Brief Research

Online Pathology Education for Medical Students: Lessons Learned During COVID-19 Lockdown in Central Thailand

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Abstract

This study aims to demonstrate a use case of asynchronous and synchronous online learning in pathology for medical students during the Novel Coronavirus 2019 (COVID-19) pandemic. Students' performances and preferences were satisfactory. Online learning should be included as a part of the pathology curriculum after the COVID-19 outbreak.

Keywords: Online learning, Pathology, Education, Medical students

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Introduction

Before the Novel Coronavirus 2019 (COVID-19) pandemic, traditional face-to-face teaching was the preferred mode of instruction for Thai medical students. Students were encouraged to attend campus didactic lectures. Participation scores would be assigned to those in attendance. The majority of faculty members believed that face-to-face instruction was the most beneficial for students. As a result, the use of recorded videos was strongly discouraged.

Pathology is viewed as a link between basic and clinical sciences. Pathology classes require medical students to become familiar with a wide variety of diseases. They may be experiencing information overload. Pathology teachers' lecture pace may be too fast for the students to keep up. As a result, traditional face-to-face instruction may not be appropriate for pathology lectures.

During the COVID-19 outbreak, the government's lockdown measure made such a traditional classroom unavailable. Hence, online learning was needed. At the time of writing, there has never been a study of medical students' use of e-learning in pathology in Thailand. The purpose of this study was to demonstrate a use case of e-learning in pathology at a small medical school in Thailand in terms of students' performances and preferences during the government's lockdown measure.

Methods

Study setting

Participants were second-year medical students enrolled in online gastrointestinal and hepatobiliary pathology classes during the COVID-19 pandemic.

Teaching and evaluation methods

A total of two classes were conducted: (1) gastrointestinal pathology and (2) hepatobiliary and pancreatic pathology. Each class comprised a three-hour session, including two hours of asynchronous online learning with review questions, followed by a one-hour wrap-up class via Microsoft Teams. One week before the classes, recorded videos, presentation materials, and review questions were uploaded on Thammasat University's modular object-oriented dynamic learning enviroment (TU-Moodle). Summary notes and a link to Pathweb (https://medicine.nus.edu.sg/pathweb/), an interactive pathology teaching resource, were also provided. Students could learn anytime, anywhere, and on any device. They were asked to finish a total of fifteen clinically oriented multiple-choice questions (MCQs) at any time before attending the wrap-up session.

Students were asked to submit the online evaluation form after finishing the course. There were a total of five evaluated topics using survey questions with a five-point Likert-style scale from 1 to 5 (5 = strongly agree, 4 = agree, 3 = not sure, 2 = disagree, and 1 = strongly disagree). If needed, students could provide additional comments. Their performance, preferences, and additional feedback were analyzed.

Results

A total of 31 second-year medical students went through asynchronous online learning in TU-Moodle (Figure 1) and synchronous online learning in Microsoft Teams (Figure 2). Participants' characteristics were summarized in Table 1. They performed well on fifteen clinically oriented MCQs (mean ± SD, 13.6 ± 1.4). Organs, diseases, and the number of correct responses were demonstrated in Table 2. Sixteen out of thirty-one students (51.6%) went through e-learning. They finished the review questions a few hours or days before the time scheduled in the timetable. A total of ten students (32.3%) finished the lesson outside office hours. The remaining students completed the lessons in time. There was no correlation between post-test scores and participants' characteristics (i.e., age, gender, or grade point average).

After completing the course, 27 students (87.1%) finished the survey questions in the course evaluation form. Evaluated topics and mean scores were shown in Table 3. Most students viewed asynchronous online learning as a potential learning modality (mean: 4.4 on the five-point Likert scale). They agreed that clinically related content with clear explanations and suitable teaching materials were provided (mean: 4.4). In synchronous online classes, the pathology teacher could ask questions to stimulate them to think about or to discuss concepts and ideas critically in the class (mean: 4.4). Wrap-up sessions were provided after students

had gone through pre-recorded videos and review questions. Students appreciated such an educational approach since these interactive sessions allowed students to grasp essential issues of lectures.

Figure 1 Asynchronous online learning in Moodle.

Instructions and course materials (including handouts, videos, and quizzes) were posted on Moodle one week before the beginning of the class. Topics were arranged into organs (i.e., esophagus, stomach, intestine) with the corresponding etiology (i.e., inflammation/infection, neoplastic). Review questions were posted following each part of the lecture. Therefore, students could watch pre-recorded videos and check their understanding by finishing the review questions. They were asked to go through all of these course materials before attending the wrap-up session.

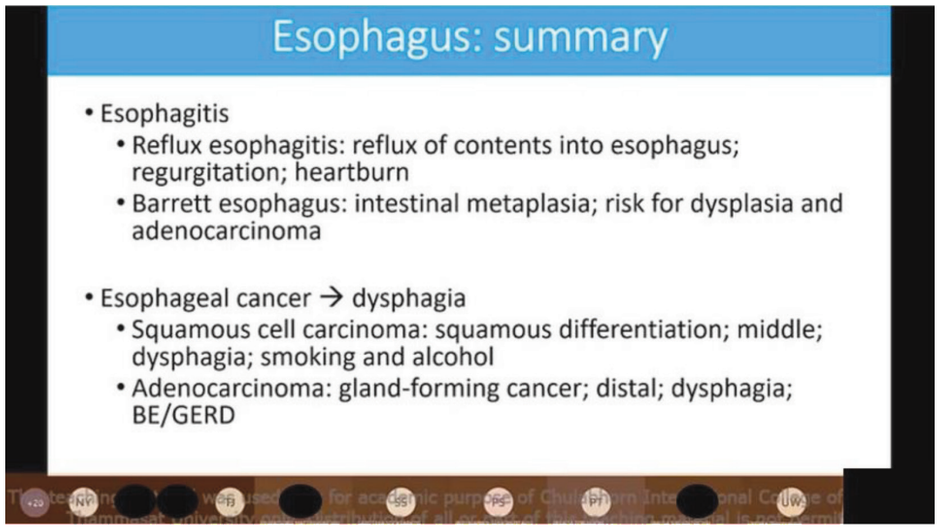

Figure 2 Synchronous online learning in Microsoft Teams. Take-home messages were emphasized during the wrap-up session.

Table 1 Participants' characteristics

Characteristics	N (%)
Number of participants	31
Age, years (mean ± SD)	20.5 ± 1.2
Gender	
Male	11 (35.5%)
Female	20 (64.5%)
GPA (mean ± SD)	3.4 ± 0.4

Abbreviation: SD, standard deviation; GPS, grade point average.

Table 2 Diseases included in review questions. A total of 31 students finished review questions of alimentary system (esophagus, stomach, intestine, anus); hepatobiliary system (liver, gallbladder); and exocrine pancreas

Organ: Disease	Number of correct responses (%)
1. Esophagus: Reflux esophagitis	26 (83.9%)
2. Esophagus: Barrett esophagus	31 (100%)
3. Esophagus: Squamous cell carcinoma	31 (100%)
4. Stomach: Gastric ulcer	29 (93.5%)
5. Stomach: Adenocarcinoma	26 (83.9%)
6. Small intestine: Crohn's disease	21 (67.7%)
7. Colon: Adenoma-carcinoma	28 (87%)
8. Colon: Diverticulosis	30 (96.8%)
9. Appendix: Acute appendicitis	30 (96.8%)
10. Anus: Hemorrhoid	31 (100%)
11. Liver: Alcoholic cirrhosis	30 (96.8%)
12. Liver: Hepatocellular carcinoma	29 (93.5%)
13. Gallbladder: Cholelithiasis	28 (90.3%)
14. Gallbladder: Chronic cholecystitis	26 (83.9%)
15. Pancreas: Acute pancreatitis	28 (90.3%)

Table 3 Evaluated topics in the online course evaluation form. Survey questions with a five-point Likert-style scale from 1 to 5 (5 = strongly agree, 4 = agree, 3 = not sure, 2 = disagree, and 1 = strongly disagree) were used

Evaluated topics	Mean
1. Content was clinically related and applicable.	4.4
2. Adequate and appropriate details of teaching materials were supplied.	4.4
3. Ideas and concepts were clearly explained.	4.4
4. The teacher asked questions to stimulate students to think about or to discuss concepts and ideas critically in the class.	4.4
5. The lecture was conducted in a timely manner.	4.4

Discussion

There is a long-held belief that a traditional face-to-face classroom is superior to online learning for medical students. This, however, may not be the case. According to a systematic review and meta-analysis, there is no evidence that offline learning is more effective than online learning. Additionally, online learning has advantages over the traditional classroom to enhance undergraduates' knowledge and skills. As such, it may be considered as a method for undergraduate medical education.[1]

The COVID-19 pandemic necessitated a rapid transition from traditional to online learning processes. In contrast to planned e-learning approaches, medical schools have been forced to deliver the entire medical curriculum via remote strategies rapidly. At the author's institution, Microsoft Teams and Moodle were used as online platforms. Student performance and satisfaction were acceptable. Online learning allowed standardization of the content and flexibility for students. Several of them went through the lesson outside office hours. Unlike a traditional face-to-face classroom or synchronous online learning, asynchronous online learning allowed students to have some time to concentrate with standardized pre-recorded videos and finish review questions before discussing with the teacher in the subsequent interactive session. Such a blended online approach resulted in a better understanding of essential issues of lectures and allowed students to overcome information overload. There was limited data on e-learning for medical students in Thailand. When used in conjunction with traditional teaching methods, e-learning has been shown to improve medical students' knowledge.[2] At the time of writing, this is the first study of e-learning in pathology for medical students in Thailand.

A recently published meta-analysis revealed several articles examining online education methods concerning the pandemic and social distancing rules. Zooms was the most frequently used online platform. Both synchronous and asynchronous approaches were analyzed in the studies.[3] There was insufficient information in the literature regarding the duration of lectures. There was only one study that examined lecture durations. The average duration of a lecture in this study was approximately one hour.[4] For the upcoming academic years, the majority of preclinical students preferred online learning.[5]

Online learning has two technologically distinct processes based on the timeliness of interactivity: synchronous and asynchronous online learning. Given that both modes of online interaction have advantages and disadvantages in learning experiences, it is critical to use these two online learning modalities appropriately. The duration of synchronous online activities is frequently limited, leaving the audience with little time to reflect. Live lectures in the medical education curriculum, covering complex clinical or basic science topics, can be recorded to give students more control over their pace and learning processes. Furthermore, providing a supplementary asynchronous online discussion forum would assist in addressing the lack of dialogue by allowing students and teachers to share ideas without being constrained by time constraints and having enough time to reflect and elaborate on complex topics. On the other hand, synchronous online interactions can help discuss topics requiring some preparation, build a social presence among members, and plan tasks requiring real-time feedback.[6]

Time restrictions, technical knowledge, insufficient infrastructure, a lack of institutional strategies and support, and negative attitudes toward all parties are the key hurdles to developing and implementing online learning in medical education. Several solutions to these issues include enhanced educator skills, increased incentives and compensation for time spent developing and delivering online content, enhanced institutional strategies and support, and a positive attitude among all those involved in the development and delivery of online content.[7]

Although the present study revealed the promising role of online pathology education for medical students, the result should not be overemphasized. This was so because the author is a pathologist specializing in the pathology of the digestive system. The course has been organized and revised by a gastroenterologist and hepatologist with other faculty members. Embracing online pathology education for other health science students might be different from the context of this study.

Online learning, particularly asynchronous learning, should be included in the pathology curriculum for medical students after the COVID-19 pandemic. This approach would allow students to study a variety of diseases before an interactive face-to-face session with a pathology teacher. To maximize the advantages of such a blended educational approach, careful preparation is required.

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