

PERCEIVED STRESS, BURNOUT AND ANXIETY AND FEAR RELATED TO COVID-19 IN ROMANIAN MEDICAL STUDENTS – EXPERIENCE FROM THE STATE OF EMERGENCY IN ROMANIA

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Abstract: Crisis situations, which cause disturbances in the daily routine of the individual can contribute to the development of mental problems. On the 26th of February, 2020, the first confirmed case of COVID-19 was reported in Romania. On the 16th of March, the President of Romania declared The State of Emergency. The following day, by Order of the Ministry of the Internal Affairs medical students starting with the 4th year of study were to be recruited, on a voluntary basis, to support activities in the Emergency Rooms, if needed. Numerous medical students volunteered. The medical students were exposed to online learning and the possibility of being recruited as volunteers in COVID-19 units. In April 2020, we created and distributed an online survey via www.psysafe.org, which collected data on demographics, personal status of infection, and general mental health, including medication and substance use, sleeping problems in the previous week, perceived stress in the previous month, and burnout in the previous two months. We translated and adapted 2 questionnaires to assess the COVID-19 related anxiety and fear. The participants were Romanian medical students. Data was statistically analysed with SPSS 20. Out of 550 surveys filled, we analysed 545 valid surveys. The mean age of the respondents was 21.66 (± 2.55) years, with 81.7% female (445) and 18.3% male (100). 91.6% of the respondents declared that they were never diagnosed with a psychiatric disorder. Coffee was used on a daily basis by 53.8% of the students, with tobacco coming in second in 19.4%. Female students perceived a higher level of stress and showed a higher level of burnout. Female students scored higher for the anxiety and fear related to Covid-19. Medical students with mental health history scored higher on perceived stress, burnout, anxiety and fear related to COVID-19. Perceived stress indicated a level of moderate stress regardless of the mental history status. For all students, the burnout value indicated that some attention was needed, as they might had been candidates to burnout. Moreover, students diagnosed with a psychiatric disorder during the pandemic showed signs that they were on the road to burnout, with changes needed to be done at the time. There were statistically significant positive correlation, of various degrees between perceived stress, burnout, anxiety and fear related to COVID-19, with the strongest one observed for the perceived stress and burnout, in Romanian medical students.

INTRODUCTION

Crisis situations, which cause disturbances in the daily routine of the individual can contribute to the development of mental problems such as depressive, anxious disorders, increased irritability. These disturbances are reported in particular in the conditions of divorce, loss of employment or other major changes in life.(1) Crisis situations requiring the quarantine of entire regions or countries inevitably lead to dramatic disruptions and changes in the labour market, with reduced activity or job loss. People who go through these changes in radical changes in daily routine report higher scores on scales that assess depressive symptomatology.(2) According to network theory, symptoms of a psychiatric disorder can lead to the development of another psychiatric disorder. Therefore, the co-existence of two psychiatric disorders belongs to a dynamic network of symptoms that produce and maintain the psychopathological picture. Common symptoms connect the two

pathologies, and the activation of the common symptom increases the risk of “transferring” symptoms from one disorder to the other.(3) Co-activation of two psychiatric disorders can be observed in crisis situations, for example epidemics, when either anxiety or depression is triggered, and failure to resolve one of them, most commonly anxiety, leads to the development of the other by transferring symptoms.(4)

As we have seen, irritability is a structure that retains stability over time, and exposure to stressful situations, causes anger responses; if the situation is not resolved, but is chronic, chronic irritability increases the risk of developing depressive disorder. Such a pressing situation, which drags on and whose resolution is not in the cross-reference, is a major epidemic crisis, in which limited resources are engaged in survival. Added to this, the instability created by the loss of daily routine, which can in turn lead to the development of symptoms of irritability and depression. Moreover, irritability and sadness, specific to

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depression, are part of the same class of affect disturbances, with negative valences.

On the 26th of February, 2020, the first confirmed case of COVID-19 was reported in Romania. On the 16th of March, the President of Romania declared The State of Emergency (5) which was in effect until May, the 14th. On the 17th of March 2020, by Order no. 74522 issued by the Ministry of the Internal Affairs At the level of each university centre, within the medical faculties, students will be recruited, starting with fourth year medical students, on a voluntary basis, to support activities in the Emergency Rooms. Recruited students only carry out support activities if the current capacity of medical facilities is exceeded.(6) Numerous medical students volunteered to be recruited.(7) So, the medical students were exposed to online learning and the possibility of being recruited as volunteers in COVID-19 units. Irritability is understood as an inclination, as a predisposition to react with anger, to stir up gallows or to have tantrums, manifestly disproportionate to the situation or the stimulus that causes the response.(8) Irritability is part of affect disturbances, with both positive and negative valences. On the one hand, from the point of view of origin, it is classified as a disturbance in a negative sense, alongside fear and sadness, and on the other hand, from the point of view of the result it is classified as a disturbance in a positive sense, alongside exaltation. Fear and sadness cause withdrawal behaviour, while exaltation, but also irritability, causes opposite behaviour of closeness.(9) Irritability, either as a symptom (10), or as a trait, does not currently benefit from a specific drug treatment. The underlying or comorbid pathology is frequently addressed, which brings with it and therapeutic response to the problem of irritability. This case is commonly found in psychiatry, where a pharmacotherapeutic class treats several pathologies.

Population studies have shown that irritability forms a distinct framework (8), with substantial stability over time, associated with depression and anxiety in longitudinal studies.(11) Moreover, it seems that the superposition with depression also has a genetic part. It has been demonstrated by longitudinal studies that irritability is associated with depressive symptoms but that this association is less if studied in relation to anxiety or symptoms of ADHD.(12) Persistent irritability has also been shown to be associated with depressive symptoms.(13)

MATERIALS AND METHODS

Population

The participants were young adults, over 18 years, Romanian medical students, from any medical school in Romania. Each participant gave an informed consent electronically.

Survey

In April 2020, we created and distributed an online survey via www.psysafe.org, which collected data on demographics, personal status of infection, personal status of public health measures disposed, a close person’s status of infection, and general mental health. We assessed the participants’ sleeping problems in the previous week, perceived stress (14) in the previous month, and burnout (15) in the previous two months, as presented in Annex 1. Sleepless nights or nights with sleeping problems as well as using sleeping pills counted as a sleeping problem. We used the Perceived Stress Scale (PPS) because its evidence for validity prove higher PSS scores were associated with “greater vulnerability to stressful life event, elicited depressive symptoms, or more colds”. The outbreak of COVID-19 was a stressful life event, and in the beginnings, there were some voices who considered it not more dangerous than a common cold. We adapted the Burnout Rating Scale (BRS), from the original 3 months period it to a 2-month

period so we would have a more accurate depiction of the phenomenon during the State of Emergency.

The items for the general mental health were classified as: a) personal history of mental illnesses, b) use of psychiatric medication and self-medication, including use of supplementary products c) substance abuse.

We translated and adapted 2 questionnaires to assess the COVID-19 related anxiety and fear. The first questionnaire was developed by Ho et al (2005) (16), and the second one by Ahorsu et al (2020).(17) The first questionnaire has 18 items, so we named it COVID-19 Fear-18 (CF-18). We assessed the participants’ opinion via a 4-point Likert scale, 0 - definitely false, 3 - definitely true. The second questionnaire, Fear of Coronavirus-19 Scale has 7 items, so we named it COVID-19 Fear-7 (CF-7). We assessed the participants’ opinion via 5-point Likert scale 1 - strongly disagree, 5 - strongly agree as presented in Annex 1.

To simplify the survey, we used the term COVID-19 for both the disease and the virus. Surveys not entirely filled were considered invalid. Data was collected from late-April to the end of May 2020.

Statistical analysis

Data was statistically analysed with SPSS 20. The research received the Approval of the Ethics Committee of the Iuliu Hațieganu University of Medicine and Pharmacy Cluj-Napoca, Romania.

The entire questionnaire is available upon request.

RESULTS

Out of 550 surveys filled, 5 had missing responses, so they were excluded from the statistical analysis. In the end, we analysed 545 valid surveys. The mean age of the respondents was 21.66 (±2.55) years, with 81.7% female (445) and 18.3% male (100). 95% of the respondents (518) were single, 2.8 % married (15), and the rest in other forms of partnership.

At the time, 85.3% (465) of the respondents declared that they were not or have not been infected with SARS-CoV-2, and 14.7% (80) declaring that did not know. On the other hand, 71 % (387) declared that they did not know a close person to be ill, 18.7% (105) that the person was cured, 8.4% (46) that the person was still ill, and 1.8% (10) that the person had died.

The percentage of respondents who were or have been placed in self-isolation was 38.2% (208), in quarantine 4.6% (25), with 57.2% (312) not placed in quarantine or self-isolation.

The personal history of mental illnesses is presented in table no. 1. There were 4.8% of the respondents who declared that they had been diagnosed with a psychiatric disorder in the past, and 3.3% of the respondents who declared that they were diagnosed at the time of the study. 91.6% of the respondents declared that they were never diagnosed with a psychiatric disorder.

Table no. 1. Relative frequency of personal history of mental illnesses, results in percentage (%)

Personal history of mental illnesses	
None	91.6
In the past	4.8
In the present	3.3

Table no. 2 presents the relative frequency of the use of psychiatric medication and self-medication, including the use of supplementary products in the Romanian medical students. 3.1% declared that they had received previous psychiatric medication, and 5.5% declared that they used self-medication, including supplements, in the past, while 1.7% declared that they were on a current medication, and 5.7% that they self-medicate currently.

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Table no. 3 presents the relative frequency of psychoactive substance use in Romanian medical students. Coffee was used on a daily basis by 53.8% of the students, with tobacco coming in second in 19.4%, and tea in third place with 8.8%. Daily alcohol consumption was reported by 1.7% of the Romanian medical students. 66.7% of the Romanian medical students declared that they had never smoked, 34.3% that they had never drunk alcohol, and 23.1% that they had never drunk coffee.

Table no. 2. Reported use of medication, including supplements, results in percentage (%)

Have you used	No	Yes
Previous psychiatric medication	96.9	3.1
Previous self-medication (including supplements)	94.5	5.5
Current psychiatric medication	98.3	1.7
Current self-medication (including supplements)	94.3	5.7

Table no. 3. Reported use of psychoactive substances, results in percentage (%)

How often do you use	alcohol	tobacco	coffee	tea	cannabis	cocaine & related	heroin & related	LSD	others
Never	34.3	66.7	23.1	45.6	95.4	98.6	99.4	99.1	95.3
Once a month	24.2	4.1	3.1	17.3	2.4	1.2	0.6	0.7	1.6
Twice a month	12.7	1.4	3.7	8.1	0.7	0.2	0.6	0.2	0.5
Once a week	13.3	2.3	5.0	7.9	0.2	0	0	0	1.3
2-3 times a week	13.8	6.2	11.4	12.4	1.0	0	0	0	1.3
Daily	1.7	19.4	53.8	8.8	0.2	0	0	0	0

The reported nights with sleeping problems are presented in figure no. 1. 37.6% of the medical students declared that they had trouble sleeping for at least 1 night during the past week.

Figure no. 1. Sleeping problems (nights/week), result in percentage (%)

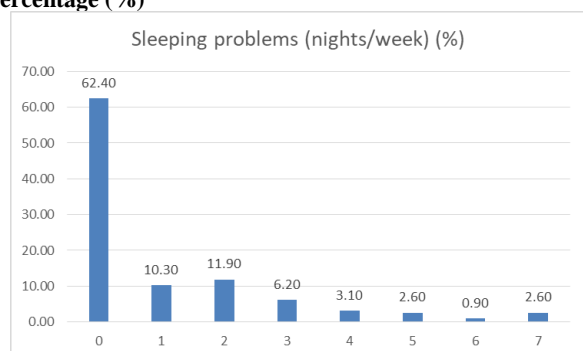


Table no. 4 presents the distribution of the mean scores for each of the 4 domains and their relationship with the participant's gender. According to the PPS mean score, female students seem to perceive a higher level of stress. Both values indicate that the medical students perceived a moderate level of stress. According to the BRS mean score, female students seem to show a higher level of burnout, with the value correspondent to some attention needed, for they may be candidates to burnout. On the other side, male students did not show any signs of burnout. The same differences have been observed when assessing the anxiety and fear related to Covid-19, with higher values for female students compared to male students.

Table no. 4. Gender distribution of mean scores for perceived stress, burnout, and anxiety and fear related to Covid-19

	Gender	Mean	t	p
PPS_score	Male	16.0900	-4.509	.000
	Female	19.5663	-4.535	.000
BRS_score	Male	14.6500	-4.650	.000
	Female	20.4831	-4.808	.000
CF-18_score	Male	13.6000	-4.376	.000
	Female	17.6921	-4.245	.000
CF-7_score	Male	11.0800	-5.497	.000
	Female	14.1393	-5.865	.000

As shown in table no. 5, Romanian medical students who were diagnosed with a psychiatric disorder at the time of the outbreak of the Covid-19 pandemic present higher values for the mean scores on all 4 domains. Medical students who had been diagnosed with a psychiatric disorder prior to the outbreak scored higher than medical students with a free personal history of mental illness on all 4 domains. Perceived stress mean value indicate a level of moderate stress regardless of the mental history status. According to the BRS mean score, students with medical free history and students that had been diagnosed with a psychiatric disorder in the past, the value corresponds to some attention is needed, as they may be candidates to burnout. Moreover, students diagnosed with a psychiatric disorder during the pandemic showed signs that they were on the road to burnout, with changes needed to be done at the time.

Table no. 5. Personal history of mental illnesses and the distribution of mean scores for perceived stress, burnout, and anxiety and fear related to Covid-19

Mental illness history	PPS_score	BRS_score	CF-18_score	CF-7_score
None	18.5591	18.8778	16.7174	13.4790
In the past	22.5769	24.3077	18.8077	14.8462
In the present	24.4444	28.4444	21.5000	15.0000
Total	18.9466	19.4549	16.9761	13.5948

The distribution of mean scores for the 4 domains and the relationship with the use of psychiatric medication is presented in Table 6. The mean scores for PPS and BRS were higher for the students who used psychiatric medication, although showing the same level of moderate stress perceived and some attention needed when looking at the burnout signs, because they may be candidates. The CF-18 and CF-7 mean scores were lower for the students who used medication.

Table no. 6. Psychiatric medication use and the distribution of mean scores for perceived stress, burnout, and anxiety and fear related to Covid-19

Psychiatric medication	PPS_score	BRS_score	CF-18_score	CF-7_score
No	18.8954	19.2909	17.0133	13.5951
Yes	20.5294	24.5294	15.8235	13.5882
Total	18.9466	19.4549	16.9761	13.5948

The distribution of mean scores for the 4 domains and the relationship with the use of alcohol is presented in table no. 7. The medical students who declared that they consume alcohol daily reported the highest mean scores for both PPS and BRS. Overall, the amount of perceived stress is levelled as moderate, and the BRS score indicate that some attention is needed. Moving to anxiety and fear related to Covid-19, the medical students who consumed alcohol 2-3 times a week scored highest at both CF-18 and CF-7.

As shown in Table 8, medical students who use alcohol have a statistically significant higher mean for perceived stress, burnout, and CF-18, but not for CF-7.

Table no. 7. Alcohol use and the distribution of mean scores for perceived stress, burnout, and anxiety and fear related to Covid-19

Alcohol use	PPS_score	BRS_score	CF-18_score	CF-7_score
Never	17.7078	17.2237	15.8402	13.1598
Once a month	19.4478	19.9701	17.0149	13.7836
Twice a month	18.7500	19.0500	17.3833	13.8667
Once a week	19.8197	20.5574	16.6393	13.5902
2-3 times a week	21.0159	24.3968	20.3492	14.3651
Daily	21.7500	24.7500	18.0000	13.1250
Total	18.9284	19.4128	16.9413	13.5780

Table no. 8. Distribution of mean scores for perceived stress, burnout, and anxiety and fear related to Covid-19 in alcohol user vs non-user medical students

	Alcohol use	Mean	t	p
PPS_score	no	17.7078	-3.325	.001
	yes	19.7485	-3.277	.001
BRS_score	no	17.2237	-3.669	.000
	yes	20.8834	-3.654	.000
CF-18_score	no	15.8402	-2.464	.014
	yes	17.681	-2.477	.014
CF-7_score	no	13.1598	-1.552	.121
	yes	13.8589	-1.547	.122

The distribution of mean scores for perceived stress, burnout, and anxiety and fear related to Covid-19 and the personal status of infection are presented in table no. 9. The highest mean scores in all 4 domains were present in the medical students' group that did not know whether they were or had been infected with Covid-19. However, the means were not statistically significant for the CF-7.

Table no. 9. Distribution of mean scores for perceived stress, burnout, and anxiety and fear related to Covid-19 and the personal status of infection

	Are you or have you been infected with COVID-19?	Mean	t	p
PPS_score	No	18.6602	-2.136	.033
	I do not know	20.4875	-2.145	.034
BRS_score	No	18.7914	-3.052	.002
	I do not know	23.0250	-2.946	.004
CF-18_score	No	16.4022	-3.571	.000
	I do not know	20.0750	-3.695	.000
CF-7_score	No	13.4817	-1.050	.294
	I do not know	14.1375	-.989	.325

As presented in table no. 10, there are statistically significant positive correlation, of various degrees between all the 4 domains assessed. The strongest correlation has been observed for the PPS and BRS, followed by CF-18 and CF-7.

Table no. 10. Correlations between scores for perceived stress, burnout, and anxiety and fear related to Covid-19

		PPS_score	BRS_score	CF-18_score	CF-7_score
PPS_score	Pearson Correlation	1	.755**	.569**	.384**
	p		.000	.000	.000
BRS_score	Pearson Correlation	.755**	1	.590**	.437**
	p	.000		.000	.000
CF-18_score	Pearson Correlation	.569**	.590**	1	.700**
	p	.000	.000		.000
CF-7_score	Pearson Correlation	.384**	.437**	.700**	1
	p	.000	.000	.000	

DISCUSSIONS

COVID-19 brought numerous changes for every individual. This pandemic is not like any other. Directly affecting the student's routine, in Romania, in some universities, including medical schools, the decision to suspend onsite activities in order to prevent and control the spread of COVID-19 has been taken long before the national decision brought to law by the declaration of The State of Emergency. The following step was the shift to online teaching activities. Each step, from confirming the first case in Romania to suspending traditional teaching activities and beginning online teaching, represented a major change in the psychological network of the medical students.

The importance of changes in the structure of the psychological network in the context of epidemiological crisis, indicates the central location of irritability. Depressive disorder can also be found in more than 30% of cases in this situation.(18) Similarly, the prevalence for depressive mood in the acute and post-epidemic epidemic situation, respectively, is 32.6% and 10.5%, respectively. For irritability, the prevalence is 4.9% in acute, and 12.8% post-epidemic. It is worth mentioning the prevalence for aggression, 7.4% in acute, with a decrease to 1% post-epidemic.(19) For the general population, it has been noted that more than half of the respondents declared to struggle with anxiety and psychological distress related to COVID-19. Moreover, about 17% of the respondents considered their level of anxiety as exaggerated, and about a quarter of the respondents considered that their level of anxiety would result in impairment in their daily life.(20)

Out of 550 surveys filled, we analysed 545 valid surveys. The mean age of the respondents was 21.66 (±2.55) years, with 81.7% female (445) and 18.3% male (100). 91.6% of the respondents declared that they were never diagnosed with a psychiatric disorder. Coffee was used on a daily basis by 53.8% of the students, with tobacco coming in second in 19.4%.

In previous recent studies conducted in Romania, it was noted that ranging from 15.2% of medical and law students and 24.7% of 1st year medical students to 45.3% of medical students were abstainers from alcohol.(21,22,23,24,25,26) Our results indicate a 34.3% of medical students, which is in the same range as the other studies. Even though these results seem encouraging, in fact medical students have relatively low levels of knowledge regarding the effect of alcohol on the body.(24) These aspects, corroborated with the daily alcohol use of 1.7% as shown in table no. 3, during a time of crisis might raise serious concerns, as it is advisable not to resort to psychoactive substance abuse in order to relieve anxiety in stressful conditions, because substance abuse, among others, tends to be associated with an increase in the psychological burden.(20)

The large majority of medical students declared that they had never used cannabis, with 95.4% of the respondents. This is somewhat similar to the results from the 1st year medical students who declared they had never used in 87.6% of the respondents.(21) However, in our study, daily smoking was present in 19.4% cases as opposed to the above-mentioned study with 13.9%. We may attribute the increase in smoking as a mean to cope with anxiety.

Female students perceived a higher level of stress and showed a higher level of burnout. Female students scored higher for the anxiety and fear related to Covid-19. Medical students with mental health history scored higher on perceived stress, burnout, anxiety and fear related to COVID-19. Perceived stress indicated a level of moderate stress regardless of the mental history status. For all students, the burnout value indicated that some attention was needed, as they might have been candidates to burnout. Moreover, students diagnosed with a psychiatric disorder during the pandemic showed signs that they were on

the road to burnout, with changes needed to be done at the time. As almost one quarter of a cohort of Romanian medical students experienced clinically significant depressive symptoms during the exam period, considered to be the most stressful period of the academic year, with nearly 5% taking antidepressant medication (23,25,26) our study shows that 3.1% of the medical students had previously taken psychiatric medication and 1.7% taking it on a current basis, during the time of the pandemic, as presented in table no. 2, and also that the personal medical history of mental illness as well as the use of psychiatric medication is associated with higher scores for perceived stress, burnout, and anxiety and fear related to COVID-19, as indicated in tables no. 5 and 6, these issues should also be properly addressed.

Our findings add to those that indicate that patients with personal history of mental illnesses suffer a worsening of their psychiatric symptoms. The same study indicated that patients suffering from COVID-19 may develop post-traumatic stress symptoms in a large proportion, up to 96.2%. Taking into consideration that up to ¼ of Romanian medical students experience clinically significant depressive symptoms during stressful events, that there was a shift from onsite to online teaching, and that starting from the 4th year, medical students were to be recruited if needed, and therefore exposed to COVID-19 in a potentially similar manner to health care workers, the findings that people suffering of COVID-19 experience significantly higher level of depressive symptoms, as well as the increased rates of depression and/or depressive symptoms, increased levels of anxiety or any other form of psychological distress as compared to the general populations, represent another potential problem. Poor quality of sleep, reported as insomnia up to 38.9% was also present in our study group, with 37.6% of the medical students suffering of sleeping problems at least 1 night a week.(27,28)

As the observed anxiety pooled prevalence can raise up to 23.2% and depression up to 22.8% during COVID-19 pandemic (28), and that in a cohort of medical students in Romania, it has been shown that up to 44,1% of the 1st year medical students suffered from anxiety (21), but with the study conducted long before the outbreak of COVID-19 or any other national crisis, it is very important to address the problem of anxiety in the pandemic context.

The profile for a person developing a mental health problem as depicted in the literature consist of a younger person, healthcare worker (29), female gender and having relatives suffering from COVID-19, with a poor self-related health, people with a personal history of mental illness.(20,27,28,30)

On the other side, Romanian medical students did not score that high on perceived stress and burnout, and this is in accordance with the findings that state that individuals who have a higher risk for developing symptoms acute stress, insomnia, anxiety or depression were the ones confirmed or suspected to be infected. In our study, medical students declared in a large proportion, up to 85.3% that they were not or had not been infected. Moreover, 71% of them declared that they did not know a close person to be ill, which is considered another risk factor. So, the Romanian medical students were not among infected individuals, nor among people with suspected infection, but they could have become part of the group that might provide care for patients suffering of COVID-19.(31,32)

We can only agree and stress the importance of the statement of Petzold et al (2020): *"In the current situation, fears regarding the COVID-19 pandemic have to be seen as normal consequences in an exceptional situation rather than as pathologic reactions"*.(20)

We acknowledge the limitation of our method of collecting responses, via online, but this had to be done in

accordance with the State of Emergency and the epidemiological conditions in Romania at the moment of the survey.

CONCLUSIONS

In general, Romanian medical students perceived a moderate level of stress and a burnout value that indicated that some attention was needed as they might have been candidates to burnout. Female medical students perceived a higher level of stress and showed a higher level of burnout, and also scored higher for anxiety and fear related to COVID-19.

Medical students with a personal history of mental illness scored higher on perceived stress, burnout, and anxiety and fear related to COVID-19. Students diagnosed with a psychiatric disorder during the pandemic showed signs that they were on the road to burnout, with changes needed to be done at the time.

There were statistically significant positive correlations, of various degrees between perceived stress, burnout, anxiety and fear related to COVID-19, with the strongest one observed for the perceived stress and burnout, in Romanian medical students.

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