

Impact of COVID-19 on Burnout in Clerkship Medical Students

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ABSTRACT

Burnout among physicians often begins in medical school and is more prevalent than in other fields. This study aimed to examine the impact of COVID-19 on different aspects of burnout in third-year medical students at a minority-serving medical school on the U.S.-Mexico border. A comparative study was conducted including students from the classes of 2019–2023. Data from the classes of 2019–2021 represented the pre-COVID period and were compared to classes 2022–2023, representing the post-COVID period. Within the class of 2023, two integrated rotation blocks—Obstetrics & Gynecology/Pediatrics/Surgery (OPS) and Internal Medicine/Family Medicine/Psychiatry (IFP)—were compared to evaluate whether non-COVID-related experiences contributed to differences in burnout. Burnout was measured using the Maslach Burnout Inventory-Human Services Survey (MBI-HSS), assessing Emotional Exhaustion (EE), Depersonalization (DP), and Personal Accomplishment (PA). Analyses included paired or unpaired t-tests for normally distributed data and Mann–Whitney tests for non-normally distributed data. After the onset of COVID-19, EE ($P<0.0001$), DP ($P<0.0001$), and PA ($P=0.02$) decreased. No significant differences were observed between rotation blocks; however, compared to a general population sample, the OPS block had higher EE ($P=0.0003$) than the IFP block. Before COVID-19, students' EE ($P<0.01$), DP ($P<0.0001$), and PA ($P<0.05$) were better than the general population, while after COVID-19, EE was lower than the general population ($P<0.0001$). These findings indicate that both the COVID-19 environment and clerkship-specific experiences influence burnout in medical students. Limitations include differences in survey administration, class year comparisons, and response bias. Broader national assessments and targeted interventions are recommended to reduce burnout in clerkship medical students and potentially in other medical schools facing similar challenges.

Keywords: Education, Burnout, Psychological, Students, Medical, Emotional Exhaustion, COVID-19

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Introduction

Burnout syndrome (BS) is a frequent disorder related to individuals that feel a deterioration in their daily activities due to highly demanding psychological requirements in their workplaces (1). BS is defined under three dimensions that involve Emotional Exhaustion (EE), which is the progressive loss of energy (including fatigue); Depersonalization (DP) manifested as a distant attitude towards others; and low levels of self-efficacy or sense of Personal Accomplishment (PA) (2).

Burnout among physicians is more prevalent than other healthcare providers (3). It is expressed as irritability, dissatisfaction with one's job, absenteeism, lower quality of care provided, lack of productivity, and major medical errors (1). Burnout in physicians appear to exhibit lower quality performance and an increased rate of quitting their jobs, both of which are believed to contribute to physician shortage and the cost of healthcare (2). Studies in other fields outside of medicine have provided evidence that burnout may be linked to poorer physical health as well (3). The time spent performing non-clinical tasks, such as electronic medical record documentation, seems to be a major consistent contributor to burnout among physicians in the literature (4). Physicians experiencing burnout symptoms and depressive symptoms are not likely to seek help for various reasons such as social stigma against mental health and possibly a lack of time to do so.

It is important to recognize that systemic problems, such as burnout, develop over time. To counteract it, we also need to understand how it begins. Burnout begins as early as medical school years. A meta-analysis estimated that, worldwide, one out of two medical students is burned out, without significant differences between genders and with slight differences among countries (5). Although prevalence of burnout ranges widely from 7.0% to 75.2%, depending on various factors specific to the individual studies (6), it is clear that burnout frequently occurs in medical schools internationally and this should be considered a major concern.

The transition from preclinical years to clerkship is a major shift in medical education. Various studies provide evidence that higher levels of burnout may occur around the time of clinical rotations. It has been reported that medical student burnout increases from 17% to 38% (7, 8). The more the number of years spent in medical school, the higher the scores of burnout scales (9). DP, which in the case of medical students, is defined as cynicism towards the utility or importance of what they are studying, and a lack of PA or self-efficacy, poses a severe problem since their sense of self-value is lost due to the academic work, so their performance decreases. Thus, the initial clerkship year is possibly the most stressful time during medical school, and it is critical to investigate the degree and origins of burnout therein.

The coronavirus disease 19 (COVID-19) pandemic had a large impact on burnout and overall mental health of medical students. Not only did mental health deteriorate, but also DP and EE increased; the latter occurs particularly in final year students, who struggle with the lack of clinical experience (10). Reports have not been consistent though. One study found that a switch to online curriculum during COVID-19 was associated with a decreased burnout (11). On the other hand, another study found that the majority of students surveyed preferred to return to clinical activities (12). How curriculum and environmental changes due to COVID-19 have impacted burnout during clinical rotations has yet to be clarified.

As the COVID-19 pandemic posed unique challenges for medical students, we aimed to compare medical students' wellness before and during the COVID-19 pandemic. We decided to screen our students for burnout, as a first step in investigating how the curriculum might be modified to best serve the students. We hypothesized that all comparisons would yield statistically significant differences. The findings from this study would help to design further studies and interventions aiming at lowering burnout levels and optimizing medical school curriculum.

Methods

Study Design and Setting

This study employed an online survey design to assess burnout among third-year medical students during the post-COVID-19 period. The survey was distributed electronically to 60 students, allowing them to complete it at their convenience. Participation was voluntary and anonymous, and there were no consequences or rewards for completing or not completing the survey.

The Maslach Burnout Inventory Human Services Survey (MBI-HSS) (Mind Garden Inc.), a widely used tool for measuring burnout levels, was administered either electronically through an emailed survey link or in person on paper. Survey instructions stated that participation was voluntary and anonymous, and that there were no consequences or rewards for taking or not taking the survey.

The MBI-HSS survey was offered to all third-year medical students during their rotations from the classes of 2019 through 2023. Burnout scores from the third-year medical students were determined before and during the COVID-19 pandemic and compared to data from the general population. Data from the third-year class of 2023 was also compared between the Obstetrics & Gynecology/Pediatric/Surgery (OPS) rotation block and the

Internal Medicine/Family Medicine/Psychiatry (IFP) rotation block. Lastly, we compared the current third-year student data to those collected from previous third-year medical students to find out if the new COVID-19 environment had an impact on burnout levels.

Participants and Sampling

All 60 third-year medical students from the classes of 2019 through 2023 were invited to participate. Sampling included students undergoing clinical rotations in the clerkship year. Data from the third-year class of 2023 was also compared between the OPS rotation block and the IFP rotation block.

The study invited 60 third-year medical students from the post-COVID-19 cohort to participate in the survey, which was distributed electronically. Out of these, 15 students responded. This represents the final sample included in the analysis.

Participation was voluntary and anonymous. Students were eligible if they were third-year medical students during their clinical rotations. There were no consequences or rewards for participation.

Tools / Instruments

The MBI-HSS survey consists of 22 statements categorized into the subscales

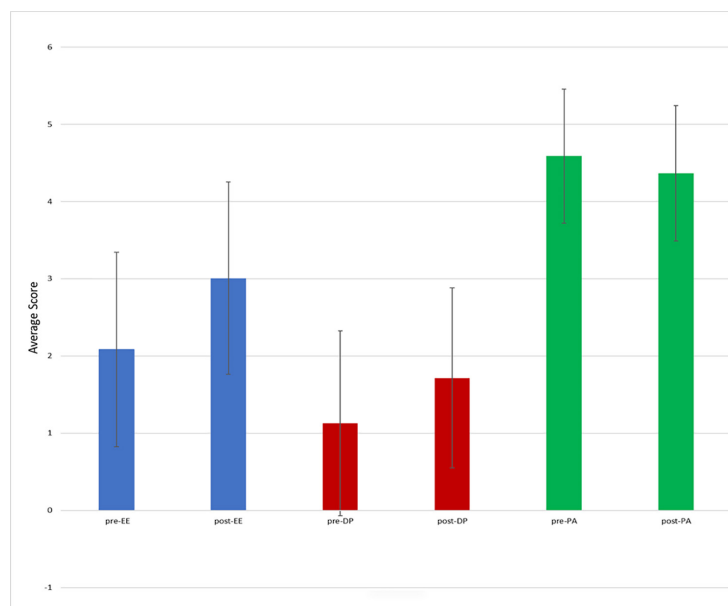


Figure 1: Comparison of Emotional Exhaustion, Depersonalization, and Personal Accomplishment scores before and after the onset of COVID-19. EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Accomplishment.

of emotional exhaustion (9 items), depersonalization (5 items), and personal accomplishment (8 items). Frequencies for every statement were assigned to indicate how often the students experienced the perception defined by the statement. The students rated the frequency using a Likert scale (0–6): 0 (never), 1 (once a year or less), 2 (once a month or less), 3 (a few times a month), 4 (once a week), 5 (a few times a week), and 6 (every day).

Data Collection

Data was submitted to the makers of the survey (Mind Garden), to obtain general

population data, and statistical services. The website generated raw data Excel sheets including EE, DP, and PA scores for each survey, as well as reports summarizing these scores among survey participants and in the general population. The obtained burnout scores were then used for further statistical analysis.

Data Analysis

To assess the impact of COVID-19 environment on burnout levels, we then compared pre- vs. post-COVID data. To determine if burnout levels differed with rotation block experiences, we compared

Table 1: Pre-COVID-19 vs. Post-COVID-19 Scores

Measure	Pre-EE (Mean±SD)	Post-EE (Mean±SD)	Pre-DP (Mean±SD)	Post-DP (Mean±SD)	Pre-PA (Mean±SD)	Post-PA (Mean±SD)
Average Score	2.08 (±1.3)	3.00 (±1.3)	1.12 (±1.3)	1.71 (±1.1)	4.58 (±1.0)	4.36 (±1.0)
P-value	<0.0001	<0.0001	0.02	0.02	—	—

Test: Mann–Whitney; SD: Standard Deviation; EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Accomplishment; IM/FM/Psych (IFP): Internal Medicine/Family Medicine/Psychiatry; OBGYN/Peds/Surg (OPS): Obstetrics & Gynecology, Pediatrics, and Surgery.

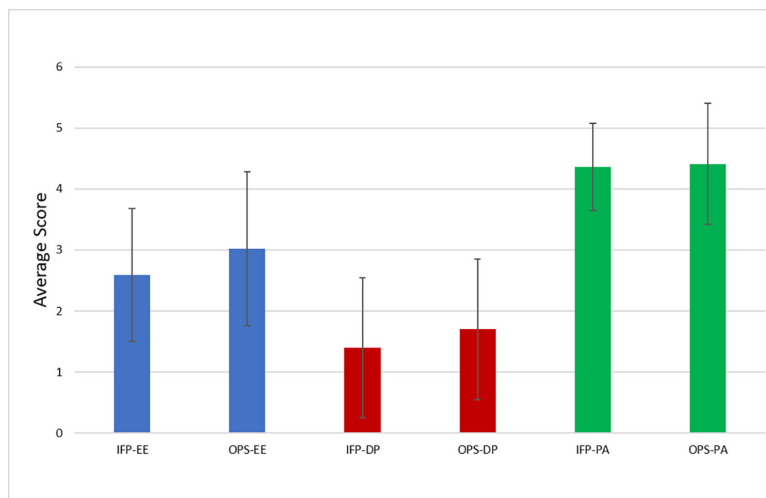


Figure 2: Emotional Exhaustion, Depersonalization, and Personal Accomplishment scores between Internal Medicine/Family Medicine/Psychiatry group vs. Obstetrics & Gynecology, Pediatrics, and Surgery clinical clerkship blocks. EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Accomplishment; IM/FM/Psych (IFP): Internal Medicine/Family Medicine/Psychiatry; OBGYN/Peds/Surg (OPS): Obstetrics & Gynecology, Pediatrics, and Surgery.

Table 2: Scores of Internal Medicine/Family Medicine/Psychiatry vs. Obstetrics & Gynecology, Pediatrics, and Surgery

Measure	IFP-EE (Mean±SD)	OPS-EE (Mean±SD)	IFP-DP (Mean±SD)	OPS-DP (Mean±SD)	IFP-PA (Mean±SD)	OPS-PA (Mean±SD)
Average Score	2.59 (±1.2)	3.02 (±1.2)	1.40 (±1.3)	1.70 (±1.2)	4.36 (±0.7)	4.41 (±0.9)
P value	0.18	0.18	0.24	0.24	0.88	0.88

Test: Unpaired T-test; SD: Standard Deviation; EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Accomplishment; IM/FM/Psych (IFP): Internal Medicine/Family Medicine/Psychiatry; OBGYN/Peds/Surg (OPS): Obstetrics & Gynecology, Pediatrics, and Surgery.

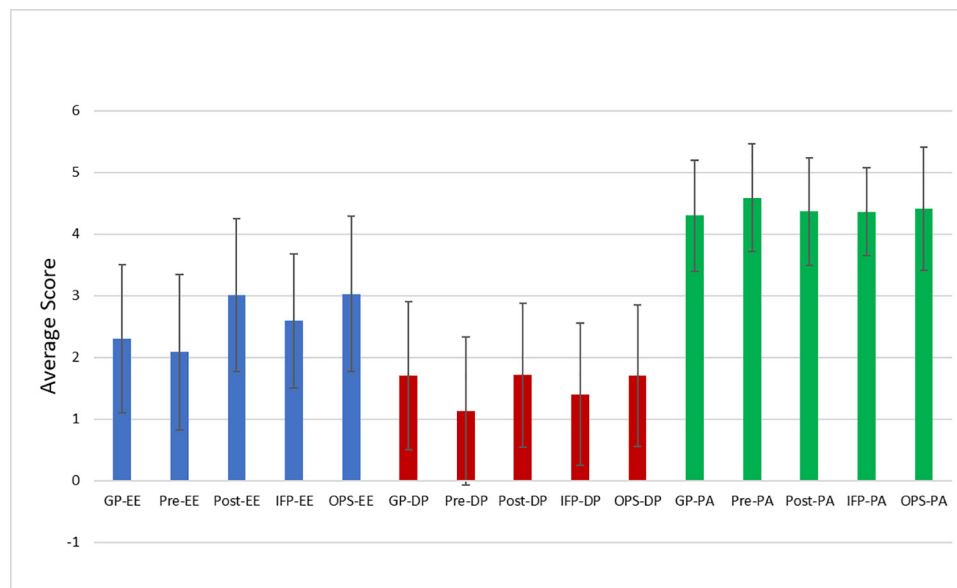


Figure 3: Emotional Exhaustion, Depersonalization, and Personal Accomplishment scores between integration rotation blocks (All Data) vs. General Population during COVID-19 pandemic. EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Accomplishment; GP: General Population.

post-COVID OPS data vs. post-COVID IFP data. Lastly, to assess burnout levels relative to the general population, we compared all data to the general population. The data were analyzed using unpaired t-test if the data followed a normal distribution or the Mann–Whitney test if this was not the case. All p-values less than 0.05 were considered statistically significant.

Results

Impact of COVID-19 on Burnout (EE, DP, PA)

To assess the impact of the COVID-19 environment on burnout levels, pre-COVID data were compared with post-COVID data. The EE and DP scores significantly increased after the onset of COVID-19 (EE: $P < 0.0001$; DP: $P < 0.0001$), while PA scores decreased significantly ($P = 0.0246$). These findings are summarized in Table 1, which presents the

pre- and post-COVID-19 scores for all burnout subscales. The corresponding changes in EE, DP, and PA are illustrated in Figure 1.

Comparison between Clinical Rotation Blocks (OPS vs IM/FM/Psych)

Post-COVID data were further analyzed to determine whether burnout levels differed according to clinical rotation experiences. Scores from the OPS block were compared with those from the IFP block. No statistically significant differences were observed between the two blocks in any of the burnout dimensions (EE: $P = 0.18$; DP: $P = 0.24$; PA: $P = 0.88$). These results are shown in Table 2, and the comparison of burnout subscale scores between the rotation blocks is depicted in Figure 2.

Comparison with the General Population

Burnout levels were also compared to data

Table 3: Pre- and Post-COVID-19 periods and integrated rotation blocks vs. general population

Measure	GP-EE	Pre-EE	Post-EE	IFP-EE	OPS-EE	GP-DP	Pre-DP	Post-DP	IFP-DP	OPS-DP	GP-PA	Pre-PA	Post-PA	IFP-PA	OPS-PA
Avg Score	2.3±1.5	2.08±1.3	3.00±1.3	2.59±1.1	3.02±1.3	1.7±1.2	1.12±1.3	1.71±1.2	1.40±1.3	1.70±1.0	4.3±0.9	4.58±0.9	4.36±0.8	4.36±0.7	4.41±0.9
P-value		0.009	0.0001	0.15	0.0003		<0.0001	1.0	0.15	1.0		0.03	0.302	0.52	0.48

Test: Unpaired T-test; SD: Standard Deviation; EE: Emotional Exhaustion; DP: Depersonalization; PA: Personal Accomplishment; GP: General Population; IFP: Internal Medicine/Family Medicine/Psychiatry; OPS: Obstetrics & Gynecology, Pediatrics, and Surgery.

from the general population to evaluate systemic differences. Before the onset of COVID-19, EE and DP scores of medical students were lower than those in the general population, whereas PA scores were higher (EE: $P<0.0099$; DP: $P<0.0001$; PA: $P=0.0307$). Following the onset of COVID-19, EE scores exceeded those of the general population ($P<0.0001$), while DP and PA scores did not show significant differences. When individual rotation blocks were compared with the general population, the OPS block showed significantly higher EE than the general population ($P=0.0003$), whereas the IFP block did not differ significantly. These comparisons are summarized in Table 3, and the distribution of burnout scores relative to the general population is illustrated in Figure 3.

Overall, the results indicate that burnout is prevalent among third-year medical students and that the COVID-19 pandemic contributed to a significant increase in EE and DP, with a concomitant decrease in PA. Although no significant differences were observed between the two clinical rotation blocks, the higher EE observed in the OPS block compared to the general population suggests that certain rotation-specific experiences may contribute to emotional exhaustion independently of COVID-19. Prior to the pandemic, students' burnout scores were generally better than the general population, but post-COVID-19 data indicate a negative impact of the pandemic on emotional exhaustion in this population. These findings highlight the importance of considering both pandemic-related changes and pre-existing stressors when addressing burnout in medical students.

Discussion

Burnout is prevalent during medical school, and major U.S. multi-institutional studies have estimated that at least half of all medical students might be affected by burnout during their medical education (13). Before COVID-19, the estimated prevalence values for emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA) were 40.8%, 35.1%, and 27.4%, respectively (5). A meta-analysis investigating medical

students across various countries using the MBI-HSS reported mean values of 22.93 (SD=10.25) for EE, 8.88 (SD=5.64) for DP, and 35.11 (SD=8.03) for PA (6). Across the four years of medical education, DP increased from 13% to 35%, and EE increased from 5% to 22% (7). Interestingly, EE peaked after the first year at 45%, and after the third year at 44% of respondents, with improvement after summer break and residency match (7). Similarly, third-year students exhibited significantly higher levels of EE and DP and lower levels of PA compared to first-year students, and reported more regrets about entering medicine (14).

The findings of the present study suggest that COVID-19-related changes may have directly contributed to burnout in medical students during the clerkship year. At the same time, the challenges of COVID-19 could have revealed pre-existing obstacles. The statistically significant differences between pre- and post-COVID-19 are likely due to COVID-19-related environmental and curriculum changes, and student scores in these areas worsened after the onset of the pandemic. Comparison of pre-COVID data to the general population revealed lower EE and DP scores and higher PA scores, suggesting that our institution performed better than the general population before COVID-19. Post-COVID comparisons showed higher EE scores relative to the general population, indicating that medical students were more negatively affected regarding emotional exhaustion than the general population.

Comparison between the two rotation blocks revealed no significant differences. However, when each rotation block was compared individually to the general population, the OPS block showed higher EE scores, suggesting that specific experiences in this block may contribute to emotional exhaustion independent of COVID-19.

Some limitations include the use of general population data, which comprised responses from over 11,000 human services professionals collected before COVID-19. Not all professionals experience the same workload

or pressures as medical students, so this comparison may not be ideal. Additionally, pre- vs. post-COVID-19 analyses were conducted on different class years rather than longitudinally on the same cohort, which may influence the findings. The pre-COVID pool was larger than the post-COVID pool. The class of 2022 was surveyed electronically, and only 15 out of 60 responded, potentially under-representing students who experienced the most dramatic COVID-19-related changes. Response bias is also a concern; students who are more burned out may be more likely to complete surveys, while in-person administration may have introduced social pressure to respond in a less candid manner.

Recent initiatives such as Longitudinal Integrated Clerkships (LICs), which combine multiple fields within one rotation block, show promise in improving student satisfaction (15), continuity of care (15), patient-centered care (15), professional identity development (16), and meaningful relationships among students, patients, and educators (17). However, evidence on the impact of LICs on burnout remains limited.

Future research should collect post-COVID-19 burnout data across pre-clerkship and clerkship years nationwide, providing baseline comparisons for other institutions. Follow-up surveys identifying specific COVID-19-related stressors could inform targeted interventions to mitigate burnout.

Conclusion

Burnout among medical students is a persistent and significant concern, exacerbated by the COVID-19 pandemic, particularly in clerkship years. Our study demonstrates that environmental and curriculum changes due to COVID-19 contributed to increased emotional exhaustion, with some rotation-specific factors further influencing burnout levels. While the pre-pandemic student cohort showed lower burnout than the general population, post-pandemic students experienced greater emotional exhaustion. Addressing these challenges requires systematic monitoring, evidence-based curriculum design, and

targeted interventions. Longitudinal integrated clerkships and tailored wellness initiatives may help reduce burnout and enhance student well-being, providing a framework for medical schools facing similar challenges in the post-pandemic era.

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This study is exempted from IRB approval (IRB NUMBER: E21088). The IRB acknowledges that this project met the criteria for exemption from formal IRB review in accordance with 45 CFR 46.104(d)(2)(i): The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects. A waiver of documentation of informed consent has been approved per 46.117(c)(1)(ii).

Authors' Contribution

MB and ST conceptualized the study. MB and HV conducted survey and gathered the data. JC and MB analyzed the data. MB and JC wrote the manuscript.

Conflict of Interest

None declared.

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