

EVALUATION OF COVID-19 PANDEMIC IMPACT ON MEDICAL EDUCATION ON A GROUP OF STUDENTS IN BUCHAREST

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ABSTRACT

Aim of the study: This cross-sectional study aims to assess the impact of Covid-19 pandemic measures on the quality of dental education, the hybrid system of training, and the anxiety caused among students of the Faculty of Dentistry, UMF Carol Davila, Bucharest, Romania. **Material and methods:** Data collected using an on-line survey was analyzed using IBM SPSS version 19 and Chi-Square test ($p < 0.005$). **Results:** Response rate was 26.71%. Only 8.3% considered on-line teaching more efficient; older students rated it as being more efficient ($p = 0.001$). Almost 60% of the respondents considered that the theoretical aspects were more efficient (18.6%) or similar (40.1%) when presented using on-line methods; 67.8% of respondents considered that their medical education was less productive due to the absence of clinical stages; 90.1% of students need a break during on-line activities, correlated to gender ($p = 0.019$). Anxiety related to their professional future was declared by 69% of the students, also correlated to gender ($p = 0.000$). 40.5% experienced anxiety caused by the possibility of being infected from colleagues, teachers or patients; 62.5% of the foreign students experienced anxiety in that matter ($p = 0.021$). **Conclusion:** Students experienced anxiety related to their professional future and expected psychological support from the university. Online teaching was considered less efficient, students preferring the hybrid model. Hourly breaks were considered useful during the theoretical courses.

Key words: COVID-19 pandemic, dental students, online education, anxiety

INTRODUCTION

The pandemic triggered by the SARS-CoV-2 virus caused important global changes in medical teaching. Like most of the schools, medical universities suddenly closed their doors once the pandemic was declared and tried to swiftly switch to on-line education; after a while, when the situation slightly improved, most of them implemented the hybrid system, with online courses and face-to-face clinical stages. Dental students were affected by the lack of clinical activities and became anxious

about their professional future. Understanding their feelings, opinions and problems is very important in order to develop the best teaching abilities in this very new and difficult situation. In a study made on a sample of 198 students in Spain during the Covid-19 pandemic one month after the beginning of a strict confinement process the authors reported abnormal anxiety levels in almost the entire sample, varying from severe (18.7%) to moderate (70.2%), with higher values for the female subjects (1). Medical teaching was even

more affected, due to the absence of clinical clerkships. A survey conducted by Aziz *et al.* (2020) showed that medical teachers experienced difficulties in adapting during the sudden transition from face-to-face to online teaching, showing institutional unpreparedness and underlining the need to introduce user friendly online teaching modalities in new medical curricula (2).

The aim of this research was to assess the impact of Covid-19 pandemic measures on the quality of dental education, the hybrid system of training and the anxiety caused among students from the Faculty of Dentistry, Carol Davila University of Medicine and Pharmacy from Bucharest (UMFCD) through a cross-sectional study using an on-line survey with 27 items which was distributed among the dental students from the last three years of dental school.

MATERIAL AND METHODS

A 27 items self-administered on-line survey was generated using Google Forms and distributed to students of the clinical years of study from the Faculty of Dental Medicine, UMFCD. The questionnaire was active from 1st until the 28th of February 2021 and collected demographical variables and data regarding the perceived impact of the COVID-19 pandemic on the medical training, and also on student's anxiety state during the national state of alert. The target sample consisted of students from the 4th, 5th and 6th year of study, in order to better assess the impact of the absence of clinical stages on their opinions regarding the quality of their medical training and on the confidence in their professional future based on that training.

The first 4 questions relate to demographic data (nationality, age, gender, year of study), while the following 23 questions of the questionnaire collected data about the sources of information related to the virus, measures taken to avoid contamination, rating online teaching versus face-to face teaching, experiencing anxiety about the future of the profession, perceived impact of the COVID-19 pandemic on their life and professional future,

possible measures that can be implemented in order to avoid or reduce contamination, telemedicine, but also the period of time during they can stay concentrated, the necessity and the optimal periodicity of breaks during an on-line course, the sufficiency of the teaching material available on platforms, the frequency of attention loss during the course. Statistical analysis was performed using IBM SPSS version 19 and Chi-Square test and assessed the relation of students' response with the respective demographical variables. Level of significance was set at $p=0.05$.

RESULTS

The sample consisted of 242 undergraduate students of the Faculty of Dental Medicine, UMFCD, who replied to our questionnaire. In our sample, 90.1% of students were Romanian nationals, 83.5% were females, 43% were in the 6th year of study, while 40.5% were in the 5th year. Most respondents were 22 years old, followed by 24 and 25 years old, with age limits between 21 and 33. Mean age of the sample was 23.60 ± 1.68 years. Male students presented a slightly higher ($p=0.251$, NS) mean age (23.88 ± 1.95 years) than female students (23.54 ± 1.62 years). Among Romanian respondents, 87.6% were female, while among the foreign students the male respondents predominated (54.1%). The response rate was 26.71%. Most foreign student respondents were in the 4th year of study but their proportion varied between 8 and 12%, with the minimum for the 5th year of study.

Most of the students (more than 75%) reported compliance with hygiene rules and preventive measures such as frequently washing hands with soap and water, controlled coughing and sneezing, social distancing and isolation in case of specific symptoms (fig. 1).

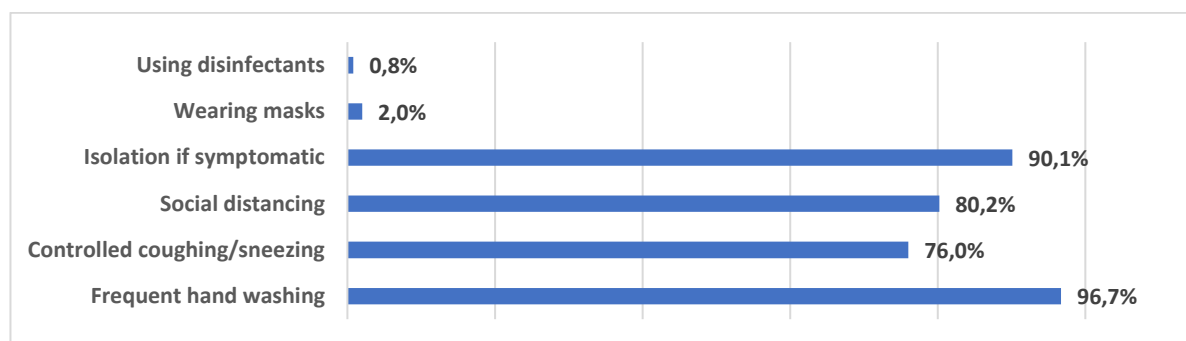


Figure 1. Hygiene and preventive measures compliance.

On-line teaching was considered less efficient by 7 out of 10 students (71.9%); only 8.3% considered it more efficient. The efficiency of on-line teaching is similarly rated by the male and female students (Anova, $p=0.332$), but also by the Romanian

and foreign students (Anova, $p=0.146$). Differences are related to the age of the students since older students rated the on-line teaching as being more efficient ($p=0.001$), but do not depend on the year of study (Anova, $p=0.082$) (fig. 2).

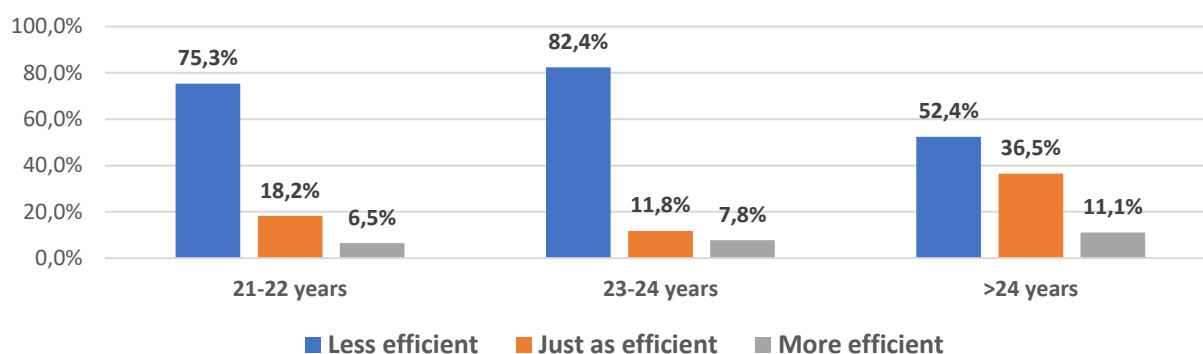


Figure 2. Online studying efficiency rating per age group.

Almost 60% of the respondents considered that the on-line presentations of theoretical aspects were more efficient (18.6%) or similar (40.1%) to live presentations, with positive correlations related to the age (Anova, $p=0.004$) and the year of study (Anova, $p=0.008$). A similar proportion of the respondents (54.5%) considered that the hybrid model improved medical training. The majority of respondents (67.8 %) considered that their medical education was less productive during the

country's state of alert (due to the absence of clinical stages), while 12.8% declared it equally productive and 19.4% declared it more productive (with more time for studying). A significantly higher (Anova, $p=0,019$) percentage of female respondents considered this period as being more productive.

Most of the respondents (72%) stated that they could concentrate for a maximum of one hour, 26.9% could stay focused for up to 2 hours, while only 1.1% exceeded the 2-hour

threshold.

The large majority of them (90.1%) need a break during on-line activities depending only on gender (Anova, $p=0.019$); 8% of the female and 20% of the male respondents declared they do not need a break. Almost two thirds of the respondents (66.6%) considered that a break is necessary after

maximum one hour, 19% after one hour and a half, 9.5% after two hours, while 4.9% did not need a break (fig. 3). The responses for this question were not influenced by any variable (Anova, nationality, $p=0.444$; year of study, $p=0.378$; sex, $p=0.657$; age, $p=0,415$).

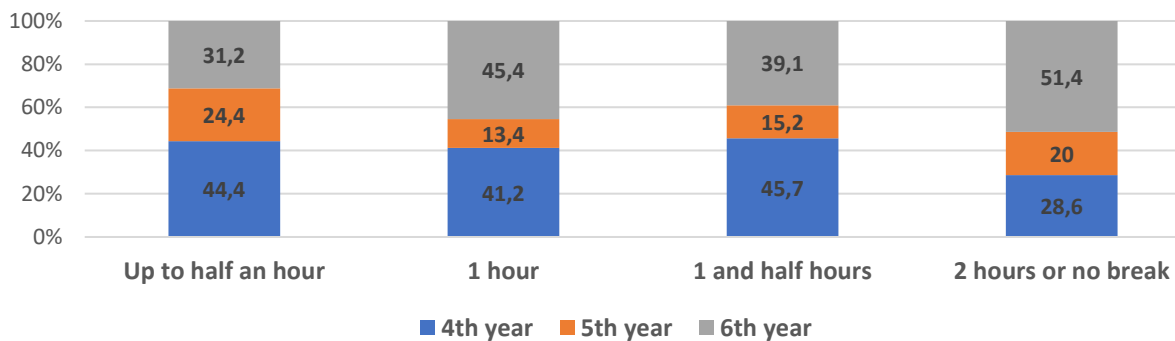


Figure 3. Break preference related to age group.

Anxiety related to their professional future was declared by 69% of the students, with only one statistically significant correlation related to gender (Anova, $p=0.000$); 55% of the male respondents did not experience anxiety in that matter, vs. only 26.33% of the females. Anxiety caused by the possibility of being infected from colleagues, teachers or patients in case of reopening of clinical stages was declared by only 40.5% of the students, with a significant correlation related to nationality (62.5% of the foreign students experienced anxiety in that matter, with $p=0.021$). A percent of 51.7% of the respondents were afraid of the possibility to infect their family, colleagues, teachers and patients. None of them decided to change their profession because of the Covid-19 pandemic; only 10% of them would consider this option. The majority of them (80.6%) mentioned that they will begin their activity

as a dentist in a large dental clinic; only 14.9% considered opening their own dental office and only 12% wanted to partner with a colleague. An almost equal number of respondents considered that the most important measures for reopening university clinics is wearing a surgical mask (44.2%) or an N-95 mask (43.4%); only 21.9% considered necessary both types of masks, surgical and N-95, together with the protection equipment that is currently used in intensive care units. Most of the respondents, 64.9%, declared that they would appreciate professional psychological support from the university during this period; 7% saw it as mandatory. Most students (75.6%) used the information provided by the WHO as the main information source, in almost equal percentage with the Government data (71.5%), followed by other sources. The majority of them declared that the COVID-19

pandemic was impacting their daily life (82.2%), their professional future (74.8%) and their mental comfort (73.1%), with no correlation with the year of study or nationality (fig. 4). The statistical analysis showed that the Covid-19 pandemic was

having a greater effect (represented by choosing two or more options) and was accentuated in terms of psychological discomfort in female respondents (Anova, $p=0.022$) versus male respondents for whom the impact was greater on daily life.

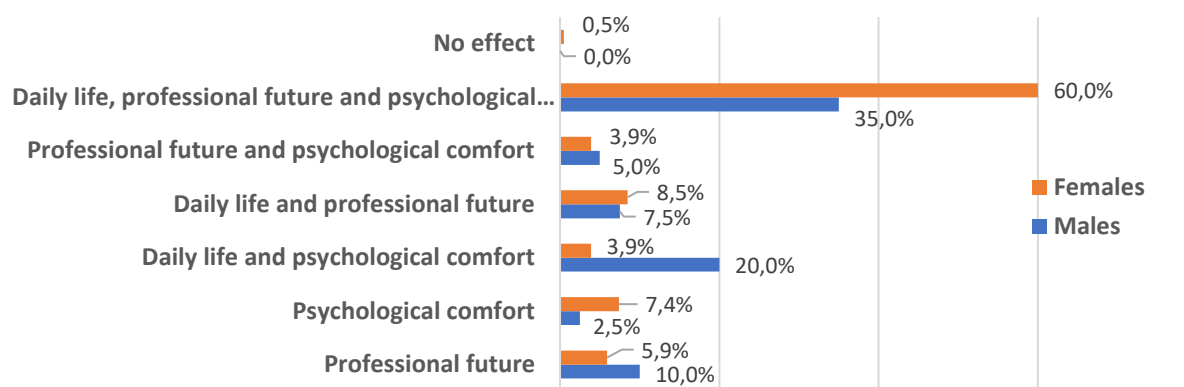


Figure 4. Impact of Covid-19 pandemic on dental students (by gender).

Almost all students (95.5%) considered that the epidemiological triage is mandatory for patients before accessing the dental offices during clinical stages; also, 92.1% of them consider it mandatory for all the persons involved in the educational process (students, teachers, auxiliary personal, etc). Regarding the question if patients should have access to telephonically offered information and telemedicine, most students answered yes for screening for fever and COVID 19 symptoms (69.8%), for avoiding useless appointments (67.4%), and for speeding up the process when they arrive at the faculty (62%). For the question if patients experiencing fever and COVID-19 symptoms should be treated in the faculty's healthcare facility, most of the students accepted their treatment in the faculty offices; 44.2% of students answered yes, but in a separate area dedicated to COVID-19 patients, and 14% answered yes, as long as the same special precautions are taken for every patient. Still, 24.8% answered no, that they should be referred to another special unit, and 15.3% answered no, that

they should be treated only after they are cured of Covid-19.

DISCUSSIONS

The preventive and confinement measures imposed in society after the emergence of the novel coronavirus created effects on all educational levels, from schools to universities, and were a challenge for both teachers and students. Several studies have been carried out in universities all over the world in order to better understand these effects and to find ways to address them. Ferrel and Ryan are highlighting the effects of COVID-19 in disrupting routines in hospitals and medical schools, in a loss of collaborative experiences caused by the absence of the in-person classes and in a failure in skill acquisition and relationship building, caused by the cancellation of clerkships; analyzing personal stories, recording data and studying the impact of those changes is mandatory, since the effect will be felt on an extensive level both for medical students and faculties (3). Dhillon *et al.* discuss the fact that the medical curricula have been forced to adapt to remote teaching

and offers the perspective of pre-clerkship and clerkship students on how medical education is changing, trying to find sustainable solutions for keeping its quality (4); other studies are also discussing strategies in the same direction, considering that personal interactions are essential (5,6). Several university hospitals have adopted telemedicine for teaching in order to compensate for the lack of physical training; however, this was not considered to be a long-term solution and could not be a replacement for face-to-face examination (7,8). Online teaching led to an overall higher rate of attendance, but, similar to our study, multiple papers reported that students faced challenges in focusing for the entire duration of the lectures (9,10,11). Multiple studies have highlighted the challenges faced in particular by less developed countries, where both teachers and students lack access to suitable infrastructure for online teaching (12,13,14).

Recently, various studies are trying to provide data regarding the effectiveness of online learning; Pei and Wu (2019) did not find in their meta-analysis any evidence that offline teaching works better (15). On the contrary, Kyaw *et al.* (2019) found only low-quality evidence that online teaching is similar to traditional methods of learning in regards to medical students' communications skills training, although blended digital education seems to have a higher potential (16). A study published in 2020 showed that 36.8% of students from the dental school of Justus-Liebig-University Giessen (Germany) preferred traditional methods of learning; still, most of the students and lecturers had a positive opinion of online learning, being open to the idea of using it even after the COVID-19 pandemic (17). In Turkey, where all classes were suspended on March 16, 2020, online education was perceived by a lot of the people involved as a new experience and an unexpected challenge; dental students from 13 universities participated in a survey that revealed a negative attitude toward

online education (18), which is accepted only as a temporary solution avoiding the complete interruption of their professional education. Also, Jordanian students experienced pessimism and lack of confidence caused by the pandemic, the quarantine and the sudden unprecedented online experience, which they perceived as being a negative one in terms of materials, exams, accessibility of devices and internet connection (19).

Badovinac *et al.* (2021) evaluated the impact of COVID-19 pandemic on dental education and the perceptions and attitude of students towards the introduction of online learning in the School of Dental Medicine in Zagreb, Croatia; 66.2% of the respondents reported being emotionally affected by the lockdown; still, more than half of the students (57.7%) stated that they were able to focus more during online lectures than they would during onsite lectures and one-third of the respondents (36.1%) agreed that online teaching fully met their expectations, while 44.4% agreed that the use of online education platforms prepared them well for further education and professional improvement (20). In their study on medical students from 39 medical schools across United Kingdom, Dost *et al.* found that the time spent on online platforms significantly increased during the pandemic, and that the greatest perceived benefits of online teaching platforms included their flexibility; as disadvantages, family distraction (26.76%) and poor internet connection (21.53%) were mentioned (21).

A study conducted in Pakistan highlighted the impact COVID-19 had on the mental wellbeing of students and the increase in depressive symptoms. However, even under these circumstances, similar to our results, the students were still willing to pursue a medical career and, in general, were not considering a career change (22). Elsalem *et al.* analyzed the behavioral changes related to remote examination, during the pandemic. They reported an increased level of stress in students and negative changes in the

students' habits, including dietary, sleeping and limited physical activity (23).

The present study was conducted a year after the lock-down measures, when people benefitted from the beginning of the vaccination campaign and started to better understand the Covid-19 pandemic. In a prior study conducted in the Department of Dentistry, Faculty of Medicine and Pharmacy, Oradea University we found that the large majority of students presented high levels of anxiety during the first session of exams after the lock-down period, caused by the huge impact that the Covid-19 pandemic had on their education (24). Also, the results of this study were compared with those of another two studies, realized using a similar questionnaire, on two samples of dental medical students and dental technology students from the Department of Dentistry, Faculty of Medicine and Pharmacy, Oradea University, during the lockdown period. Because the Covid-19 pandemic continuously caused educational changes, since preventive measures are influencing teaching methods, we added four more questions to the already existent 23 of the initial questionnaires, in order to better address this challenging situation (25,26). The demographic data are similar; in the Bucharest sample we registered 3% more respondents from foreign students and 10% more female respondents. The response rate was higher in the Oradea sample. Washing hands is the most respected recommendation in both samples (97,5% in Oradea (25) vs. 96,7% in Bucharest). The almost a year distance between the two studies can explain the differences in social distancing (12% more in Oradea sample (25)) and isolation in case of specific symptoms (14% more in Bucharest sample). Regarding the efficiency of the on-line teaching, the responses are similar, respondents in the current study assessing that the teaching process was similar or slightly more efficient than in the previous period. Anxiety regarding their professional future and anxiety caused by the

possibility of being infected was found much higher in the current study, probably caused by the difference between the mean number of cases per day (340 vs. 2800) and intensive care patients (250 vs. 950) in each period. Anxiety caused by the possibility of transmitting the disease was lower in the current study, which could be related to a better understanding of the virus and the start of the vaccination campaign. The number of those that considered changing their profession is similar (12.9% in Oradea sample (25) versus 10.3% in Bucharest sample). After almost one year, the students from Bucharest sample consider that wearing one mask is enough as a protective measure, versus those from Oradea sample that preferred to wear two masks; their opinions regarding the necessity of the epidemiological triage for everyone involved in the medical act are similar. As time went by, telemedicine was considered more important by the respondents in the Bucharest sample; also, the impact on the daily life, professional future and psychological comfort was considered higher by them compared to the Oradea sample.

These results are confirmed by Adam *et al.* (2021), in a study on preclinical and clinical dental students in Zagreb regarding discomfort and anxiety caused by the COVID-19 pandemic crisis and the quality of the study during it; even if during the second lock-down the students were more adapted to the situation, they remained still uncertain about their clinical skills and future career (27). Santabárbara *et al.* performed a meta-analysis concluding that the prevalence of depression among dental students during the COVID-19 pandemic was high compared to the general population or other college students, with Asian students showing higher rates, correlated with the alteration of educational methods and the decreased period of clinical practice, also showing the need of measures took by universities for a better mental health and wellbeing (28).

CONCLUSIONS

Within the limits of this study, during COVID-19 pandemic students experienced anxiety related to their professional future, despite the fact that they became familiar with hygiene rules and preventive measures relatively fast; they expected professional psychological support from the university during this period. Online teaching was considered less efficient, especially regarding

clinical aspects, students preferring the hybrid model. Hourly breaks were considered useful during the theoretical courses. Further studies are necessary in order to assess if more diverse methods of online teaching, besides the teaching platforms, are capable to ensure a better training and to change the perception of students regarding the quality of their medical education in the pandemic context.

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