Learning and mental health during the Covid-19 pandemic: experience of first year Medical students

Aprendizagem e saúde mental na pandemia de Covid-19: vivência de ingressantes em Medicina

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ABSTRACT

Introduction: The new coronavirus pandemic resulted in measures to contain its spread, such as the implementation of remote teaching, and affected the well-being of individuals; Thus, it becomes necessary to investigate the social and emotional consequences for students entering in 2020 at a medical school in the interior of São Paulo.

Objective: To understand the effects of the pandemic on the formation of the incoming class of an HEI in São Paulo in 2020, analyzing the academic and mental health implications of these students.

Methods: Exploratory and qualitative study using an online questionnaire, asking medical students to evaluate learning during the first year of the course, positive and negative points of remote teaching, effects on interpersonal relationships, learning and mental health. The first two authors and students who left the course between enrollment and the date of the research were excluded from the sample. The study was carried out through data analysis using Content Analysis, thematic modality.

Results: 33 students participated, 18 females and 15 males, aged between 20 and 30 years old. Content analysis identified 21 meaning cores; From them, four themes were created, dealing with the damage to the institutional process and academic performance, changes and restrictions in interpersonal relationships, the benefits and harms of using digital technologies, and the consequences of remote teaching on students' mental health.

Final considerations: This study can provide important insights to understand the true impact of the pandemic on the quality of student training, interpersonal relationships and mental health. Based on these results, measures can be implemented to meet these students' needs.

Keywords: Students, Medical; Mental health; Problem-based learning; COVID-19.

RESUMO

Introdução: A pandemia do novo coronavírus resultou em medidas de contenção de sua disseminação, como a implementação de ensino remoto, e afetou o bem-estar dos indivíduos; assim, surge a necessidade de investigar as consequências sociais e emocionais para os alunos ingressantes em 2020 em uma escola de Medicina do interior paulista.

Objetivo: Este estudo teve como objetivo compreender as repercussões da pandemia sobre a formação da turma ingressante de uma instituição de ensino superior paulista em 2020, analisando implicações acadêmicas e na saúde mental desses estudantes.

Método: Trata-se de um estudo exploratório e qualitativo realizado por meio de questionário do tipo websurvey, na plataforma Google Forms, em que se solicitou aos estudantes de Medicina, ingressantes no ano de 2020, que avaliassem a aprendizagem durante o primeiro ano do curso, os pontos positivos e negativos do ensino remoto e as repercussões nos relacionamentos interpessoais, na aprendizagem e na saúde mental. Excluíram-se da amostra as duas primeiras autoras do trabalho científico (também ingressantes em 2020) e os discentes que se desligaram do curso entre a matrícula e a data da coleta de dados. Na sistematização dos dados, utilizou-se a Análise de Conteúdo na modalidade temática.

Resultados: Participaram 33 estudantes, sendo 18 do gênero feminino e 15 do masculino, com idades entre 20 e 30 anos. A análise de conteúdo identificou 21 núcleos de sentido, e, a partir deles, elaboraram-se quatro temas que versavam sobre os prejuízos ao processo institucional e ao desempenho acadêmico, as mudanças e restrições nas relações interpessoais, os benefícios e malefícios do uso de tecnologias digitais, e as repercussões do ensino remoto na saúde mental dos estudantes.

Conclusão: Este estudo pode fornecer insights importantes para compreender o verdadeiro impacto da pandemia na qualidade da formação dos estudantes, nas relações interpessoais e na saúde mental. Com base nesses resultados, propõe-se que a faculdade desenvolva um melhor preparo para situações em que o ensino remoto precise ser implementado, oferecendo apoio psicossocial aos estudantes nesses momentos atípicos e outras medidas institucionais que visem atender às necessidades psicológicas e educacionais dos discentes.

Palavras-chave: Estudantes de medicina; Saúde Mental; Aprendizagem baseada em problemas; Covid-19.

INTRODUCTION

The new coronavirus (SARS-CoV-2) was identified in China in December 2019 after an outbreak of pneumonia in the city of Wuhan. Within a short time, the virus took on global proportions and reached all countries, becoming the first coronavirus pandemic[1,2]. According to the World Health Organization (WHO), as of January 28, 2024, 774,469,939 cases of COVID-19 and 7,026,465 deaths from the disease were confirmed worldwide. In Brazil, 37,519,960 cases and 702,116 deaths from COVID-19 ere confirmed by the same date[3].

Due to the high virulence of SARS-CoV-2 and the lack of drugs or vaccines against the disease at the time, several measures were implemented to contain the spread of the virus and the pandemic evolution[4]. As a result, world authorities decreed quarantine, social isolation, and restriction of service activity in various sectors[5]. These changes, although necessary, affected the well-being of individuals, triggering several psychopathological symptoms, such as sadness, anxiety, nervousness, sleep problems, and depressive symptoms[6].

Among the institutions that were affected by the decrees, schools, colleges, and universities have had their in-person activities suspended since March 2020, for an indefinite period[5]. From this, discussions began about which strategies would be used to maintain teaching. As a solution, the Ministry of Education (MEC) authorized the use of remote education, based on Information and Communication Technologies (ICTs), which did not require physical presence[7].

In health courses, such changes in teaching led to delays in students' practical activities and changes in the schedule, causing anxious symptoms[8]. This was no different in a Higher Education Institution (HEI) in the interior of São Paulo, whose curriculum for the first year of the course consists of the Systematized Educational Unit (UES, *Unidade Educacional Sistematizada*) and the Professional Practice Unit (UPP, *Unidade de Prática Profissional*). The UES is carried out through tutoring sessions, using Problem-Based Learning (PBL) and the UPP consists of practical activities in a real scenario - Family Health Strategy (ESF, *Estratégia Saúde da Família*) - and in a simulated scenario, based on the Professional Practice Laboratory (LPP, *Laboratório de Prática Profissional)* and the Professional Practice Support (APP, *Apoio da Prática Profissional*). However, due to the pandemic, it was necessary to change the general structure of the series, with the implementation of remote activities, some of which started to be carried out online while others were postponed, with a return periodically reassessed, according to the epidemiological situation and the Guidelines of the São Paulo Plan[9].

Based on the authors' experience, who experienced the implementation of remote teaching for the class of first-year medical students at Faculdade de Medicina de Marília (Famema) and, together with the literature, it was assumed that the implementation of remote teaching in the undergraduate course in Medicine brought social and emotional consequences to students who entered Famema during the COVID-19 pandemic. Thus, the following research question is asked: "How did the COVID-19 pandemic affect the medical education of the first-year class at Famema in 2020 and what are the academic and mental health implications for these students?"

This study aimed to understand the consequences of the COVID-19 pandemic on the medical education of the first-year class at Famema, in the year 2020, and the students' academic and mental health implications.

METHOD

This is an exploratory study with a qualitative approach, carried out in a public HEI in the interior of the state of São Paulo, Brazil.

The inclusion criterion comprised being a student enrolled at the medical course in the institution in 2020. The first two authors of the study (who also started medical school in that year) and the students who left the course between enrollment and the date of data collection were excluded from the sample. Student selection was carried out at random based on institutional lists and sample size was determined by exhaustion.

All students (72) received an invitation to participate in the study, with a time limit for the reply of 15 days and three reminders. Acceptance was considered when the questionnaire was answered, failure to return was considered refusal, and there was no sign of withdrawal. Each participant read and completed the Informed Consent Form (ICF) and a copy was sent by email after filling it out. Participation was voluntary and the students could withdraw their consent at any time. The collected data were stored on a restricted digital platform, for the exclusive use of the researchers. The participants' identification was preserved and the material destroyed after the end of the research.

Data collection was carried out between February and June 2022, through a web survey questionnaire, on the Google Forms platform, consisting of identification data (age, gender and place of residence before and after approval at FAMEMA) and 4 survey questions with a dissertation response: 1) How do you evaluate your learning during the first year of the medical course, considering the COVID-19 pandemic? Explain and give examples 2) What positive points did you find in remote teaching? Explain and give examples. 3) What negative points did you find in remote teaching? Explain and give examples. 4) How do you correlate social distancing

imposed by the pandemic and interpersonal relationships? Explain and give examples, considering classmates, teachers and other professionals separately? 5) How did remote learning affect your mental health? Explain and give examples, considering the care needs you experienced and needed to seek in this regard. The research questions were created based on the authors' experience and observation and other similar studies carried out[10].The research instrument was validated through a pilot questionnaire with students from the Nursing course at Famema who entered University in 2020, since they had similar experience to that of medical students in the same year, considering that the first two years of the courses are integrated with each other, with the same educational units and groups consisting of students from both areas. From the institutional lists, six students were selected by drawing lots, of which four answered the questionnaire on the Google Forms platform. Moreover, after participating, the interviewees were asked how the process was, to identify if the instrument was adequate or if any modification would be necessary. It was found that it was necessary to separate the positive and negative points of remote teaching into two questions, since previously, both were addressed in the same question and most of the answers did not talk about the potentialities, only about the weaknesses. Additionally, the participant's suggestion to explain and give examples about the questioned topic was added to all the questions, as it was identified in the pilot that the participants tended to give generic and succinct answers.

After collection, the data were submitted to Content Analysis, a thematic modality proposed by Bardin[11], carried out manually in three stages: 1) pre-analysis; 2) exploration of the material; and 3) treatment and interpretation of the obtained results. In the pre-analysis, the object that would be analyzed from the collected material was chosen. After that, the floating reading was carried out, in which the researchers approached the text, establishing the first perceptions. The hypotheses and objectives of the research were resumed and the participants' answers were manually organized in a spreadsheet program, forming the Corpus, which represents the materials that were analyzed[11]. The exploration of the material was the stage in which there was a search for registration units in the text, based on the separation by colors of ideas that resembled each other. At the end of each idea, the participants were coded by numbers, aiming to facilitate the search for representative excerpts from the analysis, if necessary. Afterwards, there was a grouping of common ideas into 25 nuclei of meaning, which were finally organized into four themes. Subsequently, inferences and interpretations were made and, based on this, the results were used to achieve the initial objectives of the research[11,12].

The project was submitted to the Research Ethics Committee (CEP) involving human beings at Famema and, after approval, under Opinion n. 5.039.107 of 2021.

RESULTS

A total of 33 students participated, 18 females and 15 males, aged between 20 and 30 years. Regarding the content analysis, four themes emerged, as shown in table 1 below.

Theme 1: Damages caused by the pandemic to the institutional process and academic performance

This theme deals with the damage caused by the pandemic to the institutional process and academic performance and was constituted by the following nuclei of meaning: *Negative evaluation of learning, about the difficulty of adapting to the method and quality of the content taught remotely; Faculty unprepared for the pandemic; Online has brought a different routine to students, making it difficult to manage time and studies, the lack of separation of home and study environments, in addition to causing a certain convenience; Academic performance was hampered by the lack of interpersonal relationships.*

The study showed a negative evaluation of learning, by students, about the difficulty of adapting to the method and the quality of the content taught remotely. Among the factors that caused damage to learning, the lack of preparation by the institution for the pandemic was reported, due to disorganization, lack of planning, difficulty in finding quality platforms, low academic demand and lack of support from the institution.

> *"There was a lack of planning, difficulties in finding quality platforms; lack of practice of what was learned" (S9)*

In addition, students mentioned that remote teaching brought a different routine to them, which made it difficult to manage time and studies.

> *"[...] not only did I have to adapt to the PBL method, but I also had to adapt to remote teaching and the use of videoconferencing platforms to carry out classes. I found it very difficult to manage my time to search for sources and study, so I often felt unprepared to participate in tutoring, with few participations. I couldn't absorb and understand the content [...]." (S15)*

It also generated the lack of separation of home and study environments and caused a certain convenience for being inside their homes all day.

> *"[...] a more passive and comfortable posture in the face of the need to acquire knowledge, since online it is very natural to consult sources while speaking in tutoring, which perhaps would be better in person." (S16)*

Table 1. Themes and their respective nuclei of meaning.

Theme 1: Damages caused by the pandemic to the institutional process and academic performance	Theme 2: Changes and restrictions on interpersonal relationships in the face of social isolation measures	Theme 3: Benefits and harms of the use of digital technologies in the face of the need for remote teaching in the pandemic	Theme 4: Consequence of the pandemic and remote teaching on students' mental health
- Negative evaluation of learning, about the difficulty of adapting to the method and quality of the content taught remotely. - Faculty unprepared for the pandemic. - Online has brought a different routine to students, making it difficult to manage time and studies, the lack of separation of home and study environments, in addition to causing a certain convenience. - Academic performance was hampered by the lack of interpersonal relationships.	- Interpersonal relationships were impaired with remote teaching and distancing. - Remote teaching prevented the creation of a bond with the institution and the course - With remote teaching, there was a distancing from personal relationships, restricting it to the performance of academic activities - Interpersonal relationships were modified during the pandemic - Isolation during the pandemic was necessary for people's safety	- Learning assessed as adequate, despite the difficulties of remote teaching. - Remote teaching has brought facilities and benefits because everything is done through the computer. - Learning and use of digital technologies for study - Remote learning brought the convenience of being at home and with the family. - Positive points of online about interpersonal relationships. - They do not see any positive points in remote teaching. - Overuse of the computer caused tiredness, exhaustion, distraction, and physical symptoms. - The use of the computer for all activities brought losses due to the limitations of the platforms and the internet connection. - Maintaining teaching during the pandemic was important.	- The pandemic and remote learning have caused or aggravated psychological disorders in students. - The pandemic and remote teaching have caused negative feelings and damage to students' mental health - Doubts and insecurities regarding the academic training in the face of remote teaching and its quality. - There were no negative impacts on their mental health - Some students sought the psychology service for support at this stage. - Some students had to resort to drug treatments to treat the psychological disorders triggered or aggravated in this phase. - Student had to perform physical exercises to distract themselves.

Source: prepared by the authors.

"Lack of social interaction that [...] promotes memorization of learning and well-being, facilitating the teaching-learning process; more "rigid" discussions." (S20)

Due to remote teaching and its quality, some students reported that doubts and insecurities arose regarding their academic training.

"[...] asking myself throughout the 1st year if I shouldn't cancel my enrollment and try other institutions, since I thought (I still think!) a completely unthinkable thing an active methodology carried out online." (S33)

In view of the above, it is clear that the students had a mostly negative evaluation of learning, as a consequence of the difficulty in adapting to the method and the quality of the content taught remotely. It was also evidenced that, during the quarantine, there was no separation of the home and study environment, which changed the students' routine. In addition, remote teaching modified interpersonal relationships, contributing to the impairment in academic performance.

Theme 2: Changes and restrictions on interpersonal relationships in the face of social isolation measures

This theme concerns changes and restrictions on interpersonal relationships in the face of social isolation measures and was created from the following nuclei: *Interpersonal relationships impaired by remote teaching and distancing; Remote teaching prevented the creation of a bond with the institution and the course; With remote teaching, there was a distancing from personal relationships, being restricted to carrying out academic activities; Interpersonal relationships were modified during the pandemic; Isolation during the pandemic was necessary for people's safety.*

With the advent of the pandemic, distancing and remote teaching, students point out that interpersonal relationships were impaired, with colleagues, teachers and other employees of the institution, and even living at home suffered modifications. The students reported that they did not know the whole class and the contact occurred only with colleagues in the tutoring group, which was still very impersonal, being restricted to academic activities.

"Social distancing affected all types of interpersonal relationships. [...] made it impossible to form bonds [...] this joint behavior made it difficult for people with different views to come into contact, hindering debate, questioning and even growth as a person/professional. In relation to teachers and other professionals, the distance was even greater and contributed to the hierarchy in the academic environment." (S26)

"In relation to my family, I think that at the same time that it strengthened it, it also gave me that desire to run away from home, because you go through ups and downs all the time with your family during isolation and there are times when you just want some time alone [...]" (S4)

Despite all the damage to interpersonal relationships, some students highlighted that social isolation was necessary to help fight the pandemic and to ensure people's safety.

"For me, I think that remote teaching was very important for the reduction of cases during the pandemic." (S28)

Some students considered that there were positive points about interpersonal relationships, such as the easy contact with teachers and the possibility of creating online friendships:

"With the teachers, I believe that in a way it facilitated contact [...]. In relation to the other professionals, social distancing allowed us to get in touch with (them) through social networks." (S7)

Theme 3: Benefits and harms of the use of digital technologies in the face of the need for remote teaching in the pandemic

This theme deals with the benefits and harms of the use of digital technologies in the face of the need for remote teaching in the pandemic, and has the following nuclei: *Learning evaluated as adequate, despite the difficulties of remote teaching; Remote teaching has brought facilities and benefits because everything is done through the computer); Learning and use of digital technologies for study; Remote learning brought the convenience of being at home and with the family; Positive points of online about interpersonal relationships; They do not see any positive points in remote teaching; Excessive computer use caused tiredness, exhaustion, distraction, and physical symptoms; The use of the computer for all activities brought losses due to the limitations of the platforms and the internet connection; Maintaining teaching during the pandemic was important.*

With remote teaching, part of the students saw positive points about the use of technology: the advantage of everything being done through the computer, learning to use digital technologies for study, convenience of being at home and with the family.

"The only positive point was that it is possible to attend the college conferences with greater flexibility, in relation to the schedules." (S27)

"The positive points that remote teaching provided was the apprehension of knowledge about the use of digital teaching platforms [...], for one's own benefit and about the agility in the search for information on the internet in articles and books downloaded on the computer" (S12)

Some students consider that despite the difficulties of remote teaching, maintaining teaching during the pandemic was important: it was mentioned as a positive point *"to maintain teaching during a moment of atypicality, aiming to maintain some sense of purpose and routine. [...]"* (S18).

Learning was evaluated as adequate by some students, despite the difficulties of remote teaching, but some students report that they do not see any positive point in remote teaching.

"Satisfactory (learning), since the college gives us basic areas, we were not so harmed" (S25).

"None (positive points in remote teaching)" (S25)

In addition, it was reported that the exaggerated use of the computer generated tiredness, exhaustion, distraction, difficulty concentrating, and physical symptoms, such as headaches, burning sensation in the eyes and worsening of vision problems. Additionally, there were limitations of online platforms and internet connection problems.

"Greater difficulty concentrating (being in front of the computer is more exhausting than an in-person meeting), connection problems (internet was down, platforms were crashing) [...]" (S11)

Theme 4: Consequence of the pandemic and remote teaching on students' mental health

This theme discusses the consequence of the pandemic and remote teaching on the students' mental health, and is formed by the following nuclei: *The pandemic and remote teaching caused or aggravated psychological disorders in students; The pandemic and remote teaching have caused negative feelings and damage to students' mental health; Doubts and insecurities regarding academic training in the face of remote teaching and its quality; It had no negative effects on their mental health; Some students sought the psychology service for support in this phase; Some students had to resort to drug treatments to treat the psychological disorders triggered or aggravated in this phase; A student had to perform physical exercises to distract themselves.*

With the advent of the pandemic and remote learning, many students developed or worsened psychological disorders, such as anxiety, depression, and insomnia.

"[...] Near the end of the year (2020) [...] I found myself increasingly tired and less hopeful, this ended up having impacts on both my mental health and my academic performance: my anxiety attacks became more frequent, I was struck by insomnia, I was more irritable and I lost 5kg due to stress." (S1)

Moreover, even those who did not have a psychiatric condition diagnosed, reported having negative feelings with various consequences to mental health, such as tiredness, irritation, nervousness, hopelessness, restlessness, anguish, demotivation and frustration.

"Feeling of anguish (for taking a course that should have a lot of practice in online format), hopelessness (long delay in returning to in-person)." (S11)

"During the pandemic I felt very tense, always preparing myself for the death of someone in the family [...]. Guilt, demand and judgment define this time in my life a lot. [...]" (S16)

As a solution for such losses, most students needed to resort to some type of treatment, with drug treatments and follow-up with a psychology service being reported. It was also mentioned that physical exercise helped to relieve psychological symptoms during this period.

"[...]2021 was without a doubt the worst year of my life, in terms of mental health. I had to seek psychiatric and psychological help and since then I haven't stopped." (S26)

DISCUSSION

The pandemic has brought damage to the institutional process and academic performance. It is observed that the students had a negative evaluation of learning, due to the difficulty in adapting to the method and the quality of the contents taught remotely, such as anatomy classes that were no longer carried out in-person, causing dissatisfaction. Moreover, the participants pointed out that, during the quarantine, there was no separation between the home and study environments, which changed their routines. It was also found that remote teaching modified interpersonal relationships, contributing to academic performance impairment.

This was verified in other studies, such as at the University of Pittsburgh School of Medicine[13] and Makerere University (Uganda), in which 50% of medical and nursing students observed that the knowledge achieved in remote teaching had a lower quality compared to in-person teaching[14]. Furthermore, 53% of medical students at Universidade Federal de Pernambuco reported that their learning was less effective compared to in-person learning [15]. Other universities also obtained the same type of evaluation from their students[16,17].

The lack of practical activities can cause greater difficulties in adapting to remote teaching[16,18], since subjects involving laboratory work are not appropriately adapted to the online environment and interpersonal interactions with colleagues and patients are fundamental and irreplaceable for medical training[19]. This is demonstrated by the students of the Medical University of Vienna, of which 46.5% believe they do not have enough practical competence to work in the future[20].

Moreover, in remote teaching, organization and planning were notorious difficulties encountered by students[15], as well as the overload, caused by the fact of having to stay at home all the time, as well as to study[21].

In contrast to most of the analyzed studies, it was found that, in 2020, 62.1% of the students from ninety Chinese universities were satisfied with remote teaching. What may have cooperated with this evaluation is the fact that since the beginning of the establishment of the new teaching modality, the institutions have given guidance about the online modality to the students[22].

Social isolation measures caused changes and restrictions for interpersonal relationships with classmates, teachers, employees of the institution and even with family members at home. Additionally, it was emphasized that remote teaching prevented the creation of a bond with the institution and the course. However, despite all the losses, some students still highlighted that social isolation was necessary to help fight the pandemic, and that there were some positive points, such as the facility of contact with teachers and the possibility of creating online friendships .

Among the challenges resulting from the quarantine imposed by the COVID-19 pandemic, it is possible to highlight the lack of social interaction among students, which limited the sense of community[23,24], discussions about the course subjects, and participation in events[23]. In PBL, this reduces motivation and compromises student engagement and outcomes[25]. This entire disappointing context can culminate in a lack of connection with the academic environment[26], a desire to abandon the course[21] or the thought that they would not enroll in the course again[27].

Another highlighted factor is that the relationship with teachers and other faculty employees, considered irreplaceable, was impaired[20,28], and this can affect the teaching-learning process and the student's education[28]. The relationship between students was also damaged, as teamwork and the creation of bonds were impaired by the pandemic, which made students, especially first-year students, less collaborative with each other[29].

Given the need for remote teaching in the pandemic, the use of digital technologies brought benefits and harms. As

positive points, the following were mentioned: the practical aspect of everything being done through the computer; the opportunity to learn how to use digital technologies to study; the convenience of being at home and with the family; the easy contact with teachers through social networks; and the possibility of maintaining teaching even during the pandemic which, despite the difficulties, generated adequate learning, according to some students.

On the other hand, some students report that they do not see any positive point in remote teaching; while others report that the exaggerated use of the computer generated fatigue, distraction and physical symptoms, such as headache, burning sensation in the eyes and worsening of vision problems. Additionally, there were limitations of online platforms and internet connection problems.

Students saw as positive points the flexibility of schedules[19,30,31] and the possibility of watching recorded classes repeatedly[23,30]. Being at home, in a safe environment, and not having to travel, was also described as an advantage of online teaching[17], in addition to having more time to spend with family, exercise, and leisure[31]. Another very positive point was the possibility of participating in multiple events in the academic and medical world, since these were held online due to the pandemic, facilitating access for everyone and overcoming geographical barriers.[31,32]

Although the recorded material is seen as positive, it allows students to procrastinate and even not watch the content, impairing learning[23]. Another problem that many students faced during the online teaching process was distraction, which was often present, both because the home environment has several distractors, and because of the technology itself, which impairs concentration[17,27,31,33–36].

Online tutoring was mentioned as more passive, with lower student participation, and lower motivation[17,30,33]. This is correlated with the fact that the platforms used online are dependent on the internet, which often has flaws and impairs students' discussion[13,14,28,35], in addition to the physical and mental fatigue caused by excessive screen time[30].

The pandemic and remote teaching have had impacts on students' mental health. Many developed or worsened psychological disorders, such as anxiety, depression, and insomnia; and even those who were not diagnosed with psychiatric conditions had negative symptoms, such as tiredness, irritation, nervousness, hopelessness, restlessness, anguish, demotivation and frustration. Also, some participants reported that doubts and insecurities arose regarding their academic background. On the other hand, few students stated that they did not have negative impacts on mental health.

As a solution to such psychological effects, the following were mentioned: drug treatments, follow-up with a psychology service and physical exercises.

Many studies have highlighted a high prevalence of anxiety[27,31,37–42] and depression[27,31,38,39,41,42] among medical students, and others have also evidenced the existence of negative feelings among them, such as frustration[29,34], loneliness[16,34], apathy[16], bad mood[27], despair[27], stress[37,41–43], anguish[21,37,44], discouragement, appetite changes, tiredness[40], low motivation, mental exhaustion[43,44], worry[21], insecurity[37], boredom[34] and impaired sleep quality[27,40,43]. It was also verified that students attending the first years of the course[27] had lower sleep satisfaction, in addition to the evidence that inadequate sleep or insomnia is a predisposing factor for the occurrence of mental disorders[21,45].

Furthermore, it can be said that there was a higher prevalence of anxiety and depression symptoms among those who were already undergoing some type of treatment or follow-up in this area[42].

To deal with such mental health damage, students resorted to the use of medication, especially benzodiazepines[39], and these students had a worse perception of quality of life[44].

On the other hand, some studies report that the students' quality of life was not impaired during the pandemic and remote learning, as they felt safe at home[27], with the support of friends and family[44,45]. Also, there are indications that this period would not have significantly affected the students' mental health[46], since studies prior to the pandemic already showed high levels of mental disorders among medical students, so that the course itself would be the main risk factor for their development[45]. One such example was a study carried out in Sri Lanka in 2018, in which 40.4% of the students were in severe psychological distress[47].

CONCLUSION

The present study aimed to understand the impacts of the COVID-19 pandemic on medical education in the first-year class at Famema, in the year 2020, and the implications on the students' academic performance and mental health. It is possible to say that there was a predominantly negative evaluation of learning during this period and it should be noted that the institution's teaching method was a factor that hindered the students' adaptation to remote teaching.

It should be noted that online teaching has affected interpersonal relationships with classmates and professionals at the institution, which compromised the creation of bonds with the institution and course. Additionally, there were negative impacts on the students' mental health, especially anxiety and depression, and many students had to resort to

the use of medication and psychotherapy. This corroborates the hypothesis developed by the authors at the beginning of the study, in which there was the assumption that remote teaching brought social and emotional consequences to students who entered medical school at Famema during the COVID-19 pandemic.

It is important to say that remote teaching has also brought positive points, such as the facility of doing everything through the computer and the possibility of learning to use digital technologies to study. However, the excessive use of digital technologies caused fatigue and physical exhaustion in students, in addition to losses in activities due to internet connection problems.

In view of the above, the study objective and research question were attained through this investigation. From this, the importance of the present study lies in the identification of the damage caused by the pandemic to learning and the need to correct these gaps in teaching. Furthermore, it is worth emphasizing the relevance of offering psychosocial support to students who are in psychological distress, especially in atypical moments, such as the pandemic. It should be noted that the institutions should be better prepared for situations in which remote teaching is required in the future, so that the same failures that were evidenced in this study do not occur once again.

This research has the limitation of having been carried out with a small sample of students. However, the relevance lies in its scope, since we analyzed the learning conditions, interpersonal relationships, benefits and harms of digital technologies, students' mental health conditions and treatments sought by them.

For future studies, we propose an investigation that evaluates institutions that have been successful in implementing remote learning using active learning methodologies in emergency situations, in order to provide recommendations for other institutions, when necessary.

AUTHORS' CONTRIBUTIONS

Giulia Junqueira Franchi Braghetta: study concept, data curation, formal analysis, research, visualization, writing – original draft, writing – analysis and editing; Ana Victória Silva Souza: study concept, data curation, formal analysis, research, visualization, writing – original draft, writing – analysis and editing; Ana Carolina Nonato: study concept, data curation, methodology, project administration, supervision, validation, visualization, writing – analysis and editing; Danielle Abdel Massih Pio: study concept, data curation, methodology, project administration, resources, supervision, validation, visualization, writing – analysis and editing.

CONFLICTS OF INTEREST

SOURCES OF FUNDING

REFERENCES

1. World Health Organization. Pneumonia of unknown cause – China. WHO; 2020 [acesso em 14 fev 2024]. Disponível em: https://www.who.int/emergencies/disease-outbreak-news/item/2020-DON229.

2. Pan American Health Organization, World Health Organization. WHO characterizes COVID-19 as a pandemic. Paho, WHO; 2020 [acesso em 14 fev 2024]. Disponível em: https://www.paho.org/en/news/11-3-2020-who-characterizes-covid-19-pandemic.

3. World Health Organization. Covid-19 cases, WHO [acesso em 14 fev 2024]. Disponível em: https://data.who.int/dashboards/covid19/cases.

4. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the Covid-19 epidemic? The Lancet. 2020;395(10228):931-4.

5. Hale T, Angrist N, Goldszmidt R, Kira B, Petherick A, Phillips T, Webster S, Cameron-Blake E, Hallas L, Majumdar S, Tatlow H. Variation in government responses to COVID-19 [Internet]. Oxford: Blavatnik School of Government; 2020. [acesso em 14 fev 2024]. Disponível em: https://www.bsg.ox.ac.uk/research/publications/variation-government-responses-covid-19.

6. Barros MB de A, Lima MG, Malta DC, Szwarcwald CL, Azevedo RCS de, Romero D, et al. Relato de tristeza/depressão, nervosismo/ansiedade e problemas de sono na população adulta brasileira durante a pandemia de Covid-19. Epidemiol Serv Saude. 2020;29:e2020427.

7. Brasil. Portaria no 343, de 17 de março de 2020 [acesso em 14 fev 2024]. Disponível em: https://www.in.gov.br/web/dou.

8. Cao W, Fang Z, Hou G, Han M, Xu X, Dong J, et al. The psychological impact of the Covid-19 epidemic on college students in China. Psychiatry Res. 2020;287:112934.

9. Faculdade de Medicina de Marília (FAMEMA). Ensino – Séries do Medicina [Internet]. [acesso em 14 fev 2024]. Disponível em: https://www.famema.br/graduacao/medicina/

10. Nonato AC, Pio DAM. Abordagem de necessidades de saúde durante a pandemia de Covid-19: experiência de professores de medicina. Redin - Revista Educacional Interdisciplinar. 29 de dezembro de 2023;12(2):74–90.

11. Bardin L. Análise de conteúdo. São Paulo: Almedina Brasil; 2016.

12. Minayo MC de S. O desafio do conhecimento: pesquisa qualitativa em saúde. 14a ed. São Paulo: Hucitec; 2014.

13. Elnicki DM, Drain P, Null G, Rosenstock J, Thompson A. Riding the rapids: Covid-19, the three rivers curriculum, and the experiences of the University of Pittsburgh School of Medicine. FASEB BioAdvances. 2021;3(5):387-91.

14. Olum R, Atulinda L, Kigozi E, Nassozi DR, Mulekwa A, Bongomin F, et al. Medical education and e-learning during Covid-19 pandemic: awareness, attitudes, preferences, and barriers among undergraduate medicine and nursing students at Makerere University, Uganda. J Med Educ Curric Dev. 2020;7:2382120520973212.

15. Campos Filho AS de, Ribeiro Sobrinho JMD, Romão RF, Silva CHND da, Alves JCP, Rodrigues RL. O ensino remoto no curso de Medicina de uma universidade brasileira em tempos de pandemia. Rev Bras Educ Med. 2022;46:e034.

16. Teixeira L de AC, Costa RA, Mattos RMPR de, Pimentel D. Saúde mental dos estudantes de Medicina do Brasil durante a pandemia da coronavirus disease 2019. J Bras Psiquiatr. 2021; 70(1):21–9.

17. Queiroz IC de, Santos GC dos, Barreto BAP. Impacto da tutoria remota no desempenho dos estudantes de Medicina durante a pandemia da Covid-19. Rev Bras Educ Med. 2023;47(3):e094

18. Marinot JB, Brito SSC, Grillo MB, Grillo CHB, Szpilman ARM. As implicações da pandemia de Covid-19 na saúde mental e física dos estudantes do curso de Medicina de uma universidade da região metropolitana do Espírito Santo. Rev Bras Med Fam Comunidade. 2022; 24(2):15-24.

19. Flugelman MY, Margalit R, Aronheim A, Barak O, Marom A, Dolnikov K, et al. Teaching during the Covid-19 pandemic: The experience of the Faculty of Medicine at the Technion-Israel Institute of Technology. Isr Med Assoc J. 2021;23(7):401-7.

20. Steiner-Hofbauer V, Grundnig JS, Drexler V, Holzinger A. Now, I think doctors can be heroes … Medical student's attitudes towards the Covid-19 pandemic's impact on key aspects of medical education and how the image of the medical profession has changed due to the Covid-19 pandemic. Wien Med Wochenschr. 2022;172(3):90-9.

21. Barros GFO, Coimbra Neto JBR, Campanholo EM, Ritter GP, Silva AMTC, Almeida RJ de. Fatores associados a ansiedade, depressão e estresse em estudantes de Medicina na pandemia da Covid-19. Rev Bras Educ Med. 2022;46:e135.

22. Li L, Wu H, Xie A, Ye X, Liu C, Wang W. Students' initial perspectives on online learning experience in China during the Covid-19 outbreak: expanding online education for future doctors on a national scale. BMC Med Educ. 2021;21(1):584.

23. Gondhalekar AR, Gondhalekar MR. Medical education in the midst of a pandemic: what are the longer term consequences for the doctors of tomorrow? Med J Armed Forces India. 2021;77(Suppl 1):S4-7.

24. Hartnett MK. Influences that undermine learners' perceptions of autonomy, competence and relatedness in an online context. Australas J Educ Technol. 2015;31(1): 86-99. [acesso em 14 fev 2024]. Disponível em: https://ajet.org.au/index.php/AJET/article/view/1526.

25. Read L. Letter to the editor: a response to "How Covid-19 transformed Problem-Based Learning at Carle Illinois College of Medicine". Med Sci Educ. 2021;31(2):995.

26. Serra ST, Bteshe M, Bedirian R, Belz DS, Franco CF, Oliveira LSS de. Implantação de mentoria on-line em uma faculdade de Medicina durante a pandemia da Covid-19. Rev Bras Educ Med. 2021;45:e127.

27. Villanueva EW, Meissner H, Walters RW. Medical student perceptions of the learning environment, quality of life, and the school of medicine's response to the Covid-19 pandemic: a single institution perspective. Med Sci Educ. 2021;31(2):589-98.

28. Silva DSM da, Sé EVG, Lima VV, Borim FSA, Oliveira MS de, Padilha R de Q. Metodologias ativas e tecnologias digitais na educação médica: novos desafios em tempos de pandemia. Rev Bras Educ Med. 2022;46:e058.

29. Leal G da C, Martinez EZ, Mandrá PP, Jorge TM. Self-perception of non-cognitive skills among undergraduate health students during Covid-19. Rev Bras Educ Med. 2021;45:e239.

30. Brandão JM, Silva IAV, Moura TC, Zimmermann DMV, Favaro WJ, Appenzeller S. The teaching of anatomy during the Covid-19 pandemic. Rev Bras Educ Med. 2022;46:e125.

31. Menezes Junior A da S, Farinha AKGM, Diniz PSM. Ensino médico on-line durante a pandemia em diferentes países. Rev Bras Educ Med. 2023;47(2):e064.

32. Silva MX, Floriani ID, Pedro GS, Andrade DP de, Coelho ICMM. Visão de estudantes de medicina sobre os resultados da pandemia de Covid-19 no currículo paralelo. Espaç Saúde. 2023;24:1-16.

33. Coiado OC, Yodh J, Galvez R, Ahmad K. How Covid-19 transformed Problem-Based Learning at Carle Illinois College of Medicine. Med Sci Educ. 2020;30(4):1353-4.

34. Silva PGB, de Oliveira CAL, Borges MMF, Moreira DM, Alencar PNB, Avelar RL, Bitu Sousa RMR, Sousa FB. Distance learning during social seclusion by Covid-19: improving the quality of life of undergraduate dentistry students. Eur J Dent Educ. 2021 Feb;25(1):124-134 [acesso em 17 fev 2024]. Disponível em: https://onlinelibrary.wiley.com/doi/10.1111/eje.12583.

35. Cecilio-Fernandes D, Parisi MCR, Santos TM and Sandars J. The COVID-19 pandemic and the challenge of using technology for medical education in low and middle income countries [version 1]. MedEdPublish 2020, 9:74 [acesso em 17 fev 2024]. Disponível em: https://mededpublish.org/articles/9-74.

36. Firth J, Torous J, Stubbs B, Firth JA, Steiner GZ, Smith L, et al. The "online brain": how the Internet may be changing our cognition. World Psychiatry. 2019;18(2):119-29.

37. Souza ER de, Tonholo C, Kajiyama FM, Leite MP de C, Pio DAM, Bettini RV. Estudantes do curso de Medicina na pandemia da Covid-19: experiências por meio de narrativas. Rev Bras Educ Med. 2023; 47(1)e022.

38. Leal LA, Leal R de SLR, Valença SFV, Valença RJ de V, Araújo ETH, Peres MA de A. Efectos psicológicos del distanciamiento social en estudiantes de medicina. Enferm Glob. 2023;22(69):215-244.

39. Brito ESV de, Silva LNB da, Oliveira TMM, Santos-Veloso MAO, Lima SG de. Repercussões da pandemia de Covid-19 na saúde mental nos estudantes de Medicina de Pernambuco. Rev Bras Educ Med. 2023;47(3):e082.

40. Müller MR, Albuquerque G de A e, Monnerat GR. Saúde mental dos acadêmicos de Medicina na quarentena – isolamento e enfrentamentos individuais. Rev Bras Psicoter Online. 2021;23(2): 27-34

41. Saraswathi I, Saikarthik J, Senthil Kumar K, Madhan Srinivasan K, Ardhanaari M, Gunapriya R. Impact of Covid-19 outbreak on the mental health status of undergraduate medical students in a Covid-19 treating medical college: a prospective longitudinal study. Peer J. 2020;8:e10164.

42. Mendes TC, Dias ACP. Psychological disorders and coping strategies among undergraduate medical students during the Covid-19 pandemic in Brazil. Rev Bras Educ Med. 2022;46(3):e120.

43. Allende-Rayme FR, Acuña-Vila JH, Correa-López LE, De La Cruz-Vargas JA. Academic stress and sleep quality during the Covid-19 pandemic among medical students from a university of Peru. Rev Fac Med Bogota. 2022;70(3):e206.

44. Arar FC, Chaves T de F, Turci MA, Moura EP. Qualidade de vida e saúde mental de estudantes de Medicina na pandemia da Covid-19. Rev Bras Educ Med. 2023;47:e040.

45. Cardoso ACC, Barbosa LA de O, Quintanilha LF, Avena K de M. Prevalence of common mental disorders among medical students during the Covid-19 pandemic. Rev Bras Educ Med. 2022;46:e006.

46. Souza GF de A, Souza GF de A, Alves AC de S, Cordeiro ALN, Carvalho M de SO, Costa GOLP da, et al. Fatores associados à ansiedade/depressão nos estudantes de Medicina durante distanciamento social devido à Covid-19. Rev Bras Educ Med. 2022;46:e109.

47. Wimberly CE, Rajapakse H, Park LP, Price A, Proescholld-Bell RJ, Østbye T. Mental well-being in Sri Lankan medical students: a cross-sectional study. Psychol Health Med. 2022;27(6):1213-26.