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Impact of the covid-19 pandemic on medicine graduation

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Abstract
On December 31, 2019, the World Health Organization (WHO) confirmed an outbreak of SARS-COV-2 pneumonia in the city of Wuhan, China of unknown ethology until then, which gave rise to COVID-19. Consequently, in the area of education, emergency remote teaching began as an alternative for the continuity of classes. Thus, an adaptation to distance learning was necessary due to the extension of physical distancing measures to combat the spread of the virus. With this, the planning of students and teachers was impacted in all courses, among them, Medicine, and can cause significant methodological changes in medical education. Therefore, the objective of this work is to review the literature on the impact of the COVID-19 pandemic on undergraduate medical courses. To achieve the proposed objective, the method adopted was the literature review, with a sample consisting of publications available in the Scielo, BVS, Bireme and PubMed databases, between the years 2000 to 2020.

Keywords: Covid-19, Pandemic, University education, Medicine

1. Introduction

On December 31, 2019, the World Health Organization (WHO) confirmed an outbreak of SARS-COV-2 pneumonias in the city of Wuhan, China of unknown etiology until then. Subsequently, the SARS-CoV-2 virus, the official name that means Severe Acute Respiratory Syndrome of Coronavirus 2, was the causal agent of the disease, and, due to the high rate of confirmed cases until the end of January, in China, the situation was declared by the WHO as a case of Public Health Emergency of International Concern (ALMEIDA, 2020) [3].

Thereafter, the WHO declared on 30 January 2020 that the outbreak of the disease caused by the novel coronavirus (COVID-19) constitutes a Public Health Emergency of International Concern, the highest alert level of the Organization, as anticipated in the International Health Regulations. On March 11, 2020, COVID-19 was characterized by the World Health Organization as a pandemic (BRASIL, 2020) [11].

Known as COVID-19, the disease is caused by a virus that spreads rapidly and, therefore, the population had to adapt to take proper care, as well as professionals in different areas had to undergo care related to health and safety. Follow the protocols adopted by the health system (ALMEIDA, 2020) [3].

According to Silva *et al*. (2021) [25], COVID-19 caused global impacts that manifested themselves in the economy, in society, in the academic aspect, causing everyone to "reinvent" themselves to meet the new scenario. Regarding undergraduate medical studies, the use of alternative methodologies was intensified, with the aim of continuing academic activities and under the

guidance of the Ministry of Education (MEC).

Therefore, medicine classes were migrated to digital platforms, except for practical activities (CRODA and GARCIA, 2020) [11].

Gi *et al*. (2020) [14] explain that the migration of the teaching model from face-to-face to remote was made suddenly, abruptly, demanding quick adaptation from teachers and students. For the students, this adaptation initially presented great challenges. With this, the planning of students and teachers was impacted in all courses, including Medicine, and may cause significant methodological changes in medical education.

The objective of this work is to review the literature on the impact of the COVID-19 pandemic on undergraduate medical courses.

To achieve the proposed objective, the method adopted was the literature review, with a sample consisting of publications available in the Scielo, BVS, Bireme and PubMed databases, between the years 2000 to 2020.

2. Covid-19

The coronavirus is a family of viruses that can cause harm to animals and humans. In people, it can result in respiratory infections ranging from a cold to severe acute respiratory syndromes. The coronavirus (SARS-COV-2) causes the disease called COVID-19. COVID-19 is a potentially serious acute respiratory infection caused by the novel coronavirus causing severe acute respiratory syndrome 2 (ZHOU *et al*., 2020) [29].

Souza *et al*. (2021) point out that COVID-19 is a disease characterized as a zoonosis, which is an infection capable of being naturally transmitted between humans and vertebrate animals, considering that those who are not sick harbor and expel the etiological agents, an animal that gave rise to the disease. It is also sought to carry out studies of the genetic sequencing of the virus to verify with greater precision that bats or pangolin were the most likely origin of COVID-19:

SARS-CoV-2 is a disease considered zoonosis, a naturally transmissible infection between vertebrate animals and humans, where non-diseased animals harbor and eliminate the etiological agents. The animal in which the disease originated is still being investigated. It is speculated, based on the genetic sequencing of the virus, that bats or even the pangolin, a mammal of the Manis javanica species, are the most likely origin (SOUZA *et al*., 2021, p. 547).

However, it is explained that the first cases of COVID-19 originated in the seafood market in the city of Wuhan, located in China, the first occurrences were reported at the turn of the year 12/31/2019 and the incidence increased significantly exponential in the first few weeks. In Brazil, the first case recorded was on February 26, 2020 in São Paulo (VELAVAN and MEYER, 2020) [27].

Protective measures are the same as those used to prevent respiratory diseases: wash hands with soap and water or with alcohol-based hand sanitizers; When coughing or sneezing, cover your mouth and nose with a flexed elbow or a tissue, then throw away the tissue and wash your hands. However, in case of fever, cough and difficulty breathing, medical attention should be sought as soon as possible and travel history shared with the healthcare professional (ADHIKARI *et al*., 2020; BAI *et al*., 2020) [1, 6].

The successful adoption of social restraint as a Public Health measure has proven benefits in reducing the transmission rate of COVID-19; however, negative effects associated with this restriction may have consequences for health in the medium and long term. Therefore, Public Health actions are also expected to be able to minimize the adverse effects of prolonged social restriction (AHMED *et al*., 2020; WANG *et al*., 2020) [2, 28].

Souza *et al*. (2021) explain that COVID-19, in a general concept, refers to a new type of respiratory disease caused as a result of the infection of a species of coronavirus, before the year 2019 not identified in humans. It is a virus with the ability to easily spread from one individual to another only through small amounts of droplets from the mouth or nose, released into the air through sneezing or coughing. A large amount of these droplets that come out of a person's cough or sneeze, according to Souza *et al*. (2021), falls on surfaces and objects that are close to it. In this way, it can be signalled that the transmission of the new coronavirus happens from one person to another with an incubation time of two to 14 days.

As explained by the authors, there can be several forms of contamination of COVID-19, being them through phlegm, saliva, contact with a contaminated object or surface, sneezing, coughing, contact with contaminated people and proximity to contaminated people. For the above, he sought to maintain social distance, including in colleges.

2.1. Pedagogical strategies for teaching in medical courses: adaptation to remote teaching

According to Coelho *et al*. (2021) [10], the undergraduate medical course was drastically affected directly by the pandemic moment that the world experienced with COVID-19, since it caused an urgent interruption of several academic activities, such as, for example, the suspension of face-to-face classes, of practical and clinical activities. Consequently, the faculties of medical courses had to reinvent themselves, seeking different teaching methodologies for the continuation of the learning process.

With reference to the concern of transmission between students, teachers, employees and the school community, higher education institutions had to suspend face-to-face classes, starting to adopt as a strategy, emergency remote teaching, with a focus on reducing student dropout (SANTOS, SILVA and BELMONTE, 2021) [25]. Among the teaching measures adopted for distance learning, there is remote teaching:

Emergency remote teaching is characterized by the temporary shift from face-to-face teaching to remote teaching. Teaching goes, in a time of crisis, as in the case of the Sars-CoV-2 pandemic, to totally remote, and all guidelines and all educational content are taught on distance platforms. The educational objective is not to create a robust distance course, but to provide temporary access to instruction and instructional support in a way that is quick to set up and that is reliably available during the period (Appenzeller *et al*., 2020, p. 4). -5) [4].

Based on the new reality in the educational system, Santos, Silva and Belmonte (2021) [25] indicate that faculties had to make changes to continue classes and, therefore, adopted the use of the media and Information and Communication Technologies (ICTs) as a way to offer remote teaching and minimize the impacts of Covid-19 on education. Thus, it became necessary and mandatory to migrate to remote teaching that is done through the Internet.

For Braga, Martins and Racilan (2021) [7] at the beginning of the pandemic, government officials and bodies responsible

for educational policies began to establish emergency remote teaching guidelines to reduce losses caused by the interruption of classes. In this context, although emergency remote teaching was coined to refer to something to be used during the pandemic, there was a need to define this teaching format and discuss the differences between it and Distance Education (EAD).

Ludovico, Nunes and Barcellos (2021) [16] state that, unlike educational experiences that are planned from the start and designed to be online (EAD), emergency remote teaching is a temporary shift to fully remote teaching solutions due to crisis circumstances. Many countries are responding to the crisis using different educational models such as mobile learning, blended learning, radio or other viable solutions according to the specific context. Therefore, the purpose of emergency remote learning is not to recreate a robust education ecosystem, as face-to-face or blended learning modes are likely to resume once the crisis or emergency passes.

Charczuk (2020) [9] explains about remote teaching:

Remote teaching cannot be considered an educational modality, but rather a pedagogical action, in which there is a certain transposition of classroom teaching to teaching mediated by digital tools, predominantly, or by the proposition of handouts and printed materials sent to students. Still, in the case of remote teaching, there is no specific and prior planning or theoretical-conceptual models for its practice; there is only the transposition of the face-to-face work to a digital or printed space. Digital resources or materials delivered to students are used to enable what was pedagogically planned to be carried out in person, without the explicit enunciation of a didactic-pedagogical plan articulated with the tools (CHARCZUK, 2020, p. 4-5) [9].

The migration of classes in medical courses from face-to-face to remote emergency teaching, as Santos, Silva and Belmonte (2021) [25] point out, took place overnight, with no time to plan or train teachers, who in turn had to improvise and learn to use the technological resources and methodologies of distance learning through experimentation. Emergency remote learning embraces the innovation needed to build innovative and engaging online learning infrastructures and approaches to minimize the impact of the COVID-19 pandemic on undergraduate medicine and other courses.

2.2 Impact of the COVID-19 pandemic on medical graduation

Study by Quintanilha *et al*. (2021) [18] demonstrated that COVID-19 was a pandemic state that imposed changes in the way of life, relationships, society, family, health, work and education. Considering the educational context, so that classes would not stop and students would not be harmed by the loss of the academic year, the MEC authorized the offer of remote teaching, however, for the faculties that offer medicine courses, it was not authorized by the Ministry of Education initially. However, this decision was modified and the MEC started to allow the Faculty's Medicine course to take place in the remote modality for the theoretical-cognitive disciplines from the first to the fourth year.

Silva *et al*. (2021) [25] carried out a descriptive exploratory study to analyzethe students' perceptions about the learning process during the remote classes period and found that the impact was negative for students with regard to the family environment. Another aspect that impacted the quality of remote teaching was the internet connection, which was not always good for them to participate in classes and, consequently, it was not possible to present a good academic performance.

Not only that, Felippe *et al*. (2021) [12] indicate that in relation to academic performance, the impact of CIVOD-19 on the undergraduate course through teaching was unsatisfactory in terms of achievement. Such dissatisfaction is justified because the learning process of the contents worked by the teachers in the virtual environment did not occur in a way to attract the attention of the student or that contributed, in some way, to an effective learning. On the other hand, the authors point out that some students consider classes through virtual platforms to be adequate and effective.

Aspect pointed out by Silva (2021) [25] about the impact of the COVID-19 pandemic on medical graduation refers to the maintenance of the pace of study, which observed that most students were not able to maintain the same pace of study through remote teaching, as it was through face-to-face teaching. Silva (2021) [25] observed that during the period of social isolation, most students had difficulties to maintain the rhythm and, therefore, the quality of classes. The motivation for remote study was a variable analyzed by Silva (2021) [25], which showed that many medical students felt unmotivated to continue studying remotely, mainly due to the fact that there were no possibilities of carrying out clinical and practical classes.

Study carried out by Freitas *et al*. (2021), showed that medical students attach great importance to practical classes, which cannot be done through remote teaching. The authors explain that the practical classes contribute to the consolidation and better fixation of the contents that are theoretically taught. Therefore, what is noted is the need for practical teaching in the context of undergraduate medicine.

On the other hand, Queiroz *et al*. (2022) [17] indicated that they have students who point to remote teaching as something positive as a way of not missing classes during the period of the COVID-19 pandemic. For the authors, those students who consider remote classes to be positive argue that it is favorable, given the possibility they have of attending classes as many times as necessary and, thus, improving their knowledge of the contents studied.

It is also important to emphasize that Freitas *et al*. (2021) [13] explain that, although the remote teaching modality allows students to remain at home during class hours, on the other hand, not all academics were able to manage time and organize themselves to attend all classes offered during this period. This was a significant impact caused by the COVID-19 pandemic on the medical course.

Salles *et al*. (2021), through a bibliographic study with the objective ofto assess whether the damages of the pandemic can be reduced through the practice of resilience of the medical course student, it was found that the adaptation to the online system was the biggest problem. Added to this, the impacts of these difficulties with studies will possibly remain, after the pandemic, in the academics of the medical course. Therefore, it can be said that negative feelings may be increased as a result of impacts, such as stress, sadness, anxiety, to the detriment of happiness and neutrality. Based on the above, Felippe *et al*. (2021) [12] claim that the negative impact falls on medical students with regard to the fact that it makes them more stressed and anxious.

On the impacts of the COVID-19 pandemic on medical students, in a direct and clear way, Sales and Castro (2021) [20] point out that it had a negative impact on the performance

of activities by medical students. Corroborating these authors, Queiroz *et al*. (2021) indicate that the greatest impact identified as a result of the pandemic on medical students was in relation to research and extension activities.

According to Assunção-Luiz *et al*. (2021) [5] some impacts observed as a result of the pandemic on medical students are, among others, lack of concentration and scientific blocks when the class is held remotely and the absence of practical classes in laboratories and classrooms.

For Silva *et al*. (2021) [25]:

The impact on the student requires a reformulation of teaching practices in innovative practices of both institutions and professors, in order to provide autonomy to the student aiming at a transformation not only of theoretical knowledge, but in the construction of dialogues, bonds, interaction with elements relevant to their training, even if they are not in a face-to-face format (SILVA, *et al*., p. 4).

According to Coelho *et al*. (2021) [10], the impact of the pandemic is positively spoken, which, for some students, makes autonomy possible and makes them responsible for their own learning.

Rocha and Lima (2021) [19] state that the observed impact it was the need to change paradigms that were previously centered on traditional teaching, making it a difficult factor for many students.

For Gusso *et al*. (2021) [15], it cannot be stated with vehemence as to whether or not the pandemic has impacted medical students, since the real impact occurs in the long term, mainly in terms of the educational context installed through remote teaching to students medical students.

Conclusion

This study, which aimed to review the literature on the impact of the COVID-19 pandemic on undergraduate medical courses, showed that there were several impacts, both negative and positive, among them, there was a predominance of moderate stress, increased anxiety disorder, difficulty concentrating, combining the remote study with the new life, problems with learning. But, on the other hand, other students consider the positive impacts, as they were given greater autonomy to be actors in their own learning, the use of technologies and to be able to review the same content as many times as necessary.

It is the educator's duty to act remotely through teaching based on a pedagogical practice capable of stimulating and promoting the teaching and learning of the content worked. In the context in which the activities are taking place remotely, the ludic, the differentiated didactic and pedagogical materials that arouse the student's interest are fundamental for a more dynamic class, focused on the reality of the students.

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