of words and phrases were made based on their responses to eliminate any ambiguity. The translated version in Japanese was compared with the original questionnaire, together with back translation by two members of the research team until all differences had been resolved.

Survey study

The cross-sectional questionnaire with unidentified personal information was conducted using Google Forms (Microsoft Corporation, Redmond, Washington) from 17 September to 4 October 2021. Included individuals were all Japanese volunteer pharmacists at Tokyo 2020 Games. Informed consent was provided, and the agreement of voluntary participation was obtained prior to participation in the survey.

Statistical analysis

Descriptive statistics were used to characterise responses of the pharmacists using Microsoft Excel V.2016 (Microsoft Corporation), expressed as the mean with SD or median with IQR. Scores in 5 point Likert scale of 4 and 5 were considered high, whereas 1 and 2 were considered low. Factor analysis was performed using IBM SPSS Statistics V.28.0.0.0 (IBM Corporation, Armonk, New York).

RESULTS

Respondents' demographics

The survey questionnaire was completed by 32 of 37 pharmacists (median age: 40 years, women: 63%). Most respondents were employed in community pharmacies (50%) and hospital pharmacies (44%). Approximately, 70% of the respondents worked more than 10 years as pharmacists. All had a sports pharmacist certificate from the Japan Anti-doping Agency (JADA), and 60% of them had renewed it at least two times (recertification is required every 4 years) (table 3).

Awareness and knowledge of medication use and pharmacy services at the Games

Regarding the knowledge of antidoping medication use, the pharmacists believed that they were well aware of the World Anti-Doping Agency (WADA) Prohibited List of medications (mean±SD: 4.0±0.7, median (IQR): 4 (4–4)), alternatives to prohibited substances (3.6±1.0, 4 (3–4)] and therapeutic use exemptions (TUE) policy and procedures (3.5±0.9, 4 (3–4)). In addition, they responded that COVID-19 policies of the Tokyo 2020 Organising Committee were highly recognised by the pharmacists (3.8±0.9, 4 (3–4)). Overall, the perceived competency by the pharmacists in providing pharmacy services was high (3.9±0.6, 4 (3.5–4)).

However, it did not seem that the pharmacists were familiar with the Medication Importation Declaration (2.9±1.0, 3 (2–3.5)) and International Olympic Committee (IOC) Needle Policy (2.6±1.0, 3 (2–3)). The pharmacists believed that they were not good enough to communicate in a non-Japanese language (3.0±1.0, 3 (2–4)) (table 4).

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Table 6 Difficult experiences during the Tokyo 2020 Olympic and Paralympic Games (free text response)

Item	Content	Number of responses
Communication barrier	Communication with people from non-English speaking countries	6
	Conversation in English	5
	Managing a patient complaining in a foreign language	2
	Reading handwritten prescriptions in English	2
	Working with new pharmacists in every shift	1
	Differences of opinion between pharmacists	1
	Subtotal	17
The games-specific service (non-traditional pharmacy service)	Verifying indications and dosing of medications approved in a foreign country	2
	Checking the approval status of TUEC	1
	Resolving issues outside the jurisdiction of Japanese pharmacy law	1
	When requested medications not available in Japan	1
	Unfamiliarity of IOC Needle Policy	1
	Subtotal	9
Administration	Not enough information provided about the Game delay and COVID-19	3
	Manual ID registration of athletes and doctors due to inadequately equipped polyclinic computer system	3
	Checking inventory	2
	Managing COVID-19 infection prevention and control	1
	Medications not picked up	1
	Working in the evening shift	1
	Subtotal	8
Total		34

IOC, International Olympic Committee; TUEC, Therapeutic Use Exemption Committee.

Confidence and satisfaction of the pharmacy service

Overall, the participating pharmacists were satisfied with the pharmacy service they provided (4.1±0.7, 4 (4–5)), providing medication preparation and dispensing (4.3±0.6, 4 (4–5)), working as a multidisciplinary member (4.5±0.5, 4 (4–5)) and antidoping activities (4.2±0.7, 4 (4–5)). The pharmacists had high confidence in maintaining athlete privacy (4.7±0.5, 5 (4–5)) (table 4).

Memorable and difficult experiences during the games

Pharmacists described that their memorable experiences were when they were 'feeling professional satisfaction' (n=13) after providing the care service followed by 'working as a multidisciplinary team member' (n=11) with various international professionals (table 5). On the other hand, pharmacists indicated several difficulties including speaking in a non-Japanese language (n=15), inconveniences due to the Game-specific rules, like applying IOC Needle policies and working at a temporary facility (n=19) (table 6).

DISCUSSION

This exploratory survey study showed that the volunteer pharmacists evaluated positively the readiness of providing the pharmacy service and their knowledge on medication use at the Games. Furthermore, they indicated high satisfaction on their roles and functions as pharmacists during the Games. In particular, they showed high confidence in handling the prohibited medications and the TUE process. The confidence and readiness could be contributed to pre-education and training programmes for pharmacists prior to the Games. In fact, the Organising Committee of Tokyo 2020 provided several sessions of training including field trips to the medical facility, which formed part of the preparation of pharmacy services at the Games. Moreover, the committee held online pharmacy workshops by inviting the pharmacists of the Games from 2012 London, 2016 Rio and 2018 PyeongChang to share their practical experiences. In addition, it was found that all volunteer pharmacists had the JADA-sports pharmacist certification, which focuses on antidoping.[11] In that sense, it also explained the high ratings in the questions regarding the level of understanding of the basic knowledge of medication use, antidoping regulations and the TUE for WADA prohibited list. Interestingly, none of the volunteer pharmacists in Tokyo 2020 had experience of working at the previous Games, which mirrors the findings of File *et al* who looked at the experience of pharmacy volunteers at the London 2012 Olympic and Paralympic Games.[6] In the study, they found that pre-Games education was beneficial for the pharmacists, and the most useful element of the training was the part that focused on antidoping and the use of TUEs.

Nevertheless, pharmacists were concerned about the items regarding the IOC Needle Policy and the Medication Importation Declaration. The IOC Needle Policy aims to eliminate inappropriate injection and doping, requiring the prescriber to submit a declaration for all injections administered during the Olympic Games.[12] Meanwhile, Medication Importation Declaration is another self-reporting system for doctors of the National Olympic Committee and National Paralympic Committee to declare the list of medications on behalf of the team brought into Japan from their countries for use by their own team. The medication declaration list was reported to the administrative department of the Organising Committee and reviewed by the medical committees of IOC and International Paralympic Committee. In contrast to other questions, these scores were possibly a result of unfamiliarity with the rules as they were not directly related to the service by pharmacists.

The authors believe that pharmacists working at the Games should be aware that some medications to which the IOC Needle Policy is applicable require a TUE application. Furthermore, pharmacists should make sure TUE requirements are covered when validating prescriptions which are also subject to the IOC Needle declaration to protect athletes against inadvertent antidoping violation. Moreover, as understanding of the Medication Importation Declaration will help pharmacists to recognise that athletes have access to medications not dispensed from the pharmacy. It is important for pharmacists to know the team's possession of some drugs when counselling athletes or recommending a medication or considering supplying non-formulary products. This represents an opportunity for the pharmacy team to offer comprehensive and high-quality pharmacy care at the Games. Future training for volunteer pharmacists should include application of the IOC Needle Policy and the Medication Importation Declaration.

One of the recruiting criteria for pharmacy volunteers in Tokyo 2020 was English proficiency, but the pharmacists felt that their ability to converse in English needed to be improved. In free text responses, they expressed it was a difficult experience to speak in non-Japanese, especially when Arabic and Russian were the only languages spoken by the patient; some pharmacists mentioned that a pocket voice translator was helpful. The results support the need to develop measures to overcome language barriers. It may take time and individual efforts, but in the meantime, therapeutic communication techniques for healthcare professionals should be enforced and emphasised. The training should include techniques of clarification, paraphrasing or repeating back, as well as non-verbal communication. Joining the various international network of sport pharmacists

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would present opportunities to develop communication skills, sharing ideas and resolving the challenges.

The mega sport events of Tokyo 2020 Games were postponed due to COVID-19, and anti-COVID measures at the pharmacy posed huge burdens. Based on the survey, the pharmacists seemed to be ready to implement COVID-19 prevention measures, and effort was made to comply with the rules and frequent 'PCR tests for pharmacists', but at the same time, some concerns were expressed by the pharmacists regarding 'not enough information provided about the Game delay and COVID-19' and 'managing COVID-19 infection prevention and control'. These comments may indicate that pharmacy teams in the future need to consider including anti-COVID measures in the training of the pharmacy workforce. It may warrant the development of standard operating procedures for infection prevention and control, focusing on pharmacy service at the Games.

Clinical implications

Differently from traditional pharmacy services, Olympic and Paralympic pharmacy possesses special characteristics. The pharmacy at the Games might have to deal with the lack of equipment, unclear boundaries of individual responsibility, new team members and handling of atypical and special patient populations. However, these issues cannot be avoided because the pharmacy at the Games is a temporary service facility with volunteers. Therefore, a keen awareness, exact knowledge and quick adaptation with a professional attitude are extremely important.[13] This study is unique because it evaluated pharmacist volunteers perceptions of the service offered at the Tokyo 2020 Games. The views of theses participants can help identify areas for improvement for the next Olympic and Paralympic Games; these aspects were enforcement of pre-Games education including specific policies, development of a strategy for better communication and preparation of infection control and prevention policies specific to pharmacy care.

Limitations

The number of participants in the survey was small. However, it comprised all pharmacists serving the Games. The pharmacists from the previous Games were not included due to baseline discrepancy. Aspects of pharmacy services requiring improvement were identified. Moreover, the data were analysed using simple descriptive statistics to minimise potential statistical bias. Another limitation is the possibility of systematic self-assessment bias by self-enhancement or motivational factors.

CONCLUSIONS

Overall, pharmacists were satisfied with the sports pharmacy service during the Games. The study suggested that education related to medications compliant with Game-specific policies be included in pre-Games training, and improvement in communication skills is necessary. Addressing this could help promote high-quality sustainable services in Olympic and Paralympic pharmacy care in the future.

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Ethics approval This study involves human participants and was approved by Health Sciences University of Hokkaido, 21P004. This study was conducted after approval by the Pharmacy Ethics Review Committee for Human Subjects at the Faculty of Pharmaceutical Sciences and Graduate School of Pharmaceutical Sciences, Health Sciences University of Hokkaido (Approval number 21P004, September 10, 2021). Permission to conduct the study was also obtained from the medical commissions of the IOC and IPC. The study was conducted according to the guidelines of the Declaration of Helsinki for human studies from the World Medical Association. Participants gave informed consent to participate in the study before taking part.

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