Burnout Among Undergraduate Medical Students and its Effect on the Academic Performance

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Abstract

The COVID-19 pandemic has caused a burden in almost all aspects of life, including medical education. Some research showed that almost 70% of students suffered from psychological stress during the COVID-19 pandemic. Medical students may experience burnout due to stress in distance learning routines and online exams during pandemic. The purpose of this study was to evaluate the burnout that occurs among medical students using Maslach Burnout Inventory-Student Survey (MBI-SS), to determine the factors that affect burnout, and to determine the correlation between burnout and academic performance during the pandemic. This was a cross-sectional study of 218 medical students of Universitas Muhammadiyah Surabaya (UMS). Online questionnaires were distributed in December 2020. The questionnaire consisted of the MBI-SS item with 15 questions that included exhaustion, cynicism, self-efficacy components, and other factors that may cause burnout among students. Spearman test was used to determine the correlation between burnout and its components with academic performance. Seventy-one students (33%) had high MBI-SS scores with details as follows: 56 (26%) students experienced high exhaustion, 63 (29%) students experienced high cynicism, and 87 (40%) students experienced low self-efficacy. The Spearman correlation test showed a positive correlation between academic performance with cynicism (p 0.001) and efficacy (p 0.029). Most of the medical students did not experience burnout. However, cynicism and self-efficacy might affect students' academic performance. These findings indicated that a preventive strategy is needed to reduce cynicism and increase self-efficacy during the learning process of medical students, especially during this COVID-19 pandemic.

Keywords: Academic performance, Burnout, COVID-19, Education, Medical, Pandemics students.

INTRODUCTION

The COVID-19 was declared as a pandemic in March 2020[1]. It has caused a burden on almost all aspects of life and disrupted the way of people live, work, and learn. Since then, the learning approach in every educational level has changed from face-to-face into distance learning[2,3]. Students must carry out their education from home with minimal interaction. Therefore, the medical students were also expected to be emotionally or physically affected. The distress that happened to the medical students could comprise burnout, depression, fatigue, or stress[4]. Burnout among medical students has been an interesting research topic for medical faculty worldwide[5–9]. Burnout is a pathological condition due to prolonged stress, causing maladaptive behaviour due to physical and emotional exhaustion. Burnout among students may be described based on its three dimensions: emotional exhaustion, cynicism, and self-efficacy[10,11].

Previously before the covid-19 pandemic, the prevalence of burnout was already high among the medical students[6,12,13]. Several researches showed that more than 50% of medical students were affected by that condition during their medical education[12–14]. Depression was also prevalent in up to 21,5% in medical students[15]. The global data found 33%, 26%, 51%, 29%, 54%, 44%, and 46% burnout cases among medical students in Middle East, South and Central America, North America, Europe, Oceania, and Asia, respectively[13]. If left untreated, the condition might compromise the professional development of medical students. The result is highly risky and leads to various personal consequences, including thoughts of suicide and substance abuse. Burnout causes students to feel uncomfortable with the learning process, low academic achievement, and thought of dropping out[16].

There are numerous data showing mental health issues among students during covid-19[9,17–22]. Several studies assessing the burnout and stress among medical students showed quite surprising data. Almost 70% of undergraduate medical students in Sorbonne University, French suffered psychological stress and needed psychological support[22]. The remote online test held during covid-19 pandemic also caused stress in more than one third of 1019 undergraduate students[18]. These condition highlights the importance of stress assessment and other mental health issues that may occur in our institution.

The Maslach Burnout Inventory-Student Survey (MBI-SS) was used to determine the susceptibility of students to burnout symptoms. The MBI-SS results in this study showed that the prevalence of burnout risk was significantly high[11]. A study about the prevalence of burnout among 17,431 medical students showed that more than 40% of them experienced burnout. The highest prevalence was found in the component of emotional exhaustion, followed by depersonalization, and the least was element of self-achievement[13].

It is necessary to identify students who experience burnout, considering its severe implications. It is also essential to understand the factors that may influence the phenomenon. A better understanding of those factors may allow the development of the best solution to reduce burnout in medical students. It can also improve the well-being of future physicians throughout their undergraduate medical education. The mental health of medical students was a huge concern in medical faculty. Although medical student mental health has been and continues to be a severe issue even before the onset of the COVID-19 pandemic, we were concerned that if left untreated, it could cause a potential harmful effect[20]. Therefore, the purpose of this study was to evaluate the burnout that occurs among medical students using MBI-SS, to determine the factors that affect burnout, and to determine the correlation between burnout and academic performance during the pandemic.

METHODS

Study Designs

This cross-sectional study was conducted at the Faculty of Medicine, Universitas Muhammadiyah Surabaya (UMS), East Java, Indonesia. Universitas Muhammadiyah Surabaya is a private college in Surabaya, Indonesia. This study was conducted from February 2021 to August 2021 during covid-19 pandemic. The independent variable in this research was the total burnout score and its components (exhaustion, cynicism, and self-efficacy) which were assessed during covid-19 pandemic, and the dependent variable was the academic achievements.

The survey was hosted on the web-based application Google Forms. The respondents indicated their agreement to participate via informed consent included in the first page of the survey. All the medical students in the first to the fourth year of study were invited to participate via informed consent.

This study was conducted following ethical standards. The participants' anonymity and confidentiality were emphasized. This study was approved by the Ethical Committee of Universitas Muhammadiyah Surabaya (No: 016/KET/II.3/AU/F/2021).

Sampling procedure

The minimum sample size for a cross-sectional study was estimated using the following formula:

$$n = \frac{Z^2_{1-\alpha/2}\, p\,(1-p)\, N}{d^2(N-1) + Z^2_{1-\alpha/2}\, p\,(1-p)}$$

The formula was based on the response of the parameters p = 50% (as no previous study on burnout was conducted at UMS), 95% confidence interval, and maximum error of 5%. In addition, the study assumed a non-response rate of 10%. Based on the above formula, the minimum number of samples required in this study was 155. However, 218 students agreed to participate in the study. The possibility of selection bias was minimalized with the consecutive sampling method.

Instruments

Burnout among medical students during covid-19 pandemic was assessed using MBI-SS included in the e-questionnaire. The self-administered e-questionnaire was divided into four parts. The first part was the informed consent and explanation about the study. The second part was the sample characteristic consisted of the year of enrolment, age, sex, and marital status. The third part was the burnout assessment using MBI-SS consisting of 15 items and the three domains of burnout: exhaustion (five items), cynicism (four items), and self-efficacy (five items). The items were scored on a 6-point scale ranging from one (never) to six (always, every day). Score >14 was considered high in exhaustion, score >16 was considered high in cynicism, and score <22 was considered low in self-efficacy. The last part of the questionnaire was about the factors that affect burnout, consisting of the obstacles during distance learning in the covid-19 pandemic, bullying, disruption in interaction or conflict with the lecturer or other students affecting the motivation, personal life events, and the competition between students. The data about academic achievement were collected from the institution academic data.

Data Analysis

All data were exported to Excel (Microsoft Corporation) and were analyzed using SPSS. The demographic data of the students participating in this research were calculated using descriptive statistic. The normality of data was determined using the Shapiro-Wilk test with a significance $p < 0.05$.

The questionnaire was tested for validation, and only 14 items were valid, and the value of reliability was obtained. In the present study, Cronbach's alpha values of 0,823 were obtained for 14 items. Reliability scores of ≥0.5 were considered acceptable, with higher scores indicating greater internal consistency. The correlations regarding total burnout, exhaustion, cynicism, and efficacy with academic performance scores were tested using the Spearman correlation test, with a significance $p < 0.05$.

RESULTS

The study was participated by 218 out of 257 (85%) FM-UMS students of first to the fourth year. Most of the students are female (73%) and with the highest age range of 18-21 years (82.57%). There were 71 students (33%) with a high total burnout score, with the 5th semester of study having the highest median score among the others. The academic performance was the highest in the first semester **(Table 1)**. According to **Table 2**, a total number of 128 students (59%) had a low exhaustion score, 158 students (72%) had a low cynicism score, and 132 students (61%) had a low self-efficacy score. However, the results on the 5th-semester students showed that the exhaustion score was high (67%), which showed low exhaustion in contrast to the other semester. **Figure 1** shows that the three most common factors experienced by students that caused burnout in this study were internal conflict (198), personal life events (154), and academic competition (148). There was a significant correlation between academic achievement with cynicism and with self-efficacy score. However, the strength of the correlation between academic achievement and cynicism and self-efficacy was very weak. Contrastingly, there was no significant correlation between academic achievement and total burnout score **(Table 3).**

DISCUSSION

Burnout is characterized by high score of emotional exhaustion, depersonalization or professional cynicism, and professional disbelief or low self-efficacy. This condition also occurs among medical students, which usually results in the deterioration of academic engagement. Burnout in medical students is also described as feeling tired because of the demands of study, having a cynical attitude towards studies, and feeling incompetent[6,14]. This study aimed to determine the potential for burnout, several factors that may cause it, and how it affects academic performance in medical students.

Most respondents in this study were female students of first year with age 18-21 years old. This result was in accordance with a study in Brazil. That study explained that most of the respondents were female with an average age of 21 years, and most of them were first-year students. Whether gender affects burnout remains debatable. According to that study, gender and age were not correlated with the degree of burnout in medical students. At the same time, education level had a significant correlation ($p<0.05$)[6]. Meanwhile, other studies suggest that female are more likely to experience higher levels of stress than males. In this case, female are more sensitive in interpreting academic demands, and also often experience pressure and obstacles related to gender equality. Another underlying factor is the

differences in neuroendocrine and hypothalamic–pituitary–adrenal (HPA) axis reactivity[21].

Boni *et al*. (2018) and Wang *et al*. (2021) explained that first-year students tend to experience burnout and experience a transition period from high school to college [6,21]. Transitions are often marked by increased anxiety due to the disruption of usual routines and social contacts, which require an adaptation process. The main problems that are often faced in this phase are preparation for assessments, understanding a large amount of new information, time management, intense study routines, time and personal financial management, and distance from the family[6,23]. This was different from first semester students in this study whose the median burnout score showed a low burnout. The possible factor was the low academic stressor. The curriculum is still unchallenging, and there is still few medical subjects such as anatomy, histology, etc. In addition, the first semester students in this study have received digital/online learning from the beginning of the lecture, making them unnecessary to feel separated from their family, which can reduce psychosocial stress [21].

In general, our study showed that most preclinical students did not experience burnout because more students had a low total score of MBI-SS. This Covid-19 pandemic can cause uncertainty, confusion, and significant concerns about medical student's future careers and lives[24]. This study was also different from the research by Mahfouz and Ali (2020) which showed that burnout syndrome was highly prevalent among medical students at Jazan University[8].

Many factors contribute to the risk of learning burnout among medical students in the covid-19 pandemic. A study found a significant correlation between academic burnout, low family income and lack of social support [25]. The most possible factor which might influence the degree of student burnout in this study was internal conflict. During this pandemic, student study from home, leading to enriched interactions with families. According to research, work-family conflict can trigger high degrees of burnout[7]. Many students in this study also experienced academic competition. Medical students were found to be more likely to experience burnout due to competition and academic demands. Intense academic competition and academic demands continues to increase along with the increase of academic levels; 80% of it can affect stress-related psychological problems among medical students [26]. The learning environment, the adaptation of the distance-learning curriculum, financial pressure, learning facilities, and other factors can also affect student burnout[27].

Although many factors remain common obstacles during online learning, most students at FMUMS had low burnout scores. This might happen because most students have been able to adapt to existing learning methods and have received many benefits from online learning, such as time and location flexibility, no requirement of specific preparation and low cost, except for cellular data[27]. In addition, other factors such as the type of personality and self-resilience of students, can also be used as coping strategies to prevent burnout[26,28]. However, FMUMS has prepared some approach to cope with these problems. Good relations between lecturers and students, opinions, constructive criticism and suggestions are always accommodated with two-way communication such as audience programs and motivation given by lecturers during lecture or other activities. In addition, the existing subjects in our curriculum about Islamic character is expected to increase the religious aspect. It was stated in a journal that the level of religiosity would increase coping strategies against burnout and stress management[29,30].

If detailed observation is made in each year, most of the students in this study had low exhausted scores except for 5th semester students. Exhaustion is a burnout dimension that leads to excessive emotional feelings and lack of energy to face another day or other people. The 5th-semester students had the highest degree of exhaustion because of academic fatigue influenced by the tight curriculum. In this semester, students start working on their undergraduate thesis and have a tight schedule. Exhaustion that occurs in these students is related to work overload and little opportunity to rest and recover[10].

Cynicism is one component that shows students' doubts about the benefits of learning and results in less interest or enthusiasm. Medical students often have high scores cynicism. The cynicism that occurs may be seen as a coping mechanism to reduce stress, handle new situations, and limited support or hierarchical structures in the medical field. A study showed that medical students' cynicism scores increased during online learning. This happens because of the feeling that the clinical experience of a medical doctor cannot be achieved through electronic lectures or videos[9]. However, most of the students at all academic years in this study had low cynicism scores. This result might be because the students already have healthy coping strategies like a personal reflection, peer support or strong mentors, family, and friends to protect themselves against this negative trend [31].

Self-efficacy is an important component in learning success because it is correlated with academic motivation and self-determination. Therefore, people with a high level of self-efficacy are more likely not to give up when they face academic problems but rather try to find potential solutions for their problems. Contrastingly, students with low efficacy tend to have higher stress experiences because they do not use planning to solve the problem[32]. Most students at FMUMS had low efficacy scores, suggesting the same pattern for all classes.

The factor that may cause low self-efficacy in most students is the type of personality which unfortunately was not identified in this study. Another contributing

factor is environmental factors, the ineffectiveness of relationships with other students or teachers. The Covid-19 pandemic requires long-distance learning (LDL), which further limits interaction and communication with friends or lecturers[27]. These interactions are essential to build motivation and enthusiasm to believe that they can be good medical students. The low quality of this communication in the Covid-19 pandemic may possibly affect their emotions and feelings of incompetence during their studies[33].

It was found in this study that there was a significant correlation between cynicism and self-efficacy to student academic performance. Cynicism is one of the main burnout dimensions and can decline in empathy and emotional neutralization. Interestingly, this character can develop during study in medicine. In this condition, cynicism is a form of coping mechanism from various challenging conditions in medical field such as limited support, hierarchical demands, long hours of work or study, challenges to opportunities for unprofessionalism, etc. If these characters are not controlled, it can lead to decreased physical health, decreased BMI scores, increased C-reactive protein levels, decreased heart rate variability, etc. This inevitably may have an impact on academic performance. Therefore, it is necessary to create a program with potential capability to reduce or control this cynicism. Programs that can increase character strengths are also needed[31,34]. The preparation of a hidden curriculum and another program like Online discussion forums are ideal examples of two-way communication which can promote dynamic interactions between individuals with a lower risk of consequence[31,34]. Since self-efficacy is an essential factor that affects academic performance, an academic program is needed to improve this self-efficacy, such as presentation of some tasks which can enforce personal achievements and also verbal reinforcement from lectures to their students[32].

This pandemic condition requires medical institutions, students, and parents to adapt well. A suitable strategy is needed during this pandemic to minimize the risk of burnout in medical students[25]. In this case, we need a program that can reduce stressors and increase personal self-resilience such as learning behaviour and individual characteristics, social support, such as learning environment, facilities, and financial support that might play a protective role in reducing the risk of learning burnout. Moreover, all medical schools should have mental health services which are easily accessible for its medical students[9,21]. Career counselling, life coaching, personal engagement, extracurricular activities, students autonomy, mentorship program, and evaluation system are needed to help students in reducing stress and burnout[33].

Several important limitations in this study need to be considered, such as the limited analysis of burnout factors. Therefore, the further research can be developed by analyzing other factors such as type of personality, self-motivation, and self-resilience. More profound research is also needed to analyze aspects of workload, control, reward, community, fairness, and values which are highly correlated with burnout levels. The quantitative data results need to be validated by qualitative analysis using interview techniques or focus group discussions. Research should also be carried out continuously, considering that this pandemic has caused tremendous disruption to students' physical and mental health.

CONCLUSION

Most of the medical students in UMS did not experience burnout based on the MBI-SS. The three factors that mostly affect burnout in this study were internal conflicts, personal life events, and academic competition. There was no correlation between total burnout score and academic performance during this pandemic. However, cynicism and self-efficacy might affect students' academic performance. These findings indicated that a preventive strategy is needed to reduce cynicism and increase self-efficacy during the learning process of medical students, especially during this COVID-19 pandemic.

What is already know on this topic

- Most medical students had high levels of burnout during COVID-19 pandemic due to distance learning.
- Burnout may affect the academic performance of medical students

What this study adds

- Most of the medical students in UMS did not experience burnout based on the MBI-SS
- Internal conflicts, personal life events, and academic competition were the factors that mostly affect burnout in medical students during COVID-19 pandemic.
- There was no correlation between total burnout score and academic performance, however, cynicism and self-efficacy play a significant role in students' academic performance during COVID-19 pandemic.

Competing interests

The authors declare no competing interest.

Authors' contributions

All authors have contributed to this work. All have read and agreed to the final manuscript

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Table 3: Spearman correlation test between academic achievement and burnout total and burnout component score during covid-19 pandemic

Figure 1: Factors that caused burnout in medical student during covid-19 pandemic

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Include All the Tables Here, Listed Numerically

Table 1. The sample profile (n= 218) defined by sex, age, semester of study, total burnout score, academic performance

No	Variables	N (%)	Median (min-max)
1	***Sex***		
	Female	160 (73%)	-
	Male	58 (27%)	
2	***Age***		
	< 18	4 (1.83%)	
	18 - 21	180 (82.57%)	-
	22 - 25	32 (14.68%)	
	26 - 30	2 (0.92%)	
3	***Semester of Study***		
	1st	72 (33%)	
	3rd	64 (29%)	-
	5th	39 (18%)	
	7th	43 (20%)	
4	***MBI-SS Score***		
	Total burnout score		
	Low (0-42)	147(67%)	
	High (43-84)	71(33%)	
	Burnout score of each semester of study		
	1st		38 (22-64)
	3rd	-	38 (21-60)
	5th		46.5 (25-69)
	7th		39 (1-60)
5	***Academic* achievement**		
	1st-semester students		3.8 (3.45 – 3.95)
	3rd-semester students	-	3.3 (2.57 – 3.67)
	5th-semester students		3.41 (3.10 – 3.88)
	7th-semester students		3.27 (3.00 – 3.90)

Table 2. Burnout components prevalence (n, %) among medical students in different semester of study (N = 218) during covid-19 pandemic

Semester of Study	Burnout Component n (%)					
	Exhaustion		Cynicism		Self-efficacy	
	High	Low	High	Low	High	Low
1st	25 (35%)	47 (65%)	16 (22%)	56 (78%)	35 (49%)	37 (51%)
3rd	25 (39%)	39 (61%)	17 (27%)	47 (73%)	23 (36%)	41 (64%)
5th	26 (67%)	13 (33%)	18 (46%)	21 (54%)	7 (18%)	32 (82%)
7th	14 (33%)	29 (67%)	9 (21%)	34 (79%)	21 (49%)	22 (51%)
Total	**90 (41%)**	**128 (59%)**	**60 28%)**	**158 (72%)**	**86 (39%)**	**132 (61%)**

Table 3. Spearman correlation test between academic achievement and burnout total and burnout component score during covid-19 pandemic

	Burnout total score	Burnout component score		
		Exhausted	Cynicism	Self-Efficacy
Academic achievement	r = 0.127 p = 0.062 n 218	r = 0.124 p = 0.068 n = 218	r = 0.234 p = 0.001* n = 218	r = 0.148 p = 0.029* n = 218

The * sign shows a significant correlation with p<0,05.

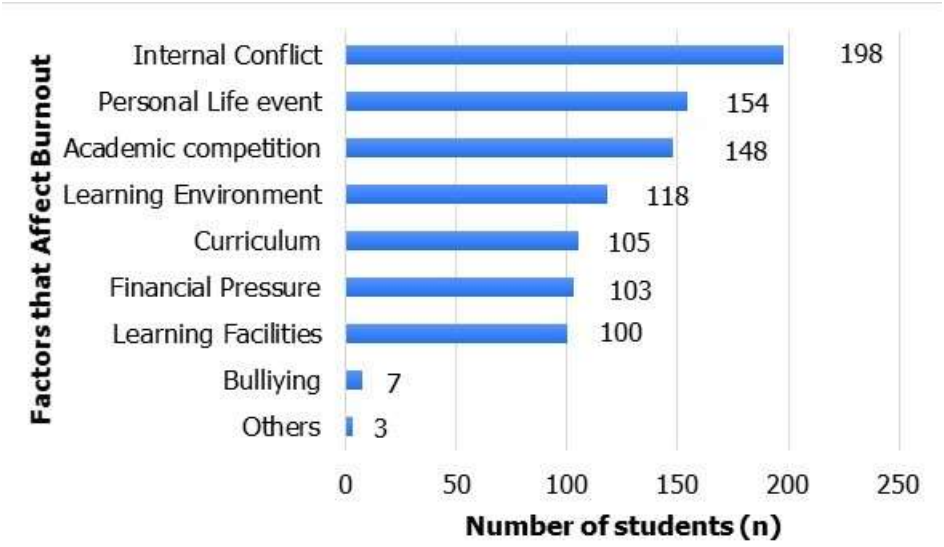

Figure 1. Factors that caused burnout in medical student during covid-19 pandemic