

Shift in Format of Medical School Education During COVID-19 in India, Portugal, and the U.S.

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ABSTRACT

Since March 2020, when COVID-19 was declared a pandemic by the World Health Organization, medical schools across the globe have had to adapt medical student curriculums due to the burden of the pandemic on the healthcare system, social distancing measures, and limitation of health resources. The pandemic has pressured medical schools to shift from traditional in-person teaching to other formats to minimize in-person interaction. The purpose of this study was to explore the extent that COVID-19 initially impacted the format of medical school curriculums in different parts of the world. From June 12, 2020, to August 13, 2020, a survey was distributed to international medical student listservs, medical student social media forums, and national medical student associations through Qualtrics. Currently enrolled medical students were asked to complete the questionnaire. For statistical analysis, chi-square and t-test were used at $p < 0.05$. The survey was completed by 112 medical students from India, Portugal, and the U.S. Medical school classes shifted from in-person to online learning after the start of the pandemic. In all three countries, over 97% of respondents reported that classes became exclusively online after the pandemic. Compared to before the pandemic, medical students had less patient interaction after the start of the pandemic in India and the U.S. However, in Portugal, there was an increase in patient interaction among medical students. The COVID-19 pandemic led to new modes of learning for medical students and required medical schools to re-design traditional class formats.

Introduction

The COVID-19 caused by the novel virus SARS-CoV-2 was officially declared a pandemic by the World Health Organization by March 2020. [1] Since then, COVID-19 has led to disruptions in numerous aspects of society. Medical education involves active interaction with patients and the healthcare setting; however, in the context of the pandemic, such interactions have had to be restricted in many countries. The pandemic required medical training programs around the world to adapt to the changing demands of the health care system, including re-deploying medical student to other clinical spaces, removing students from the health care system, and shifting to online curriculums to promote social distancing. [2-4] This shift in the structure of medical education has impacted foundational aspects of medical curriculums, including in-person patient interactions, observation of physical exam skills, hands-on clinical assessment, and bedside teaching. [5]

Online learning among medical students increased during COVID-19 and medical students' generally had a negative perception of online learning on their education. [6-8] In India, curriculum changes in medical schools due to COVID-19 included remote learning, flexible approaches within research protocols, and diminished patient interaction during pre-clinical years. [9] Medical schools in European countries, including Portugal, similarly experienced shifts to online learning, as well as re-deployment of medical students for volunteer work to address the surge of COVID-19 positive patients. [10] Medical staff shortages led some university hospital systems in the U.S. to employ

final year medical students as temporary residents or allowed final year students to graduate early to work as interns. [11, 12]

The goal of this research was to analyze the change in format of classes, interaction with patients, and students' perceptions of online learning among medical students training in various countries around the world due to the COVID-19 pandemic. We hoped to discover interesting variations in the way that medical schools around the world modified curriculums due to the pandemic. Understanding perceptions of medical students to rapid changes in curriculum during the COVID-19 pandemic can inform future improvements in medical school education during health crises. Finding strategies to mitigate disruptions in medical education during public health crises and disasters is imperative to training the future physician workforce globally.

Methods

Survey Design and Distribution

A 33-item online, anonymous, Qualtrics survey was designed, combining multiple choice, Likert response scale free text, and dichotomous questions in English (Appendix 1). We developed the survey through open-ended discussion groups with medical students in India, Portugal, and the U.S. Questions were selected to gather information on demographics, format of medical school curriculum, and students' perceptions of changes in curriculum. This survey was administered from June 12, 2020, to August 13, 2020. It was distributed on Facebook groups, WhatsApp, and email listservs of medical students of national and international medical student associations. The survey link was also shared peer-to-peer.

Surveys that were completely answered by students from India, Portugal, and the U.S. were included. We decided to exclude responses from the 11 other countries represented since less than 2 responses were obtained from each of these countries. Survey questions regarding format of classes, interaction with patients, improvements for online learning, and modes of online learning were included for analysis. We excluded free text responses to focus on quantitative analysis for this paper. In the survey, questions referring to format of classes and perceptions before the pandemic were considered to represent medical education prior to COVID-19 declared as a pandemic in March 2020. After the pandemic refers to changes that occurred after March 2020. This research study was reviewed by the University of Michigan Institutional Review Board for Human Subjects Research and determined to be exempt (HUM00180972).

Data Analysis

We obtained 112 completed responses from medical students in India, Portugal, and U.S. For statistical analysis, we used Microsoft Excel. We used the chi-square test to determine the association of variables before and after the pandemic.

Results

Demographics

In this study, a total of 112 students from India (N = 54), Portugal (N = 22), and the U.S. (N = 36) responded to the survey. For the responses from the United States, the majority (84%) were from students enrolled in medical schools in Michigan. Of all the respondents, 45% of students were pursuing an MD degree, 38% of students were pursuing an

MBBS degree, and 17% students were pursuing other types of medical degrees. The year in medical school of the respondents ranged from 1st to 6th year, with 52% of respondents enrolled in their 1st or 2nd year of medical school.

Changes in Class Format

Before the pandemic, 91% of medical schools in India conducted classes in-person, 18% of medical schools in Portugal conducted classes in-person, and 31% of medical schools in the United States conducted classes in-person (**Figure 1**). 100% of students from Portugal and India, as well as 97% of students from the United States indicated that their class format was online only. As for the format of online learning after the start of the pandemic, 3% of students whose classes switched online reported that online classes were conducted over telephone. 81% of students from India, 91% of students from Portugal, and 76% of students from the United States received online classes via videoconferencing. Online classes using video were utilized by 62% of students from India, 45% of students from Portugal, and 94% of students from the United States. Finally, online classes using social media platforms were used by 87% of students from India, while not used at all by students from Portugal or from the United States. The changes in class format from in-person or both before the pandemic to online learning after the pandemic were significant among respondents from India, Portugal, and the U.S.

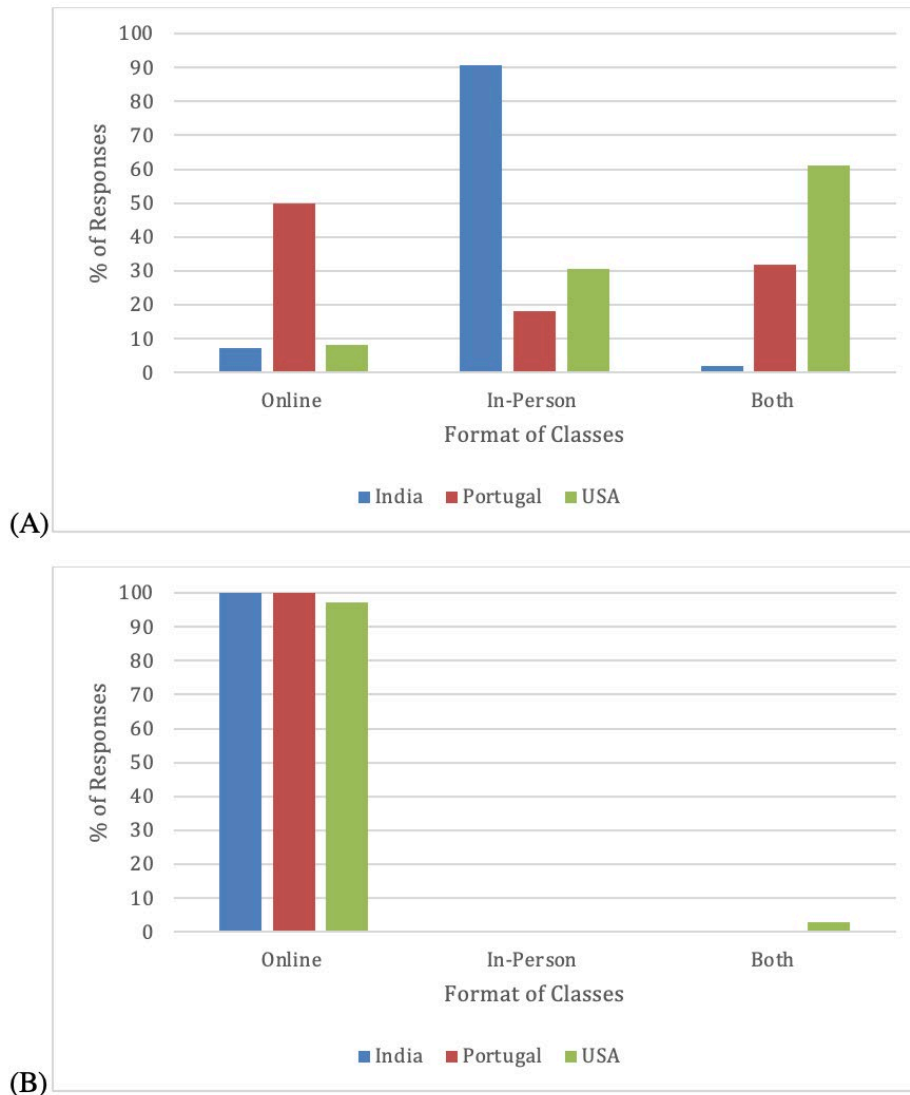


Figure 1. Format of classes before the pandemic (A); Format of classes after the pandemic (B).
Changes in Interaction with Patients due to COVID-19

Interaction with patients significantly changed for students in India and the U.S. The change was not significant for students in Portugal. Before the pandemic began, 82% of students from India reported having interactions with patients through their online curriculum. This decreased to 7% after the pandemic began. In Portugal, 64% of respondents reported interacting with patients before the pandemic. After the pandemic, 100% of students reported interaction with patients. In the U.S. the percent of respondents reporting interaction with patients decreased from 75% to 22% after the pandemic (**Figure 2**).

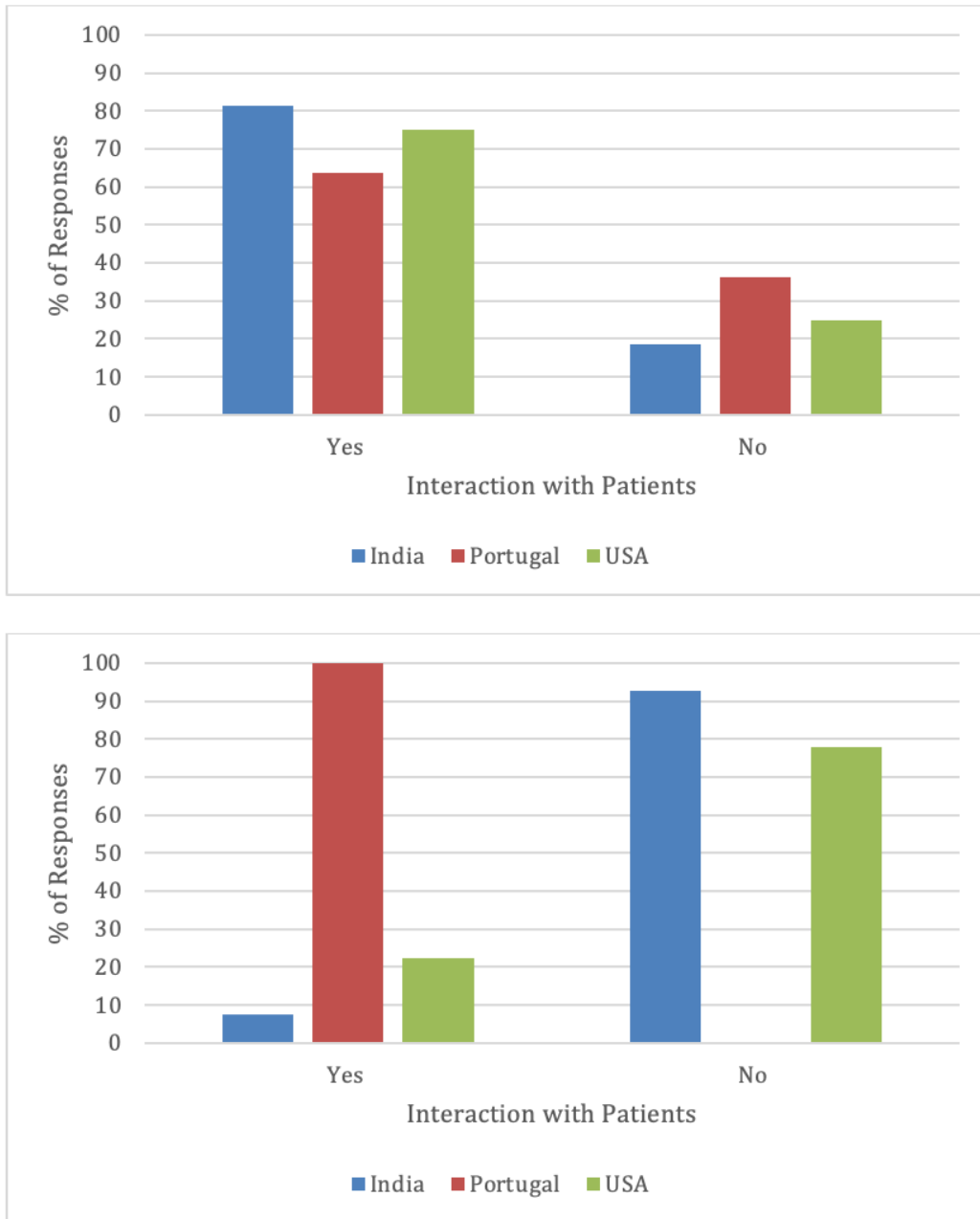


Figure 2. Interaction with patients before the pandemic (A); Interaction with patients after the pandemic (B).
Format of Online Learning

The format of online learning varied by country. Live video was the most common form for online learning in India. In Portugal, videoconferencing was the most common online learning format, while in the U.S. recorded videos were the most common. In India, social medial platforms were used as a part of online learning, unlike in Portugal and the U.S (Table 1). Most students in all 3 countries responded that the online learning experience that began after the pandemic could be improved. The percent of respondents expressing that the online learning experience could be improved in India, Portugal, and the U.S. were 93%, 100%, and 80%, respectively.

Table 1. Formats for online learning in India, Portugal, and the U.S. following the COVID-19 pandemic.

	Live Video	Discussion Groups	Telephone	Video Conferencing	Recorded Videos	Social Media Platforms
India	31%	16%	1%	27%	21%	4%
Portugal	26%	26%	0%	32%	16%	0%
USA	20%	23%	1%	25%	31%	0%

Discussion

The COVID-19 pandemic required medical schools to adapt curriculums to the new burdens of the healthcare system and social distancing measures. [2-5] Our study focused on the change in format of classes, modes of online learning, medical student interactions with patients, and student perceptions of online learning shortly after pandemic. [1] A shift to online learning was present in all three countries represented; however, the types of online learning different by country. In India, online learning included live video, discussion groups, videoconferencing, recorded videos, telephone and social medial platforms. Students had decreased interaction with patients in India and the U.S., but interestingly increased in Portugal. The increase in interaction with patients in Portugal may have been an effect of re-deployment of medical students as volunteers for relief work. [14] The majority of respondents in our study felt that online learning could be improved. Other studies have shown that medical students felt concerned about the limits of online courses and loss of clinical time with patients. [6, 13] The results of our study align with the findings of these other studies.

Conclusion

The COVID-19 pandemic disrupted medical education in many parts of the world. Curriculums shifted to online forms of learning and medical students' interaction with patients changed in the few months after the start of the pandemic. Students felt that online learning could be improved. An understanding of the disruptions in medical education due to COVID-19 can help medical schools develop improved contingency plans future health crises.

Limitations

Limitations of our study include bias in survey collection. The sample had less than 2 responses from countries represented besides India, Portugal, and the United States, which reflected the authors' affiliations. The survey also required understanding of English and access to Internet. It was difficult to classify students as pre-clinical and clinical among the countries since school years differ by country and the transition from pre-clinical to clinical vary by medical school. In this paper, we only included a subset of the entire survey and excluded qualitative data, which can be explored in future studies.

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