

The Impact of the COVID-19 Pandemic on Current Anatomy Education: A Venezuelan Medical Student's Perspective

El impacto de la pandemia de COVID-19 en la educación actual en anatomía:
Una perspectiva de los estudiantes de medicina venezolanos

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SUMMARY

Introduction: *The effects of the COVID-19 pandemic have modified people's daily lives. The coronavirus has changed the landscape of medical education. The use of innovative teaching strategies and techniques becomes needed in this particular period of academic life.* **Methods:** *An online questionnaire using Google Forms[®] was conducted to recognize the potential challenges being faced by the Venezuelan 1st-year medical students while attending online anatomy classes.* **Results:** *In this survey (n=106) more than half of students (52.8 %) are moderately satisfied with virtual classes. But most of them (88.7 %) felt the lack of proper gadgets, high bandwidth, and strong internet connections, was a barrier to their current learning*

process. 76.4 % of students overlooked every aspect of anatomy education. In addition, 80.2 % felt a lack of proper books or study material in their homes.

Discussion: *The COVID-19 crisis may provide to update us on whether such approaches can deliver appropriate learning gain. Further, if these online anatomy programs were suitably integrated into curriculum design. At present conditions majority of students (78.3 %) preferred distance learning by video recorded classes. And 52.8 % are moderately satisfied with virtual classes.* **Conclusion:** *In this research, the majority of students (92.5 %) recognize that cadaver practice helped them to understand and grasp the subject more easily. Further, most of the students (78.3 %) consider it easier to understand lectures and cadaver practice above online sessions.*

Keywords: *Anatomy education, COVID-19 influences on medical studies, Venezuelan medical students.*

DOI: <https://doi.org/10.47307/GMC.2022.130.2.10>

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Recibido: 27 de abril 2022
Aceptado: 30 de mayo 2022

RESUMEN

Introducción: *Los efectos de la pandemia de COVID-19 han modificado la vida cotidiana de las personas. El coronavirus ha cambiado el panorama de la educación médica. El uso de estrategias y técnicas de enseñanza innovadoras se hace necesario en este período particular de la vida académica.* **Métodos:** *Se realizó un cuestionario en línea utilizando Google Forms[®] para reconocer los desafíos potenciales que enfrentan los estudiantes venezolanos de primer año de medicina mientras asisten a clases de anatomía*

en línea. **Resultados:** En esta encuesta (n=106) más de la mitad de los estudiantes (52,8 %) están medianamente satisfechos con las clases virtuales. Pero la mayoría de ellos (88,7 %) sintieron que la falta de dispositivos adecuados, un gran ancho de banda y conexiones sólidas a Internet era una barrera en su proceso de aprendizaje actual. El 76,4 % de los estudiantes pasó por alto todos los aspectos de la enseñanza de la anatomía. Además, el 80,2% sintieron falta de libros adecuados o material de estudio en sus hogares. **Discusión:** La crisis de COVID-19 puede brindarnos información actualizada sobre si tales enfoques pueden brindar una ganancia de aprendizaje adecuada. Además, si estos programas de anatomía en línea se integraran adecuadamente en el diseño del plan de estudios. En las condiciones actuales, la mayoría de los estudiantes (78,3 %) prefirió el aprendizaje a distancia mediante clases grabadas en video. Y el 52,8% está moderadamente satisfecho con las clases virtuales. **Conclusión:** En esta investigación, la mayoría de los estudiantes (92,5 %) reconoce que la práctica cadavérica les ayudó a comprender y comprender el tema con mayor facilidad. Además, la mayoría de los estudiantes (78,3 %) considera que es más fácil comprender las clases magistrales y la práctica cadavérica que las sesiones en línea.

Palabras clave: Enseñanza de la anatomía, influencias del COVID-19 en la carrera de medicina, estudiantes de medicina venezolanos.

INTRODUCTION

The pandemics have desolated humankind throughout its existence, often changing life's conditions and even their future. It appears that the outbreak of the coronavirus began in Wuhan, China, in December 2019. The COVID-19 epi-demic was labeled as a pandemic on 11th March 2020. On May 15, 2022, there have been 525 467 084 confirmed cases of COVID-19, including 6 285 171 deaths (1).

The effects of the COVID-19 pandemic have modified people's daily lives. This pandemic led public health authorities and governments to institute several containment preventive measures. One of these containment measures employed to curb the viral spread was the closure of schools and universities. By the beginning of April 2020, this legislation affected more than 1.5 billion students across the globe. The COVID-19 outbreak is also a major education crisis (2). The

closure of schools and universities resulted in an unexpected disruption of the academic year for both the students and the academics. This global public health action imposed a swift shift to remote teaching, learning, and assessment to ensure that students continue their education. The coronavirus has changed the landscape of medical education. This pandemic presented many challenges like challenges to faculty in shifting from face-to-face to online teaching challenges to students in shifting to online learning, challenges in accessing the internet and using technology, and challenges to the institution in organizing online teaching-learning modality (3-5). In the Human Anatomy field, the use of innovative teaching strategies and techniques becomes needed in this particular period of academic life. Moving anatomy education from lecture halls and dissection rooms to homes is a necessity due to the pandemic. It is uncertain how far longer the term digital switch over might go. In response to the COVID-19 pandemic, universities are taking intensive measures to prevent and protect all students and staff members from highly infectious diseases. This pandemic has forced changes in medical education methods, modalities, and processes, which though may demand extra effort initially, provides teachers, faculty, and students the impetus to keep pace with current trends in technology (6-8). These aspects have not been an issue of research in Venezuela. In fact, there are no references in Venezuela on this concern. The aim of this research was a survey conducted to understand the potential challenges being faced by the Venezuelan 1st-year medical students while attending online anatomy classes.

METHODS

The present survey was conducted in Jose Maria Vargas Medical School, Faculty of Medicine, Universidad Central de Venezuela in Caracas to 1st-year medical students who were admitted in September 2019 and were willing to participate in the survey. An online nameless multiple-choice close-ended questionnaire regarding their opinion on virtual classes was designed and feedback was taken from 106 medical students. This research was performed to recognize the potential challenges being faced

by the Venezuelan 1st-year medical students while attending online anatomy classes. The digital informed consent of all the participants was obtained before their participation. Each student has explained the objectives of the study via e-mail. The data analysis could potentially enable us to learn from such an experience and improve tuition in the future. Nearly all students belong to Generation Z who has born around the early 2000s (mostly between 1995 and 2012). At the same time, the blow-up of mobile devices and social media began.

The questionnaire was converted into an online questionnaire by using Google Forms® (Alphabet Inc., Mountain View, CA). The link for the online questionnaire was distributed to the class representatives of 1st year through an email. The class representatives were responsible for the dissemination of the link to their classmates (n = 106 students) through their emails and social media private group accounts. The students were informed that they had a week (between August 1st and August 31, 2021) to respond to the questionnaire. A single-choice close-ended questionnaire was designed and emailed to the students. During this period, two reminders were issued by the class representatives to encourage their classmates to take part in the questionnaire (see Survey format).

RESULTS

The survey outcome showed students belong to age groups from 19-35 years (mean age 20 years), 73 females and 33 males. Out of 106 students, 54 belonged to the urban area (Caracas) and 52 belonged to other Venezuelan cities or towns (from 1 to 3 students per place). Currently, all the students are dependent on digital learning, 90.6 % agreed to be computer-friendly enough to handle online learning. More than half of the students (56.6 %) were using smartphones; 42.5 % were laptops/desktops, and only one student was using a tablet for the same.

Most of them (88.7 %) felt the lack of proper gadgets, high bandwidth, and strong internet connections, was a barrier in their current learning process. In addition, 80.2 % felt a lack of proper books or study material in their homes. The

majority of them (76.4 %) missed every aspect of anatomy education i.e., cadaveric lab, face-to-face lectures, discussion with their classmates, and interaction with mentors. 16 % felt a lack of cadaveric/lab only. Nearly the rest of the students felt either a lack of interaction with classmates (4.7 %) or discussion with their classmates (1.9 %) (Figure 1). Most of the students (92.5 %) accepted that cadaveric practice helped them to understand and grasp the subject more easily. Also, 78.3 % of the students consider it easier to understand lectures and cadaver practice above online sessions. But in current circumstances the majority of them (78.3 %) preferred distance learning by video-recorded classes, followed by a PowerPoint presentation (17 %) and theoretical write-ups (5 %).

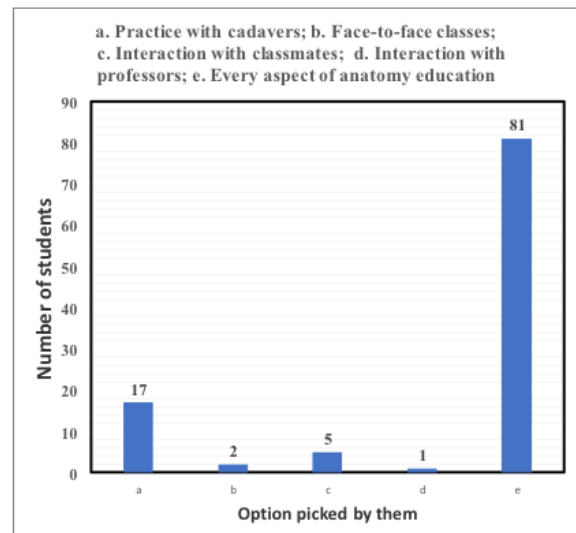


Figure 1. What do you miss most in online classes/studies?

When asked about their satisfaction level; 12.3 % were fully satisfied whereas the other 5,7 % were completely dissatisfied to study via virtual classes and 52.8 % of students identified as moderately satisfied (grade 3) with virtual classes (Figure 2). Lack of self-motivation was felt by 73.6 % of students. Furthermore, most of them (94.3 %) recognized that they missed their real campus environment, companions, and cultural and sporting events.

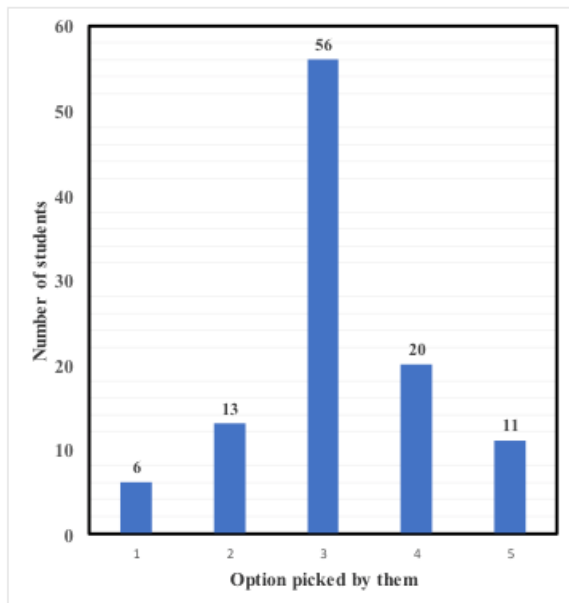


Figure 2. Do you find it useful to study through virtual classes? (Indicate the number between 1 to 5). Where 1 is totally dissatisfied, 2 is mostly dissatisfied, 3 is moderately satisfied, 4 is reasonably satisfied and 5 is totally satisfied. Option 1: 5.7 % / 6 responses; Option 2: 12.3 % / 13 responses; Option 3: 52.8 % / 53 responses; Option 4: 18.9 % / 20 responses; Option 5: 10.4 % / 11 responses.

DISCUSSION

The COVID-19 pandemic has forced changes in medical education methods, modalities, and processes, which though may require additional effort initially, provides teachers, faculty, and students. The disappeared practical teaching since the COVID-19 pandemic, regardless of whether students normally receive cadaveric teaching or not, will most likely have many lasting impacts on students. The outlook of the learning environment now is far less than favorable, the loss of face-to-face contact and direct interactions. Although the advances in technology allow for online distance learning, acquiring anatomical knowledge in the dissection room, is often still regarded as not only a rite of passage but also the most effective method (3,9,10).

Once students lost contact with dissection rooms, they lost access not only to cadavers,

but also to a range of other optimal learning modalities: prosections, models, skeletons, and others. The coronavirus pandemic has further shortened the contact time current students have received. As a result, current anatomy students are being taught anatomy without access to practical-based learning materials, be cadavers, prosections, or models (11,12). Adaptation to online distance learning is no easy task for students or teachers. Despite there being a large number of online anatomy software programs available for students to use, they can often be costly. In addition, many universities do not have enough infrastructure or resources to facilitate online teaching with immediate effect (5,8). There is also a steep learning curve associated with using these programs for both teachers and students thus further bringing into question their usefulness in times as challenging as the COVID-19 pandemic.

Nevertheless, research on the efficacy of purposely designed, solely online anatomy programs has not yet been done. The COVID-19 crisis may provide an update on whether such approaches can deliver appropriate learning gain. Further, if these online anatomy programs were suitably integrated into curriculum design (10,12).

The Department of Anatomy, like the rest of the other departments at Universidad Central de Venezuela, changed in-person face-to-face lectures, tutorials, and cadaveric practice to remote sessions. At present conditions majority of students (78.3 %) preferred distance learning by video recorded classes. And more than half of students (52.8 %) are moderately satisfied with virtual classes. However, 78.3 % of the students contemplate easier to understand lectures and cadaver practice above online sessions. The learning curve needs to be improved for both teachers and students. On the other hand, most of them (88.7 %) felt the lack of proper gadgets, high bandwidth, and strong internet connections, was a barrier to their current learning process. In addition, 80.2 % of students felt a lack of proper books or study material in their homes.

The main limitation of the present research is a relatively small sample size, and the findings are limited to a particular medical school in a specific geographic region, however, this research may

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Survey format. Close ended questionnaire for student's feedback

Age (years)		
Gender (male/female)		
City or region		
	Question	Answer
1	Do you have sufficient computer skills to handle online learning?	Yes/No
2	What device do you use to attend online classes?	Smartphone/laptop/tablet
3	Do you consider the lack of adequate devices, high bandwidth and strong Internet connection as an obstacle in your current learning process?	Yes/No
4	Do you consider the lack of adequate books or study materials an obstacle in your learning process?	Yes/No
5	What do you miss most in online classes/studies?	a- Practice with cadavers b- Face-to-face classes c- Interaction with classmates d- Interaction with professors e- All of them
6	Does the presential cadaver practice help you to understand the subject comparatively easier?	Yes/No
7	You have studied the upper limb (along with thorax-mediastinum, and abdominal cavity with the help of lectures and cadaver practice, while the lower limb through online classes, which was easier to understand?	Upper limb/Lower limb
8	What modality do you prefer for your distance learning?	Videotaped lectures/theoretical scripts/ power-point presentations
9	Do you feel a lack of self-motivation in the current scenario?	Yes/No
10	Do you miss your real university environment, peers, cultural and sporting events?	Yes/No
11	Do you find it useful to study through virtual classes?	(Indicate the number between 1 to 5) Where 1 is totally dissatisfied, 2 is mostly dissatisfied, 3 is moderately satisfied, 4 is reasonably satisfied and 5 is totally satisfied

make a part of the future integrated analysis in some countries.

CONCLUSION

Like many other human activities during the COVID-19 pandemic, basic medical studies take a new approach to their training (4,6). Medical schools will not approve any elective placements which do not fulfill health and safety criteria.

Students will come back to their essential training in medical sciences after the coronavirus pandemic runs its course (11,13).

The faculty of Anatomy did its best to continue the delivery of the teaching as smoothly as possible considering the pandemic and its effects. However, such an overnight unexpected drastic change as a consequence of the COVID-19 pandemic could have affected the medical students' anatomical learning (3,5). More large-scale studies from worldwide are required to

accurately depict how this unparalleled period has affected all aspects of medical education.

Certain aspects of medical education cannot be replaced by online resources such as human anatomical dissections, surgical trainees, and other handy activities (7,9,14). In this research, the majority of students (92.5 %) recognize that cadaver practice helped them to understand and grasp the subject more easily. Additionally, most of the students 78.3 % consider it easier to understand lectures and cadaver practice above online sessions.

Most of the students (76.4 %) overlooked every aspect of anatomy education i.e., cadaveric practice, face-to-face lectures, discussion with their classmates, and interaction with mentors. No matter the quality of the resource, simulations and online instruction does not provide the same level of understanding of complex relationships as studying essential medical studies face to face.

Author contributions

RR: Data collection, project development, data analysis, manuscript writing, manuscript editing.

Acknowledgments

Data collection and graphics designs by Genesis Acurero-Materano. The author thanks all medical students who contributed to this survey. This paper is dedicated to all worldwide health staff that is fighting against the COVID-19 pandemic.

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