

## Original Research

# Video-based learning can improve the understanding of pharmacists' contributions during the COVID-19 pandemic: A cross-sectional survey of pharmacy students in Japan

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### Abstract

**Background:** It has been challenging to conduct university education in face-to-face and large group settings during the COVID-19 pandemic. Accordingly, there is a pressing need for online educational videos. **Objective:** To create educational videos to highlight community pharmacists' efforts during the COVID-19 pandemic in Japan and investigate pharmacy students' awareness of community pharmacists' efforts. **Methods:** To assess the importance of five educational videos, we conducted a cross-sectional survey. In July 2020, first-year pharmacy students (n = 120) were invited to watch these educational videos, which dealt with infection control measures for COVID-19 in pharmacies and the questions received from patients on COVID-19. Subsequently, the students were asked to respond to a questionnaire to assess the impact of the videos on them. **Results:** Seventy percent of the students revealed that after watching the videos, they, for the first time, realized the contributions of community pharmacists toward healthcare during the COVID-19 pandemic. Many of the students reported that their image of the pharmacist profession changed to "a familiar medical professional who is close to patients." Furthermore, 102 of the participants (85%) were satisfied with the videos and more than 60% said they gave them confidence for their future studies. **Conclusions:** Creating these five educational videos provided the first-year pharmacy students with an improved understanding of the role played by pharmacists in public health. Through the videos, the role of pharmacists during the COVID-19 pandemic was particularly highlighted. This helped students feel closer to pharmacists, whose role is rarely reported in the media. Moreover, their future goal of becoming a pharmacist was concretized.

**Keywords:** student, pharmacy; education, distance; COVID-19; motion pictures; pharmacists

## INTRODUCTION

In December 2019, the novel coronavirus disease (COVID-19) was first confirmed in Wuhan, China. As of January 14, 2022, more than 600 million cases and 6.5 million deaths had been attributed to COVID-19 in over 200 countries.<sup>1</sup> This pandemic has created unprecedented challenges in the education field globally. However, efforts have been made to avoid disrupting education by providing individualized support through e-mail and online meeting systems, allowing students to learn without feeling isolated.<sup>2-5</sup>

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In Japan, the first COVID-19 case was confirmed on January 15, 2020. As the infection spread rapidly, the country declared a state of emergency in April 2020.<sup>6</sup> Consequently, nearly 90% of public and private universities halted face-to-face classes from the start of the new school year.<sup>7</sup> In all universities across Japan, students were restricted from entering campuses and all classes for the new semester were held remotely. In mid-May, the state of emergency was lifted in all prefectures within the Kansai region. From June onward, only practical training and research activities that could not be conducted remotely were permitted on-campus under strict regulations for infectious disease control (Table 1).<sup>8</sup>

Pharmacists are a crucial component of the healthcare sector through their frontline work dispensing acute care medicine as well as community medicine. Pharmacy students in Japan learn about pharmacists' role in community medicine by visiting pharmacies and hospitals, where they may work in the future. When studying for a professional role, such early exposure to the demands of professional life facilitates students' learning process and subsequent learning goals.<sup>9-11</sup> However, such opportunities were lost during the pandemic despite television and the online media providing daily reports on doctors and nurses in direct contact with COVID-19 patients.<sup>12</sup>

Since the International Pharmaceutical Federation's guidelines highlight that pharmacists' roles in public health are rarely covered by the media during a pandemic,<sup>13</sup> we created five educational videos to highlight community pharmacists' efforts during the COVID-19 pandemic. We assessed the importance



	Governmental action	University's response
January 31, 2020	The World Health Organization declares COVID-19 a public health emergency of international concern	
30 March		Suspension of research activities
7 April	State of emergency declared in seven cities	
9 April		No entry onto the campus. University facilities (e.g., laboratories, libraries, and study rooms) were closed
16 April	Declaration of state of emergency (nationwide)	
17 April	Kyoto Prefecture emergency measures to prevent the spread of COVID-19	
8 May		All spring semester classes were offered remotely
25 May	State of emergency lifted nationwide	
31 May	Kyoto Prefecture requests the suspension of university facilities (e.g., use restrictions) to be lifted	
1 June		Resumption of university and graduate school research activities
17 September		Entrance controls and headcount restrictions lifted

of these educational videos by conducting a cross-sectional survey of 120 first-year pharmacy students in July and August 2020.

## METHODS

### Study design and participants

The cross-sectional survey was answered by 120 first-year pharmacy students who enrolled in a six-year pharmacy course on the topic "Introduction to Clinical Pharmacy." The sample was recruited from the first author's university. Five educational videos were created (see the next subsection) and made available to the students on the university's learning management system from July 6 to July 17, 2020. After watching the videos, the students were asked to respond to an online survey on the same system from July 23 to August 1, 2020.

### Production of the educational videos

The educational videos were created from the edited videos of focus group interviews with three pharmacists who were active members of the COVID-19 Community Pharmacies Support Project.<sup>14</sup> The interviews were recorded by two facilitators using predefined questions and methods via the online conferencing service Zoom. The content of the interviews was organized and the five videos were published on YouTube. Each video was approximately 10 minutes in length (Table 2). An online chat tool was used for preliminary discussions on the creation of the videos.

### Online survey

Eligible students were asked to respond to a self-administered online questionnaire after watching the videos. The questionnaire consisted of three sections and seven questions (Table 3). Section 1 explored the sources of information from which the participants had learned about how community

Video	Content	URL
Video 1	COVID-19 measures in pharmacies	<a href="https://youtu.be/BSxvD5JkRXM">https://youtu.be/BSxvD5JkRXM</a>
Video 2	Online medication instruction	<a href="https://youtu.be/ZLnSNB837MI">https://youtu.be/ZLnSNB837MI</a>
Video 3	Specific examples of patient care	<a href="https://youtu.be/11LD2z4iJAU">https://youtu.be/11LD2z4iJAU</a>
Video 4	Rewards of being a pharmacist	<a href="https://youtu.be/FYc3AgKVXqQ">https://youtu.be/FYc3AgKVXqQ</a>
Video 5	What a student should experience	<a href="https://youtu.be/ppnu3y35imY">https://youtu.be/ppnu3y35imY</a>

<b>Section 1:</b> Sources of information about the contributions of pharmacists
q1. How did you hear about community pharmacists' contributions during the COVID-19 pandemic?
<b>Section 2:</b> Impact of viewing the videos
q2. Did watching these educational videos change your image of what a pharmacist does?
q3. Which of the following aspects of the video impressed you the most about pharmacists' contributions during the COVID-19 pandemic?
<b>Section 3:</b> Effect of viewing the videos on motivation to learn
q4. The videos presented in this class captured your attention. [Attention]
q5. The content of these videos was irrelevant to you. [Relevance]
q6. The information you gained from watching these videos has given you confidence for your future studies. [Confidence]
q7. You are glad to have watched these videos. [Satisfaction]

pharmacists contributed to healthcare during the COVID-19 pandemic. The respondents were asked to choose from the following five options: "this video," "TV and other media," "social networking services (Facebook, Twitter, Instagram)," "I have actually seen it myself," and "I heard about it from an acquaintance or family member." Section 2 aimed to investigate the videos' impact on the students; the participants were asked to answer questions about the changes in their perception



of the profession because of watching the videos as well as the most memorable stories in the video content. Section 3 assessed the videos' impact on students' motivation to learn using a 5-point Likert scale with the following options: "agree," "somewhat agree," "undecided," "somewhat disagree," and "disagree." For learning motivation, one question was prepared for each of four related factors: attention, relevance, confidence, and satisfaction.<sup>15</sup>

### Analysis

The participants were divided into two groups based on the source of information they mentioned (q1): the "known" group (n = 37), who already knew about the contributions of pharmacists, and the "first-time viewer" group (n = 83), who had learned about them for the first time through the videos. A Chi-square test was used to determine the relationship between "impact" and "willingness to learn." The participants' change of mind about pharmacists' contributions as a result of watching the videos was compared by dividing the respondents into two groups: those who answered "agree" or "somewhat agree" were classified into the "changed" group, while those who answered "undecided," "somewhat disagree," and "disagree" were classified into the "did not change" group. Statistical analysis was conducted using IBM SPSS Statistics Ver. 26 software, with a significance level of 5%.

### Ethics approval

This survey falls within the scope of our university's "Guidelines for research that does not require an application for ethics review for research involving human subjects." Sufficient steps

were taken to address the relevant ethical considerations, including statistical processing to ensure that the participants' personal information remained anonymous (from Doshisha Women's College of Liberal Arts Ethics Review Committee Regulations Concerning Research Involving Human Subjects [revised March 12, 2020]). Before conducting the survey, its purpose and the voluntary nature of participation were explained to the participants in writing and orally, and they were given the liberty to decline when responding.

## RESULTS

### Participants

The survey was administered to the 120 first-year students at the university, with a 100% response rate and a 100% valid response rate. In response to q1 ("Where did you learn about community pharmacists' contributions during the COVID-19 pandemic?"), 83 (69.2%) of the respondents mentioned the videos shown, whereas 37 (30.8%) answered "other information sources." Among those who obtained information from sources other than the videos shown, 17 (14.2%) mentioned that they learned about it from TV or other media platforms, followed by five (4.2%) who learned about it from social networking services (Table 4).

### Comparison of the impact of watching videos and effect on learning motivation

Table 5 shows the differences in the videos' impact on learning motivation across the two groups formulated on the basis of

Item	Overall n = 120	
	Frequency	(%)
q1. How did you hear about community pharmacists' contributions during the COVID-19 pandemic?		
This video	83	(69.2)
Television and another media coverage	17	(14.2)
Social networking services (Facebook, Twitter, Instagram)	5	(4.2)
Have seen it myself	2	(1.7)
Heard about it from acquaintances/family members	9	(7.5)
Other	4	(3.3)

Item	Pharmacists' contributions during the COVID-19 pandemic				P value
	First-time viewer group n = 83		Known group n = 37		
	Frequency	(%)	Frequency	(%)	
q2. Did watching these educational videos change your image of what a pharmacist does?					
Changed	54	(65.1)	16	(43.2)	0.025*
q3. Which of the videos' following aspects impressed you the most about pharmacists' contributions during the COVID-19 pandemic?					



Infection control in pharmacies	7	(8.4)	6	(16.2)	0.580
Attitude when providing correct and appropriate information	12	(14.5)	7	(18.9)	
Pharmacist answered questions/concerns on topics other than prescription drugs	10	(12.0)	3	(8.1)	
Pharmacist seems familiar with the patient	53	(63.9)	20	(54.1)	
Other	1	(1.2)	1	(2.7)	
q4. The video presented in this class captured your attention. [Attention]					
Agree	70	(84.3)	26	(70.3)	0.075
Somewhat agree	13	(15.7)	11	(29.7)	
Undecided	0	(0)	0	(0)	
Somewhat disagree	0	(0)	0	(0)	
Disagree	0	(0)	0	(0)	
q5. The content of these videos was irrelevant to you. [Relevance]					
Agree	1	(1.2)	0	(0)	0.337
Somewhat agree	0	(0)	1	(2.7)	
Undecided	3	(3.6)	3	(8.1)	
Somewhat disagree	20	(24.1)	11	(29.7)	
Disagree	59	(71.1)	22	(59.5)	
q6. The information you gained from watching these videos has given you confidence for your future studies. [Confidence]					
Agree	55	(66.3)	21	(56.8)	0.293
Somewhat agree	24	(28.9)	16	(43.2)	
Undecided	3	(3.6)	0	(0)	
Somewhat disagree	1	(1.2)	0	(0)	
Disagree	0	(0)	0	(0)	
q7. You are glad to have watched these videos. [Satisfaction]					
Agree	73	(88)	29	(78.4)	0.175
Somewhat agree	10	(12)	8	(21.6)	
Undecided	0	(0)	0	(0)	
Somewhat disagree	0	(0)	0	(0)	
Disagree	0	(0)	0	(0)	

\*Statistically significant at  $P < 0.05$

the source of information. The number of those who answered that the videos changed their concept of pharmacists' jobs (q2) was 54 (65.1%) in the "first-time viewer" group and 16 (43.2%) in the "known" group. Subsequently, when asked about the most memorable part of the video (q3), most of the respondents in both the "first-time viewer" and the "known" groups answered "pharmacists' familiarity with patients" (53/83 (63.9%) and 20/37 (54.1%), respectively). However, the percentage of students who said they were most impressed with "infection control in pharmacies" was almost twice as high in the "known" group (16.2% vs 8.4% in the "first-time" group).

Additionally, when we asked about the respondents' attention (q4) and satisfaction (q7) regarding the videos, 96 (80.0%) and 102 (85.0%) of the sample agreed and disagreed, respectively. When we asked about how much they could relate to the videos (q5; relevance) and how much confidence they had in their future studies (q6; confidence), more than 60% of the

students indicated that both questions were relevant to their lives and that the videos boosted their confidence for future studies. No significant differences were found between the "first-time" and "known" groups for any of the questions.

## DISCUSSION

The five educational videos created in this study improved first-year pharmacy students' understanding of community pharmacists' role in public health. Through the videos, pharmacists' role during the COVID-19 pandemic was highlighted. The videos thus helped students feel closer to pharmacists (whose contributions often go unreported by the media) and concretized their future goal of becoming pharmacists. Overall, the students found the experience highly satisfactory.



In the survey, approximately 70% of the respondents indicated that they had initially learned about community pharmacists' contributions during the COVID-19 pandemic through the videos. This may be due to the low level of public awareness of pharmacists' role in society and lack of opportunities for them to appear on TV and other media platforms. Previous studies have reported that pharmacists' work is not well known to the public, which is consistent with our results.<sup>12</sup> In a previous study of pharmacy students' perception of pharmacists, more than 70% answered "pharmacists are medical professionals," whereas only a minority answered that "pharmacists have a public health mission," as stated in Article 1 of the Pharmacists Act.<sup>16</sup> During the COVID-19 pandemic, community pharmacists worked directly with COVID-19 patients and played an important role in to public health by educating patients about the prevention of infection, responding to patients' COVID-19 concerns, and supporting the healthcare system by counseling patients concerned about minor symptoms.<sup>17,18</sup> Our videos could thus serve as a useful source of information to convey pharmacists' social role to pharmacy students.

In the survey, we asked the participants about the change in their perception of pharmacists' job and what, if anything, impressed them about the videos. The survey results suggested that pharmacy students who thought that pharmacists were experts in medicine became aware of the pharmacist's job, which goes beyond just receiving and delivering medicine.

Previous studies have reported that students who practiced at pharmacies during the COVID-19 pandemic learned the importance of pharmacists' role as familiar and trustworthy medical personnel during disasters.<sup>19</sup> However, our survey approached the topic from the perspective of preventing the spread of infection and used educational videos instead of on-site observations. Watching videos as a way to learn about pharmacists' frontline struggles during the pandemic may have also contributed to pharmacy students' acquisition of new knowledge about pharmacists' work.

In the survey, all the students revealed that the educational videos sustained their attention. They reported being highly satisfied after watching them, possibly because the videos directly conveyed the COVID-19 pandemic experience through interviews with actual community pharmacists rather than through the distribution of materials or lecture videos that offer limited knowledge. Video learning has recently been introduced in various educational settings (including medical settings) because it instills greater confidence and promotes increased engagement than text-only learning.<sup>20-22</sup> Moreover, learning content that stimulates curiosity and appeals to learners' emotions can more effectively improve knowledge and promote behavioral change.<sup>23</sup> As the COVID-19 pandemic resulted in restricted social contact, it is crucial to make appropriate use of video-based learning.

### Strengths and limitations

This survey had some limitations. It examined the effects of learning over a limited period, while the sample included first-year pharmacy students exclusively; therefore, there were no data on the long-term effects. Furthermore, the survey asked

all the participants to watch the same videos and did not include a control group. Nonetheless, its findings confirmed that helping pharmacy students understand the importance of pharmacists' role through educational videos is particularly significant in an environment in which contact is limited owing to the COVID-19 pandemic. When faculty members are unable to deliver face-to-face lectures, the effective use of videos can thus improve students' motivation to learn. Accordingly, when face-to-face learning opportunities are limited such as during a pandemic, the use of video-based learning and online conferencing software can provide students with opportunities to learn about pharmacists' social roles during emergencies. In the future, more studies should be conducted to continuously evaluate the effectiveness of video-based learning and its impact on students' willingness to learn in the long term.

## CONCLUSIONS

The implementation of educational videos explained professional pharmacists' roles in public health to first-year pharmacy school students in Japan. Watching videos as a way to learn about pharmacists' frontline struggles during the pandemic may have also contributed to pharmacy students' acquisition of new knowledge about pharmacists' work. The five videos helped students feel closer to pharmacists (whose contributions often go unreported by the media) and concretized their future goal of becoming pharmacists.

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## AUTHOR'S CONTRIBUTIONS

Conceptualization, AN, SS, and HO; Data curation, AN; Formal Analysis, AN; Writing – original draft, AN, SS, and HO; Writing – review & editing, AN. Supervision, NS. All authors read and approved the final manuscript.

## CONFLICTS OF INTEREST

Asako Nishimura, Shota Suzuki, and Nobuhito Shibata declare that they have no financial interests. Hiroshi Okada is employed by Collaborative Research Course with I&H Co., Ltd., Nakagawa Pharmacy, KRAFT Inc., and Kyoto University.

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