










Evaluation of a web-based educational programme for pharmacists during the COVID-19 pandemic in Japan

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Funding information

This publication was supported financially by the Japanese Society of Pharmaceutical Oncology (JASPO).

Abstract

What is known and Objective: Continuing education is essential for pharmacists to acquire and maintain the knowledge, skills, and ethical attitudes necessary for clinical practice. However, with the emergence of COVID-19, the social circumstances and face-to-face learning environments have changed. The objectives of this study were to determine Japanese pharmacists' perception of a web-based educational programme in oncology, and assess changes in their understanding of pharmaceutical care in oncology before and after their participation in the webinar.

Methods: Questionnaire-based surveys were conducted for the participants of the web-based educational programme to determine their perspectives on the webinar, and their degree of comprehension of the five cancer types covered before and after watching the webinar.

Results and Discussion: Of the 1936 pharmacists taking the programme, all participated in the pre-webinar survey, and 1861 (96.1%) in the post-webinar survey. Compared with previous seminars that were held in the offline mode before the COVID-19 pandemic, 76.8% of respondents were significantly satisfied with

the web-based educational programme. The median post-webinar comprehension scores in all modules were significantly higher than the median pre-webinar scores ($p < 0.0001$). A majority of the participants agreed that a web-based educational programme was satisfactory in acquiring knowledge.

What is new and Conclusion: This web-based educational programme was effective for Japanese pharmacists for postgraduate education in pharmaceutical care in oncology. To the best of our knowledge, our study is the first to report the effectiveness of a web-based educational programme for oncology pharmacists using a large population.

KEYWORDS

clinical pharmacy, education, oncology

1 | WHAT IS KNOWN AND OBJECTIVE

Continuing education for pharmacists, as a lifelong learning model, is an internationally recommended approach. It enables pharmacists to acquire and maintain the necessary knowledge, skills, and ethical attitudes for their clinical practice.^{1,2} Oncology pharmacists have been recognized as being a frontline provider of patient care within a multidisciplinary team,³ and continuing education is therefore needed for oncology pharmacists. A survey conducted by the International Society of Oncology Pharmacy Practitioners (ISOPP) reports that barriers to accessing education in oncology pharmacy practice include travelling time to attend educational activities and a limited number of organizations that provide such learning opportunities in their countries of practice. The ISOPP survey also states that most respondents consider webinars as an effective educational tool.⁴ COVID-19 has brought about changes in social circumstances and in the educational environment for pharmacists. The Japanese government promoted avoidance of the three 'C's' (close spaces, crowded places, and close-contact settings) during the pandemic.⁵ Thus, many annual meetings and educational seminars were cancelled in early 2020. In this COVID-19 pandemic era, the remote learning style must be adopted to maintain social distance.⁶

The Japanese Society of Pharmaceutical Oncology (JASPO) is an academic society for health professionals involved in cancer care. The purpose of this society is to contribute to the development of cancer medicines and improve public health. Annually, the JASPO education and training committee provides educational courses for beginning and advanced pharmacists. Before the COVID-19 pandemic, educational courses for mid- to advanced-level pharmacists (JASPO Brush-up seminar) were offered in the 'in-person' style twice or thrice a year in large cities (eg Tokyo, Osaka, Fukuoka) of Japan. In the current situation, offering in-person lectures is challenging. Thus, we developed a web-based programme for pharmacists to provide them advanced oncology pharmaceutical care training.

The objectives of this study were to determine Japanese pharmacists' perception of a web-based educational programme in

oncology and assess changes in their understanding of pharmaceutical care for cancers before and after participation in the webinar.

2 | METHODS

2.1 | Webinar for oncology pharmacists

The educational webinar for mid- to advanced-level pharmacists (JASPO Brush-up seminar) was offered for seven days (from December 14 to December 20, 2020). Participants could re-watch the webinars as per their convenience. Originally created as a 1-day offline mode programme, the web-based educational programme was extended to 7-days. Modules of the educational webinar were pharmaceutical care of gastric cancer, colon cancer, lung cancer, breast cancer, and haematological malignancy. Each 60-minute module was pre-recorded by oncology pharmacy specialists in Japan.

2.2 | Questionnaires

Four members of the education and training committee of the JASPO developed the drafts of the questionnaires. According to suggestions and comments from committee members, the self-administered questionnaire drafts were modified and finalized by agreement of all 15 committee members. The questionnaires were completed by participants before and after watching the educational webinar (pre-webinar and post-webinar surveys). The pre-webinar survey was accessible before watching the webinar, and the post-webinar survey could only be accessed after completion of the five modules. Questions were aimed at determining the participants' perspectives on the webinar and their degree of comprehension of the five cancer types mentioned above. Before and after the webinar, the degree of comprehension was recorded using an eleven-level indication metric, where 0 represented 'I do not understand at all' and 10 represented 'I understand well-enough'. Perspectives

of the participants were evaluated by a 5-point Likert-scale. We used linkable anonymizing to analyse and compare the responses to the questionnaire. The participants' completion and submission of the questionnaire were regarded as consent to participate in this research.

2.3 | Statistical analyses

All statistical analyses were performed using SAS version 9.4 (SAS Institute). The Wilcoxon signed-rank test was used to compare scores for degrees of comprehension of each module. Significance was defined at $p < 0.05$ for all statistical tests.

2.4 | Ethics approval

This study was approved by the ethics review board of Miyagi Cancer Center (approval number: 2020-043).

3 | RESULTS AND DISCUSSION

Of 1974 webinar applicants, 38 were excluded at the beginning because they never accessed the webinar. Among the remaining 1936, 100% participated in the pre-webinar survey and 1861 (96.1%) in the post-webinar survey. Unanswered questions were not considered in the evaluation of the data, though we included data from other questions answered by the respondents. We evaluated characteristics of the respondents using a pre-webinar survey ($n = 1936$) and their perspectives by a post-webinar survey ($n = 1861$). To compare the scores of degrees of comprehension before and after the webinar, we analysed only complete questionnaires, which included responses of 1200 participants (60.8%).

3.1 | Characteristics of respondents

The characteristics of pre-webinar survey respondents are shown in Table 1. Approximately 46% of respondents ($n = 886$) had less than ten years of experience as a pharmacist. Of the 1936 respondents, only 6.7% ($n = 129$) worked at cancer centres, and 25.9% ($n = 502$) at dispensing pharmacies. According to the workplace location, 33% ($n = 641$) of respondents were from the Tokyo metropolitan area (Tokyo, Chiba prefecture, Saitama prefecture, Kanagawa prefecture). The percentage of respondents who had any board certification was 39.1% ($n = 771$), while 51.9% ($n = 1001$) had no board certification. Certifications related to oncology were as follows: Accredited Pharmacist of Ambulatory Cancer Chemotherapy certified by JASPO ($n = 565$, 29.2%), Board Certified Pharmacist in Oncology Pharmacy certified by the Japanese Society of Hospital Pharmacists ($n = 144$, 7.4%), Board Certified Pharmacist in Palliative Pharmacy certified by the Japanese Society for Pharmaceutical

TABLE 1 Characteristics of participants of pre-webinar survey ($n = 1936$)

	<i>n</i> (%)
Age, years	
<25	19 (1.0%)
25–29	321 (16.6%)
30–34	561 (29.0%)
35–39	372 (19.2%)
40–44	216 (11.1%)
45–49	146 (7.5%)
50–54	85 (4.4%)
55–59	61 (3.2%)
60–64	28 (1.4%)
N/A	127 (6.6%)
Pharmacy experience, years	
1–4	330 (17.0%)
5–9	556 (28.7%)
10–19	606 (31.3%)
20–29	227 (11.7%)
>30	85 (4.4%)
Not pharmacist	5 (0.3%)
N/A	127 (6.6%)
Workplace distribution	
Cancer centre	129 (6.7%)
General Hospital/ Clinic	1160 (59.9%)
Dispensing pharmacy	502 (25.9%)
Others (pharmaceutical company, faculty member, government)	21 (1.1%)
N/A	124 (6.4%)
Workplace location	
Tokyo metropolitan area (Tokyo, Chiba, Saitama, Kanagawa)	641 (33.1%)
Osaka	154 (8.0%)
Fukuoka	92 (4.8%)
Others	870 (44.9%)
N/A	179 (9.2%)
Board pharmacy certification	
Yes	771 (39.6%)
APACC	565 (29.2%)
BCPOP	144 (7.4%)
BCPPP	68 (3.5%)
JOP	51 (2.6%)
Other certification	127 (6.6%)
No	1001 (51.9%)
N/A	164 (8.5%)

Abbreviations: APACC, Accredited Pharmacist of Ambulatory Cancer Chemotherapy; BCPOP, Board Certified Pharmacist in Oncology Pharmacy; BCPPOP, Board Certified Pharmacist in Palliative Pharmacy; JOP, JSPHCS-certified Oncology Pharmacist; JSPHCS, Japanese Society of Pharmaceutical Health Care and Sciences; N/A, not applicable.

Palliative Care and Sciences ($n = 68$, 3.5%), and Japanese Society of Pharmaceutical Health Care and Sciences certified Oncology Pharmacist ($n = 51$, 2.6%).

3.2 | Perspectives of respondents

Table 2 shows respondents' perception of the webinar evaluated using the post-webinar survey and excluding the no-responses. More than half of the respondents (826 out of 1300, 63.5%) evaluated the degree of difficulty of the web-based educational programme as 'just right', followed by 'slightly difficult' (350 out of 1300, 26.9%). For the length of each module (60 min), 78.9% of respondents felt that it was 'just right' (1028 out of 1303), followed by 'slightly long' responses (213 out of 1303, 16.3%). Compared to previous seminars held in-person before the COVID-19 pandemic, 78.2% of respondents (817 out of 1045) evaluated the usefulness of the web-based educational programme as 'slightly improved' or 'significantly improved'. A similar trend was observed in the evaluation of the convenience of the web-based educational programme. Ninety per cent of respondents (919 out of 1026) answered that the convenience of the web-based educational programme was 'slightly improved' or 'significantly improved' compared to previous in-person seminars. Satisfaction of the web-based educational programme was evaluated as slightly or significantly improved by 76.8% of respondents (780 out of 1016).

3.3 | Degree of comprehension before and after the webinar

The comprehension scores for each module before and after the webinar are shown in Figure 1. The median post-webinar comprehension scores in the gastric cancer, colon cancer, lung cancer, breast cancer, and haematological malignancy modules significantly increased compared to the median pre-webinar scores ($p < 0.0001$).

4 | DISCUSSION

There is a need for increasing the learning opportunities for oncology pharmacists⁴; however, few reports describe the effectiveness of web-based educational seminars for oncology pharmacists. We conducted one of the most extensive questionnaire survey-based studies to evaluate the perception of a web-based educational oncology programme for pharmacists in Japan and found significant improvement in the degree of comprehension for all modules on the five cancer types after the webinar (Figure 1).

The majority of respondents worked at a hospital or a clinic, while 26% worked at dispensing pharmacies. In Japan, pharmacists in hospitals or clinics are more specialized in oncology than in dispensing pharmacies. Suzuki et al.⁷ reported the evaluation of community pharmacists' ability when administering oral anticancer agents; more than half of community pharmacists experienced

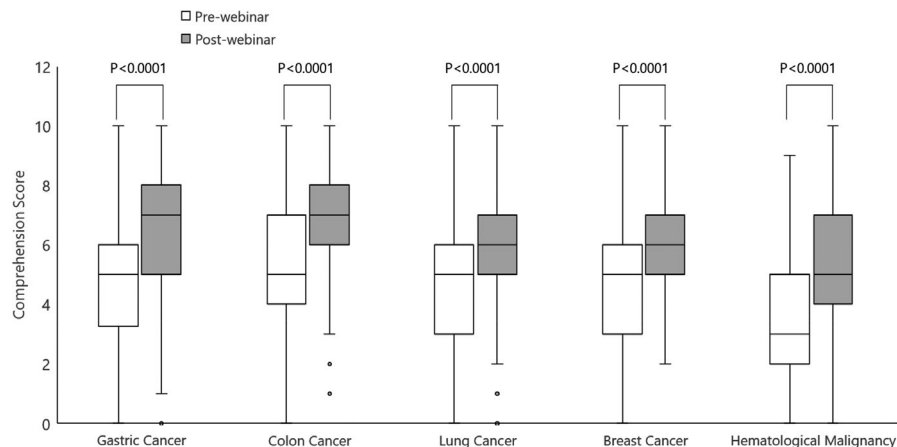
TABLE 2 The participants' perspectives of educational webinar (excluding non-responses)

	n (%)
Degree of difficulty ($n = 1300$)	
Easy	7 (0.5%)
Slightly easy	72 (5.5%)
Just right	826 (63.5%)
Slightly difficult	350 (26.9%)
Difficult	45 (3.5%)
Length of each module ($n = 1303$)	
Short	2 (0.2%)
Slightly short	50 (3.8%)
Just right	1028 (78.9%)
Slightly long	213 (16.3%)
Long	10 (0.8%)
Improvement of usefulness compared to the previous seminar (in-person style) ($n = 1045$)	
Significantly improved	320 (30.6%)
Slightly improved	497 (47.6%)
Neither	212 (20.3%)
Slightly deteriorated	13 (1.2%)
Significantly deteriorated	3 (0.3%)
Improvement of convenience compared to the previous seminar (in-person style) ($n = 1026$)	
Significantly improved	494 (48.1%)
Slightly improved	425 (41.4%)
Neither	101 (9.8%)
Slightly deteriorated	5 (0.5%)
Significantly deteriorated	1 (0.1%)
Improvement of satisfaction compared to the previous seminar (in-person style) ($n = 1016$)	
Significantly improved	311 (30.6%)
Slightly improved	469 (46.2%)
Neither	211 (20.8%)
Slightly deteriorated	22 (2.2%)
Significantly deteriorated	3 (0.3%)

difficulties in providing support for oral chemotherapy patients. We speculated that the low percentage of participants from dispensing pharmacies could be related to their perception of oncology being difficult. Among the participants in our web-based educational programme, 33% of respondents worked in the Tokyo metropolitan area. As per the statistics of physicians, dentists, and pharmacists in 2018,⁸ the percentage of pharmacists in this area was approximately 33%; therefore, the participation in our web-based educational programme corresponded to the pharmacists' distribution in Japan.

In the present study, we assessed the Japanese pharmacists' perspectives on the web-based educational programme. Sixty-four per cent of respondents evaluated the degree of difficulty of our web-based educational programme as 'just right'. In contrast, 30.4%

FIGURE 1 The comprehension scores for each module before and after the webinar. Horizontal lines within the boxes indicate medians; boxes indicate the values of the interquartile range (IQR) between Q1 (the 25th) and Q3 (the 75th) percentiles. The whiskers above and below boxes represent maximum and minimum values. Open circles are outliers



of respondents (395 out of 1300) felt that it was 'slightly difficult' or 'difficult'. Furthermore, 45.7% of respondents (886 out of 1936) were young pharmacists with less than 10 years of experience. Our web-based educational programme, the 'Brush-up seminar', was developed for mid- to advanced-level pharmacists. The contents of each module consisted of state-of-the-art cancer pharmacotherapy, investigational drugs, and case presentations by oncology pharmacy specialists. This could be the one of the reasons for 30% of respondents rating the degree of difficulty as 'slightly difficult' or 'difficult'. Regarding the length of each module, approximately 80% of respondents felt that it was 'just right'. Previous in-person seminars were also 60-minutes per module. Therefore, the length of each module did not change between the in-person and online modes.

Approximately 80% of respondents stated that there was an improvement in usefulness, convenience, and satisfaction compared to the previous in-person style seminar. The top three advantages of a web-based educational programme as described by the respondents were: flexible watching time and location (1165 out of 1861, 62.6%), re-watching convenience (1097 out of 1861, 58.9%), and saving to-and-from travel time to the seminar location and money (1000 out of 1861, 53.7%). In a previous study on distance education among medical students in Jordan,⁶ limited social contact, such as social distancing, and saving money and energy for university transportation, were reported as advantages of online learning. The recorded model allows for pause and play, and allows for adaptation to daily activities, which are the merits of online learning.⁹ Some students prefer recorded lectures to live interaction because it allows them to choose the best time to study.¹⁰ Our results are consistent with these reports.

Regarding disadvantages of the web-based educational programme, more than 20% of respondents felt that the opportunities for networking with other participants or lecturers through the web seminar were lesser. In addition, some respondents faced technical issues such as volume control, internet connection, and computer settings. Thus, in contrast to in-person style seminars, web-based educational programmes are dependent on the accessibility and functionality of technological gadgets (eg personal computers, smartphones, and tablets) and network environments.^{11,12} Furthermore, connectivity issues were also reported, which limit the

use of e-learning.¹³ Although technical settings for both lecturers and participants were needed, our study is the first to report the effectiveness of web-based educational programmes for oncology pharmacists in a large population.

In terms of the degree of comprehension compared before and after the webinar, the scores significantly improved in all modules. Although the understanding of each module was based on self-assessment, most respondents concluded that a web-based educational programme enhanced their comprehension of pharmaceutical care in oncology. Similarly, the effectiveness of online education programmes for chronic kidney disease and anaphylactic shock for pharmacists and pharmacy students is reported in several studies.¹⁴⁻¹⁸ Overall, our results showed that most respondents were satisfied with the shift to a web-based educational programme. Therefore, the educational effects of web-based educational programmes are at par with traditional seminars and face-to-face learning.

Similar results were obtained in a previous study on online education for medical haematology/oncology fellows.¹⁹ Additionally, most fellows were comfortable in transitioning to an online learning environment from the traditional in-person learning mode due to the pandemic. However, some studies conducted before the COVID-19 pandemic show that medical students do not yet favour the online educational approach over the in-person educational environment.²⁰⁻²² Cancer has been the leading cause of death in Japan since 1981,²³ and projections for 2020 indicate that 1,012,000 people will suffer and 379,400 people will die due to cancer.²⁴ It would be no exaggeration to say that Japan is currently in the 'Cancer Era'. This web-based educational programme for oncology pharmacists in Japan is, therefore, extremely important in this COVID-19 pandemic situation.

The present study has some limitations. First, while the response rate was high (100% and 96.1% in the pre-and post-webinar surveys, respectively), no-responses in several questions were frequent, particularly in the post-webinar survey. Second, more of the respondents in the post-webinar survey could have been enthusiastic individuals who were willing to answer such a survey after completing the 5-h web-based educational programme, while other less enthusiastic participants chose to leave without completing the survey. Therefore, the results of the study cannot be generalized to

all the licenced pharmacists in Japan. Finally, our questionnaire survey only evaluated the self-assessed degree of comprehension, not the educational effects by objective measures such as standardized achievement-test scores. To better evaluate the educational benefits of the web-based educational programme for Japanese pharmacists in oncology, an objective assessment tool should be developed and employed in the near future.

5 | WHAT IS NEW AND CONCLUSION

This web-based educational programme was an effective medium for postgraduate education in pharmaceutical care in oncology for Japanese pharmacists. Web-based educational programmes are very useful for acquiring knowledge and satisfy the expectations of the participants. Due to the COVID-19 pandemic situation, there is a need to explore and develop an effective remote learning environment for pharmacists.

ACKNOWLEDGEMENTS

We thank the participants of the 'JASPO Brush-up seminar' who participated in the surveys for this study. Furthermore, we would like to express sincere gratitude to Dr. Hiroyoshi Kato, president of JASPO, the vice presidents of JASPO, Mr. Hiroshi Yamamoto, Mr. Masataka Otsuka, Mr. Naoki Kondo, and Dr. Reiko Matsui, and Dr. Akira Shinohara, a member of the education and training committee, for their cooperation in organizing this educational programme.

CONFLICTS OF INTEREST

The authors declare no relevant conflicts of interest or financial relationships.

PATIENT CONSENT STATEMENT

The participants' completion and submission of the questionnaire were regarded as consent to participate in this research.

PERMISSION TO REPRODUCE MATERIAL FROM OTHER SOURCES

Not applicable.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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How to cite this article: Tsuchiya M, Terazono H, Maki Y, et al. Evaluation of a web-based educational programme for pharmacists during the COVID-19 pandemic in Japan. *J Clin Pharm Ther*. 2021;46:1743-1749. <https://doi.org/10.1111/jcpt.13526>