Psychiatria Danubina, 2021; Vol. 33, Suppl. 10, pp S114-119
Medicina Academica Mostariensia, 2021; Vol. 9, No. 1, pp 114-119

COVID-19 forum: Original paper

IMPACT OF COVID-19 PANDEMIC ON MENTAL HEALTH OF MEDICAL STUDENTS AT THE UNIVERSITY OF MOSTAR

Šima Šimić[1], Edita Černy Obrdalj[2], Mateo Bevanda[1], Daniel Bevanda[1], Azer Rizikalo[1] & Inga Marijanović [1]

[1]University Clinical Center Mostar, Mostar, Bosnia and Herzegovina
[2]Department of Family Medicine, Health Center Mostar, School of Medicine University of Mostar, Mostar, Bosnia and Herzegovina

received: 12.2.2021; revised: 29.4.2021; accepted: 1.6.2021

SUMMARY

Background: *Previous studies have shown that medical students are more prone to depression, more tired, and more prone to emotional exhaustion, depersonalization and burnout syndrome than other students. In terms of mental health, they are a "more vulnerable" than individuals of the same age in the general population. In December 2019 in Wuhan (China) the outbreak of pneumonia caused by the new coronavirus captured worldwide attention. The implementation of strict quarantine measures kept a large number of people in self-isolation which affected all aspects of life.*

Objective of the study is to determine the direct impact of the COVID-19 pandemic on mental health and quality of life of medical students and the differences in the impact between genders and years of study.

Subject and methods: *This is a cross-sectional study conducted from May 25 to June 5 2020. It includes medical students who resided in the country affected by the COVID-19 pandemic. Participants completed a modified anonymous online questionnaire that assessed the Impact of Event Scale, indicators of negative mental health impacts, social and family support, and lifestyle changes due to a pandemic.*

Results: *The mean IES score in the participants showed a moderate stressful impact, with the mean IES score of females being significantly higher than that of males (29 vs. 19) with $p < 0.001$. More than half of the participants had an IES score ≥ 26. With the onset of the pandemic, 71.5% of all medical students reported feeling increased stress from commitments.*

Conclusions: *the pandemic had stressful impact on the mental health of medical students and it was significantly more stressful for women and students in the preclinical years of study. The COVID-19 pandemic had no impact on social and family support, however a positive impact on the lifestyle of medical students was found.*

Key words: *COVID-19 - mental health - medical students – IES - pandemic*

* * * * *

INTRODUCTION

For many years, medical school stress has been recognized as a significant problem (Slavin at al. 2014). Medical students begin their education in better mental health than their peers. Nevertheless, numerous studies that have proven extremely high levels of stress among medical students, it can be said that their learning environment and training process contribute to the deterioration of mental health (Brazeau at al. 2014). The COVID-19 pandemic has led to sudden changes in the daily lives of students around the world (Sahu et al. 2020).

A lot of studies have shown that medical students are more prone to depression, more tired, and more prone to emotional exhaustion, depersonalization, and burnout syndrome than other students. Likewise, symptoms of depression, suicidal ideas, and dissatisfaction with personal accomplishments show the greatest prevalence during medical studies, while it subsequently declines in a physician's career (Dyrbye et al. 2014). Meta-analysis conducted in 2016, which included 129 123 medical students from 47 countries, showed a prevalence of depression and depressive symptoms of 27.2%, and for suicidal ideation 11.1% which proved to be higher than in the general population (Rotenstein et al. 2016).

In terms of mental health, medical students are a "more vulnerable" group compared to individuals of the same age in the general population (Abdel Wahed at al. 2017, Abdulghani & Hassan 2011, Venkatarao et al. 2015, Backović et al. 2012). Meta-analysis conducted in 2019 was analyzed data from 69 studies which involved 40 348 medical students. The global prevalence of anxiety among medical students did not show a statistically significant difference in anxiety prevalence between students in the preclinical and clinical years of study (Quek et al. 2019).

COVID 19 have a significant impact on the physical and mental condition of the population. The clinical spectrum of the disease ranges from asymptomatic forms to severe pneumonitis, acute respiratory distress syndrome, and death (Xu et al. 2020, Day 2020) The World Health Organization declared COVID-19 a global health crisis on January, 2020 (Sohrabi et al. 2020). To control further transmission, aggressive

public health measures such as sanitary measures, travel restrictions, home quarantine, social distancing measures, and central quarantine have been introduced globally. (Pan et al. 2020, Signorelli et al. 2020).

A study conducted in China that examined the impact of COVID-19 on the mental health of the population, shows overall prevalence of generalized anxiety disorder (GAD) of 35.1% and depressive symptoms 20.1%. Young people had a significantly higher prevalence of both GAD and depressive symptoms than the elderly population (Huang et al. 2020). Also, peritraumatic distress affected medical students. Due to the rapid increase in patients worldwide, many countries have considered early graduation of medical students while some clinics involved medical students in work during the pandemic (Klasen et al. 2020). Medical students at Harvard University during the pandemic gathered the Medical Student Response Team to effectively mobilize interested fellow students in response to the COVID-19 pandemic (Soled et al. 2020). Chinese medical students involved in this program showed as many as 26.63% significant psychological distress while 11.10% of them met the criteria for a possible acute stress response (Li et al. 2020).

The objective of this study was to investigate the impact of the COVID19 pandemic on the mental health of medical students, on their social and family support as well as on their lifestyle.

SUBJECTS AND METHODS

The sample covers total of 246 participants – 178 (72.36%) female and 68 (27.64%) male students who fill out the questionnaire.

Out of total number of students in the preclinical years was 152 (61.79%), but in the clinical years was 94 (38.21%) students. 112 students reject to fill out the questionnaire.

The criterion for inclusion of students in the study was residence in the country affected by the COVID-19 pandemic, as well as Internet access.

The data were collected through an anonymous online survey. The study was approved by the Ethics committee of the School of medicine University of Mostar.

The questionnaire in this study was the modified one used in cross-sectional study examining the impact of the COVID-19 pandemic on the mental health and quality of life of the local population in one Chinese province (Li et al. 2008).

The participants completed an anonymous survey sent through an online messaging group. The questionnaire contains sociodemographic data, then the impact scale of the traumatic event (IES - Impact of Event Scale) with 15 questions (Joseph 2000). Impact of Event Scale is one of the most used measures of self-reporting of post-traumatic stress, on the frequency scale: answer "never" - 0, "rarely" - 1, "sometimes" - 3, "often" - 5 points. The sum of 26 points was taken as a "cut off" to determine the presence of the traumatic experience of the COVID-19 pandemic. The total IES score can also be interpreted according to the following dimensions of posttraumatic stress symptoms: 0-8 (subclinical), 9-25 (mild), 26-43 (moderate) and 44+ (severe) (Sterling 2008).

Furthermore, the questionnaire contains six questions on the negative impact of a pandemic on mental health with “yes” or “no” answers, five questions on the impact of a pandemic on social and family support and four questions related to lifestyle changes during a pandemic with possible answers “less”, “Same as before” and “increased” The questionnaire in this study also contains six modified and validated questions related to the negative mental health impacts resulting from a pandemic. The questions investigated whether there was an increase in stress from obligations, financial stress, and home stress compared to the period before the pandemic. The answers to the questions are "yes" or "no" The last four questions in the questionnaire were also modified and validated questions, examining the impact of the COVID-19 pandemic on lifestyle changes relevant to mental health. Respondents were asked to indicate how much attention they give to their mental health, and whether the time spent resting, the time spent relaxing, and the time spent exercising were” reduced “the same as before” or “increased” (Zang & Ma 2020).

Statistical Analyses

The data in this research were collected in an MS Excel database (version 11. Microsoft Corporation, Redmond, WA, USA). SPSS 17.0 statistical software (SPSS Inc., Chicago, IL, USA) was used for all statistical analyzes. The obtained results were processed using descriptive and non - parametric and parametric methods of inferential statistics depending on the data distribution. The sample distribution for each continuous variable and for each study group was tested by the Kolmogorov-Smirnov test. Category variables are presented descriptively statistically as frequency and percentage while continuous variables are presented as arithmetic mean and standard deviation. Differences in categorical variables were tested by Hi square test and Fisher exact test where necessary. Differences between continuous variables were tested by Student t-test. The level of significance was set on $p<0.05$.

RESULTS

More than half of students 133 (54%) have IES scor ≥ 26, while IES score <26 have113 (46%) students.

The average IES score of the participants was 26. The average of IES score of women was significantly higher than the men (29 vs. 19) with p<0.001. Preclinical study students had a significantly higher average IES score than their clinical colleagues (28 vs. 24).

Among students included in this study, 176 (71.5%) reported feeling increased stress from obligations, 139 (56.5%) reported feeling increased financial stress compared to the pre-pandemic period, and 138 (55.7%) feel worried about COVID-19. On the other hand, only 15 (6.1%) of medical students stated that they do not feel terrified of the pandemic, and 116 (47.3%) of medical students feel helpless about COVID-19. Likewise, 180 (73.2%) of medical students stated that they do not feel increased stress at home.

Comparing the negative impact of the COVID 19 pandemic in terms of gender, a greater negative impact was found in female students. They had increased stress of obligations 76.4% than male students (58.8%; χ^2=6.63, p=0.001) and increased financial stress than male students. Also, female students had increased stress at home (31.5%) than male students (14.7%; 6.20, p=0.013).

There were statistically significant differences between female and male students in responses "I feel increased stress from obligations" - female (76.4%) compared to male students (58.8%; χ^2=6.632, p<0.010), “I feel increased financial stress” (61.2%) of female students compared to male students (44.1%; χ^2=5.19, p<0.023), “I feel increased stress at home” (31.5%) female students, according to male students (14.7%; χ^2=6.20, p=0.013) and 48.9% of female students "feel helpless because of COVID-19" in comparison to male students who felt that way (32.4%; χ^2=4.79, p=0.029) (Table 1).

The negative impact of COVID-19 on mental health according to the year of study indicates that students of preclinical years of study (31.6%) felt increased stress at home compared to those in clinical years (19.1%; χ^2=3.96, p=0.047).

Table 1. Negative effects on mental health by gender

	Gender					
	M		F		χ^2	p
	n	%	n	%		
I feel increased stress from obligations	40	58.8	136	76.4	6.632	*0.010*
Increased financial stress	30	44.1	109	61.2	5.191	*0.023*
Increased stress at home	10	14.7	56	31.5	6.208	*0.013*
I feel terrified	3	4.4	12	6.7	0.148	0.766*
I feel worried	32	47.1	105	59.0	2.375	0.123
I feel helpless	22	32.4	87	48.9	4.795	*0.029*

*Fisher's exact test

Table 2. Awareness and lifestyle according to the year of study

	Years of study					
	Preclinical		Clinical		χ^2	p
	n	%	n	%		
Paying attention to mental health					8.705	*0.013*
Decreased	18	11.8	5	5.3		
Same as before	52	34.2	49	52.1		
Increased	82	53.9	40	42.6		
Time spent resting					0.078	0.962
Decreased	32	21.1	19	20.2		
Same as before	70	46.1	45	47.9		
Increased	50	32.9	30	31.9		
Time spent relaxing					4.111	0.128
Decreased	32	21.1	15	16.0		
Same as before	83	54.6	45	47.9		
Increased	37	24.3	34	36.2		
Time spent exercising					0.409	0.815
Decreased	28	18.4	18	19.1		
Same as before	58	38.2	39	41.5		
Increased	66	43.4	37	39.4		

*Fisher's exact test

Nearly half of the medical students included in this study 122 (49.6%) reported increasing attention to their mental health after the onset of a pandemic. The time spent on the rest for 114 (46.7%) students has not changed comparing to before. Similar data were provided during the time spent relaxing - 128 (52.0%) of medical students stated that it was the same as before the pandemic. Exercise time increased after the pandemic - 103 (41.9%) of students. The gender variable was not statistically significantly associated with any of the four modified survey questions related to lifestyle changes due to COVID-19.

There were no significant differences in awareness and lifestyle according to the year of study except in the question of "paying attention to mental health". Preclinical students paying significantly more importance to the same (χ^2=8.70, p=0.013) (Table 2).

The students who have an IES score ≥26 and traumatic experience have increased "financial stress" (χ^2=11.094, p=0.001), increased "stress at home" (χ^2=6.874, p=0.009), who "feel terrified" (χ^2=5.57, p=0.014) , who "feel worried" (χ^2=12.96, p<0.001) and "feel helpless" χ^2=1.97, p<0.001 because of a pandemic (Table 3).

Students who have IES score <26 were more likely to share feelings with family members (χ^2=9.70 p=0.008) and cared about their feelings (χ^2=13.955, p<0.001) as much as before the pandemic (Table 4).

Medical students who had an IES score ≥26 were paying increased attention to their mental health (χ^2=10.278, p<0.006).

Table 3. Negative effects on mental health according to the IES score

	IES					
	<26		26+		χ^2	p
	n	%	n	%		
I feel increased stress from obligations	75	65.8	101	76.5	2.950	0.086
Increased financial stress	51	44.7	88	66.7	11.094	*0.001*
Increased stress at home	21	18.4	45	34.1	6.874	*0.009*
I feel terrified	2	1.8	13	9.8	5.567	*0.014**
I feel worried	49	43.0	88	66.7	12.962	*<0.001*
I feel helpless	34	29.8	75	56.8	1.986	*<0.001*

*Fisher's exact test

Table 4. Changes in social and family support according to the IES score

	IES					
	<26		26+		χ^2	p
	n	%	n	%		
Support from frends					0.943	0.624
Decreased	20	17.5	25	18.9		
Same as before	81	71.1	87	65.9		
Increased	13	11.4	20	15.2		
Support from family members					3.831	0.147
Decreased	9	7.9	8	6.1		
Same as before	82	71.9	83	62.9		
Increased	23	20.2	41	31.1		
Sharing feelings with family members					9.700	*0.008*
Decreased	8	7.0	8	6.1		
Same as before	82	71.9	72	54.5		
Increased	24	21.1	52	39.4		
Sharing feelings with other when I am sad					2.601	0.272
Decreased	10	8.8	10	7.6		
Same as before	79	69.3	81	61.4		
Increased	25	21.9	41	31.1		
Caring for family members					13.955	*0.001**
Decreased	4	3.5	5	3.8		
Same as before	75	65.8	56	42.4		
Increased	35	30.7	71	53.8		

*Fisher's exact test

DISCUSSION

The average IES score of the subjects showed a moderately stressful impact of the event and thus proved the stressful experience of the COVID-19 pandemic. More than half of the respondents had an IES score ≥ 26 which was taken as a "cut off" for the presence of a traumatic experience. Research conducted in China showed a slightly stressful impact of the pandemic and only 7.6% of respondents had an IES score ≥ 26. However, it should be noted that it was done on the local population of a Chinese province, while here we are talking about medical students as " more vulnerable" group in terms of mental health. There is also a difference in the timing of the study where a Chinese study was done in late January 2020 when the occurrence of COVID-19 was not labeled as serious and the population examined was probably not sufficiently informed about the severity of the virus at the time. On the other hand, in this study, data were collected in June of the same year which gave the pandemic enough time to leave more serious consequences on mental health. In addition, it is about medical students who are better informed about the dangers of a pandemic than the general population. In this study, the average IES score of women was significantly higher than the men. study there were no significant differences between gender in the Chinese (Zhang & Ma 2020). Unfortunately, there is no stress scale for medical students during the COVID-019 pandemic, such as scale for health professionals (Tavormina et al. 2020).

However, a study conducted among the Italian population also showed a significantly more stressful impact of COVID-19 on females (Costantini & Mazzotti 2020). Students in the preclinical years of study had a significantly higher average of IES score than their counterparts in the clinical years of study. There are no studies which investigate the impact of the pandemic on preclinical and clinical study of medicine, but, the large meta-analysis from 2019 showed no statistically significant difference in the global prevalence of anxiety between students in preclinical and clinical years of study (Quek et al.2019). Therefore, the more stressful impact of the pandemic on preclinical students can be explained by their poor clinical inexperience and greater fear of disease, in opposite to colleagues from clinical years of study who gained some experience through clinical rotations and have a clearer picture of the disease.

Regarding the impact of the COVID-19 pandemic on mental health, most medical students stated that they feel increased stress from obligations, increased financial stress, and that they feel concerned about the pandemic. The Chinese study did not find increased stress from obligations or increased financial stress in the majority of the population, but more than half of them were still concerned about COVID-19 (Zhang & Ma 2020)). In a similar study in 2003 which investigate the impact of the SARS epidemic on the mental health of the general population of Hong Kong, the results were similar to those in the Chinese study (Lau et al. 2006). A statistically significant association was found between females and responses such as "I feel increased stress from obligations", "I feel increased financial stress", "I feel increased stress at home" and "I feel helpless because of COVID-19". In the Chinese study, no significant gender difference was found for these questionnaire items (Zhang & Ma 2020), while in the 2003 study, responses such as "I feel terrified of SARS" and "I feel worried about SARS" were significantly related to female (Lau et al. 2006). The preclinical study was statistically significant associated with the "feeling of increased stress at home" due to the pandemic. It could be explained by the big academic pressure at the beginning of the study, a lot of textbooks in a short period of time. Additional stressful conditions are online classes in the period of COVID-19 pandemic.

In this study, most medical students have unchanged support from friends, support from family members, sharing feelings with family members, sharing feelings with others, and caring for the feelings of family members. In the Chinese study, the results were completely opposite - most respondents had increased social and family support compared to the period before the advent of COVID-19 (Zhang & Ma 2020). The results of our study shows that men were significantly more likely to share their feelings with family members and care for their feelings as they did before the COVID-19 pandemic. In a Chinese study, the gender variable was not significantly associated with any of the five items of the support-related questionnaire (Zhang & Ma 2020), whereas in the SARS study, men were less prone than women to increased emotion sharing with others (Lau et al. 2006). Furthermore, there was no statistically significant difference in changes in social and family support between the preclinical and clinical years of study.

Nearly half of medical students reported increasing attention to their mental health after the onset of the pandemic, which coincides with both the Chinese (Zhang & Ma 2020). and SARS studies (Lau et al. 2006). Increased attention to mental health was statistically significantly associated with the preclinical study. This positive impact of the pandemic on mental health probably stemmed from the need to better cope with the extreme stress that COVID-19 had on this particular group. The positive impact of the pandemic on mental health care is probably due to the need to better cope with increased stress.

CONCLUSIONS

The COVID-19 pandemic has had stressful impact on medical students The pandemic has had a more stressful effect on female students and on students of preclinical years of medical studies. Also, the COVID-19

pandemic had no impact on social and family support, however a positive impact on the lifestyle of medical students was found.

Acknowledgements:

We would like to thank the students for taking part in the study.

Conflict of interest: None to declare.

Contribution of individual authors:

Šima Šimić: collecting, review of literature data, design of the article, drafting the final version of article, review of literature

Edita Černy Obrdalj: contributed to the design of the study, design of the article, drafting the final version of article and revising it critically for important, intellectual content.

Mateo Bevanda: drafting the final version of the article and revising it critically.

Inga Marijanović: contributed to the design of the study, drafting the final version of the article

References

1. *Slavin SJ, Schindler DL, Chibnall JT: Medical student mental health 3.0: improving student wellness through curricular changes. Acad Med 2014; 89:573–7*
2. *Brazeau CM, Shanafelt T, Durning SJ, Massie FS, Eacker A, Moutier C, et al.: Distress among matriculating medical students relative to the general population. Acad Med 2014; 89:1520–5*
3. *Sahu P: Closure of universities due to coronavirus disease 2019 (COVID-19): Impact on education and mental health of students and academic staff. Cureus. 2020;12:7541*
4. *Dyrbye LN, West CP, Satele D, Boone S, Tan L, Sloan J, et al.: Burnout among U.S. medical students, residents and early career physicians relative to the general U.S. population. Acad Med. 2014; 89:443–51*
5. *Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al.: Prevalence of depression, depressive symptoms and suicidal ideation among medical students. JAMA. 2016; 316:2214-36*
6. *Abdel Wahed WY, Hassan SK: Prevalence and associated factors of stress, anxiety and depression among medical Fayoum University students. Alex J Med. 2017; 53:77–84*
7. *Abdulghani HM, AlKanhal AA, Mahmoud ES, Ponnamperuma GG, Alfaris EA: Stress and its effects on medical students: A cross-sectional study at a college of medicine in Saudi Arabia. J Health Popul Nutr 2011; 29:516-22*
8. *Venkatarao E, Iqbal S, Gupta S: Stress, anxiety & depression among medical undergraduate students & their socio-demographic correlates. Indian J Med Res 2015; 141:354-7*
9. *Backović DV, Živojinović JI, Maksimović J, Maksimović M: Gender differences in academic stress and burnout among medical students in final years of education. Psychiatr Danub. 2012; 24:175-81.*
10. *Quek T T, Tam WW, Tran BX, Zhang M, Zhang Z, Ho CS et al.: The global prevalence of anxiety among medical students: A meta-analysis. Int J Environ Res Public Health. 2019;16:2735*
11. *Xu Z, Li S, Tian S, Li H, Kong L et al.: Full spectrum of COVID-19 severity still being depicted. Lancet. 2020; 395:947–8*
12. *Day M: Covid-19: four fifths of cases are asymptomatic, China figures indicate. BMJ. 2020; 369:1375*
13. *Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al.: World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). Int J Surg 2020; 76:71–6*
14. *Pan A, Liu L, Wang C, et al. Association of public health interventions with the epidemiology of the COVID-19 outbreak in Wuhan, China. JAMA. 2020;323:1915–23*
15. *Signorelli C, Scognamiglio T, Odone A et al.: COVID-19 in Italy: impact of containment measures and prevalence estimates of infection in the general population. Acta Biomed. 2020;91:175–9*
16. *Huang Y & Zhao N: Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. Psychiatry Res 2020; 288:1-13*
17. *Klasen JM, Meienberg A, Nickel C, Bingisser R et al.: SWAB team instead of SWAT team - students as front-line force during the COVID-19 Pandemic. Med Educ 2020; 54:860*
18. *Soled D, Goel S, Barry D, Erfani P, Joseph N, Kochis M, et al.: Medical student mobilization during a crisis: Lessons from a COVID-19 medical student response team. Acad Med 2020; 20:1-4*
19. *Li Y, Wang Y, Jiang J, Valdimarsdóttir UA, Fall K, Fang F, et al.: Psychological distress among health professional students during the COVID-19. Psychol Med 2020; 11:1-3*
20. *Joseph S: Psychometric evaluation of Horowitz's impact of event scale: A review. J Trauma Stress. 2020; 13:101–13*
21. *Sterling M: The impact of event scale (IES). Aust J Physiother 2008; 54:78*
22. *Zhang Y & Ma ZF: Impact of the COVID-19 pandemic on mental health and quality of life among local residents in Liaoning province, China: A cross-sectional study. Int J of Environ Res Public Health 2020; 17:2381*
23. *Costantini A & Mazzotti E: Italian validation of CoViD-19 peritraumatic distress index and preliminary data in a sample of general population. Riv Psichiatr 2020; 55:145-51*
24. *Tavormina G, Tavormina MGM , Franza F, Aldi G, Amici P et al.: A new rating scale (SAVE-9) to demonstrate the stress and anxiety in the healthcare workers during the COVID-19 viral pandemic. Psych Danub 2020; 32:5-9*
25. *Lau J, Yang X, Tsui H, Pang E, Wing Y et al.: Positive mental health-related impacts of the SARS epidemic on the general public in Hong Kong and their associations with other negative impacts. J Infect. 2006; 53:114–24*

Correspondence:
Professor Edita Černy Obrdalj, MD, PhD
Department of Family Medicine School of Medicine University of Mostar
Bijeli Brijeg bb, 88 000 Mostar, Bosnia and Herzegovina
E-mail: ecerniobrdalj@gmail.com