

Prevalence of Burnout among 7th Year Lebanese University Medical Students and Its Association with Anxiety, Depression, and Other Factors

Ali H. Nizam¹, Mohamad Y. Aoun¹, Tony Haykal², Brenda Chahla² & Omar Jamal²

¹ Faculty of medical sciences, Lebanese University, Beirut, Lebanon.

² School of medicine, Lebanese American University, Byblos, Lebanon.

Correspondence: Ali H. Nizam, School of medicine, Lebanese American University, Byblos, Lebanon.

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Abstract

Background & Objectives: Burnout Syndrome and its three interrelated dimensions: emotional exhaustion, depersonalization, and personal accomplishment poses an enormous burden on a person's familial and social life. This syndrome is problematic as it affects individuals differently and may lead to dropping off from work, work-related errors, and even suicidal ideation. Burnout in medical students is a relatively new topic and no previous studies were performed in Lebanon on this population of interest along with its association with anxiety and depression. The primary aim of this study is to determine the prevalence of burnout among Lebanese University 7th-year medical students rotating in private and public national hospitals and to elucidate any association with depression, anxiety, and several other factors.

Subjects & Methods: A total of 137 Lebanese University 7th-year medical students rotating from July 2019- June 2020 in different national hospitals were surveyed using the Maslach Burnout Inventory for Health Services Workers (MBS-HSS), The Hamilton Anxiety Rating scale (HAM-A), and the Hamilton Depression Rating Scale (HAM-D or HDRS). Data analysis was conducted using IBM SPSS version 21. The relationship between the variables was studied using chi-square testing, and the p-value (<0.05) was considered statistically significant.

Results: A total of 112 students responded to the questionnaire (response rate of 81.75%). The prevalence of burnout was mainly high in low Personal Accomplishment (67%), followed by Emotional Exhaustion (37.5%), with the lowest prevalence rate for depersonalization (25.9%). 84.8% of the students had high burnout in at least one domain. The prevalence of anxiety and depression was found to be 7.2% and 41.9%, respectively. The Number of calls and prescription errors was found to be strongly correlated with burnout level. Furthermore, anxiety and depression were found to be associated with high burnout levels.

Conclusion: This study sheds the light on the high burnout level experienced by medical students at Lebanese University and the necessity to conduct more studies to investigate the causes and to develop different coping strategies.

Keywords: anxiety, burnout syndrome, depression, medical students, Lebanon

Abbreviations:

BS: Burnout Syndrome

DEP: Depersonalization

EE: Emotional Exhaustion

HAM-A: Hamilton anxiety scale

HAM-D: Hamilton depression scale

MBI: Maslach Burnout Inventory

MBI-HSS: Maslach Burnout Inventory – Human Services Survey

PA: Personal Accomplishment

1. Introduction

Burnout is a term that was first coined to portray the psychological and mental state of a person working in stressful conditions (Freudenberger HJ, 1974). Later, it was further discussed by Maslach who described a triad of emotional exhaustion, a sense of low personal accomplishment, and arousal of negative feelings towards service recipients (Maslach C, Jackson SE, Leiter M., 1996) (Maslach C, Schaufeli WB, Leiter MP., 2001) (Maslach C, Jackson SE, 1981). Burnout is an evolving issue invading many working sectors, including healthcare workers, particularly resident physicians and medical students (Keel P, 1993). The enormous burden of stress and burnout reflects on the psychological and mental well-being of those exposed.

Burnout Syndrome is categorized into a triad of emotional exhaustion, depersonalization, and lack of accomplishment. Emotional exhaustion is the most common presenting symptom of the triad, where the person feels emotionally drained toward his job. Depersonalization refers to a change in the relation between the worker and his clients or service recipients, where this relation becomes deprived of humanity and a sense of "objectifying the recipient" emerges. The lack of accomplishment refers to dissatisfaction and a negative judgment towards one's work and achievements recipients (Maslach C, Jackson SE, Leiter M., 1996) (Maslach C, Schaufeli WB, Leiter MP., 2001) (Maslach C, Jackson SE, 1981).

A study done by Schnafelt et al. (2012) showed an increased rate of burnout among US physicians when compared to the general population (37.9% vs 27.8% with $p < 0.001$) (Shanafelt TD, Bradley KA, Wipf JE, Back AL, 2002). Primary care physicians were the most affected doctors, which was attributed to increased working hours (Shanafelt TD et al., 2002). Studies undertaken in Europe, the UK, and the Arab region also showed high levels of burnout among physicians. In Lebanon, studies that investigate burnout among physicians are scarce. Achkar K, Romani M, Musharrafieh U, Chaaya M (2010) conducted a study of burnout on 155 residents in two big hospitals in Beirut. The results showed that 80% of the sample had a high level of burnout in at least one domain and the highest levels were recorded in the Emotional Exhaustion domain compared to Depersonalization and Low Accomplishment domains.

Recently, a rising interest in burnout among medical students has been noted worldwide. A systemic review and meta-analysis by Frajerman A, Morvan Y, Krebs MO, Gorwood P, Chaumette B, (2019) reviewed 24 studies in which 17431 medical students involved concluded the prevalence of burnout to be 44.2%, with the prevalence of the three dimensions of burnout being 40.8% for emotional exhaustion, 35.1% for depersonalization, and 27.4% for personal accomplishment. Burnout was more prevalent among medical students living in Oceania and the Middle East than in other continents.

Other players on the mental and psychological levels are depression and anxiety. Depression and anxiety are increasingly evident in healthcare workers, especially physicians and medical students, affecting their efficiency and productivity at work (Quek TTC, et al, 2019) (Fahrenkopf AM, et al., 2008). According to Dyrbye LN, et al. (2014), medical students exhibited more symptoms of depression compared to the general population and even compared to residents and fellows. In addition, a systemic review and meta-analysis by Rotenstein LS, et al. (2016) showed a 27.2% prevalence of depression and 11.1% prevalence of suicidal thoughts among medical students.

Many studies have found a significant relationship between burnout and depression on one side, and between burnout and anxiety on another side (Koutsimani P, Montgomery A, Georganta K., 2019). According to Fitzpatrick O, Biesma R, Conroy RM, McGarvey A. (2019), in a study on 269 medical students in Ireland, burnout had a significant relationship to depression, where higher rates of clinical depression were associated with higher rates of burnout. Burnout and depression were significantly different between school years, with the prevalence being highest in the clinical years compared to the preclinical years (Fitzpatrick O et al., 2019).

To our knowledge, no studies have looked into the prevalence of burnout syndrome among medical students and the factors associated with it in Lebanon. The primary objective of this study is to determine the prevalence of Burnout among Lebanese University 7th-year medical students. Secondary objectives aim to determine the association between burnout on one hand and depression, and anxiety on the other hand, and to explore some factors associated with burnout like gender, working hours, and type of hospital (public or private).

2. Methods

2.1 Study Design

The study is a cross-sectional study targeting the prevalence of Burnout Syndrome in Lebanese University medical students rotating in hospitals from July 2019 till July 2020, and its relationship with anxiety, depression,

and other factors. Data collection commenced as of June 2020 up till late July 2020. The study was approved by the ethical committee of Sahel general hospital.

2.2 Study Population

The sample included 137 7th year medical students at the Lebanese University rotating at hospitals in Lebanon. No exclusion criteria were applied.

2.3 Tests Employed

2.3.1 Burnout Syndrome

BS was evaluated using the Maslach Burnout Inventory for Health Services Workers (MBI- HSS) (Maslach C et al, 1996). It includes 22 questions distributed over the three domains as follows: Emotional Exhaustion: 9 questions; Depersonalization: 5 questions; and Personal Accomplishment: 8 questions. Each question is graded on a seven point Likert Scale: 0: never, 1: rarely, 2: every month, 3: more than once per month, 4: weekly, 5: few times a week, 6: daily.

2.3.2 Depression

Depression was assessed using the Hamilton Depression rating scale (HAM-D), being the most commonly used instrument for assessing depression. This scale comprises 17 questions investigating depression symptoms (HAMILTON M, 1960).

2.3.3 Anxiety

Anxiety was assessed using the Hamilton anxiety rating scale (HAM-A), being one of the first developed tools to measure the severity of anxiety symptoms, and is still widely used in research settings. It consists of 14 questions measuring both psychic anxiety (mental agitation and psychological distress) and somatic-physical complaints related to anxiety (HAMILTON M, 1959).

2.4 Data Collection

A structured electronic questionnaire was disseminated via social media platforms to the students as a link to the informed consent with the questionnaire. It comprised:

- Medical student demographic and work characteristics: Gender, working hours, number of calls hospital rotating in whether private or public etc...

-MBI-HSS

-HAM-A

-HAM-D

Scoring of burnout, depression and anxiety is as follows:

- Burnout: 3 separate scores have been computed to assess the 3 domains of burnout

- For EE: low burnout: 0-16, Moderate: 17 - 26, high: >27;
- For DP: low burnout : <6, moderate: 7-12, high: >13;
- For PA: high burnout>39, moderate: 32-38, low: 0-31.

- Depression:

Normal: 0-7, mild depression: 8-13, moderate depression: 14-18, severe depression: 19-22, very severe depression: > 23.

- Anxiety:

Mild anxiety severity: <17, mild to moderate: 18-24, moderate to severe: 25-30, severe: >30.

Results were collected on an Excel sheet automatically obtained through Google forms. Results were automatically obtained via Google surveys. Data was then transferred into SPSS version 21 for statistical analysis.

2.5 Statistical Analysis

Data was analyzed using IBM SPSS system version 21. Chi-square and Fisher's exact tests were used to determine the association between categorical variables. Backward multiple logistics regression analysis was conducted for each of the three MBI component levels to examine the relationship between burnout and general characteristics of the participants. The odds ratios (OR) and 95% confidence intervals (95% CI) were also calculated. A p-value of less than 0.05 was considered of statistical significance.

2.6 Ethical Considerations

Informed consent was obtained from each individual. Participants were made aware of the purpose of the study, funding, and adverse impact of their participation. The identity of each student was kept anonymous, only the research personnel had access to the data collected. Ethical Committee approval was obtained from Sahel General Hospital.

3. Results

3.1 Demographic and Work-Related Results

A total of 112 students out of 137 responded with a response rate of 81.75%.

Of the respondents, 53 were males (47.3%), 59 were females (52.7%). The majority of the students (86.6%) were rotating in private hospitals and (81.3%) of them have ever worked more than or equal 24hrs without leaving the hospital. Regarding the number of night calls at the hospital, 59.8% of the students had more than 8 calls per month. 50.9% of the students had 4 days off or less per month. 58.9% reported that they might make errors in their prescriptions due to tiredness and stress. The demographic and work-related factors are presented in Table 1.

Table 1. The demographic and work-related characteristics of the medical students who responded to the survey

		N	%
Gender	Male	53	47.3%
	Female	59	52.7%
Working hospital	Private	97	86.6%
	Public	15	13.4%
Max working hours /24hrs	<24hrs	21	18.8%
	≥24hrs	91	81.3%
Number of calls per month	>8	67	59.8%
	≤8	45	40.2%
Days off per month	>4	55	49.1%
	≤4	57	50.9%
Prescription Errors	Yes	66	58.9%
	No	46	41.1%

3.2 Burnout, Depression, Anxiety

84.8% of the medical students reported high levels of burnout in at least one domain of the three burnout domains. 9.8% of students had high levels of burnout in all three dimensions. The percentages of burnout in every dimension are depicted in Table 2. Personal Accomplishment was the predominant domain in which students reported high burnout with a percentage of 67%.

Table 2. The frequencies and percentages of the student distribution in the different levels of the 3 dimensions of burnout

Domain/burnout level	EE	DP	PA
Low	26 (23.2%)	37 (33%)	18 (16%)
Moderate	44 (39.3%)	46 (41.1%)	19 (17%)
High	42 (37.5%)	29 (25.9%)	75 (67%)

Regarding depression among students, 41.9% had depression ranging from moderate to very severe (Table 3).

Table 3. The frequencies and percentages of the student distribution in the different levels of depression

Severity	Normal	mild	moderate	severe	Very severe
N(%)	35(31.1%)	30(26.8%)	23(20.5%)	15(13.4%)	9(8%)

Regarding anxiety among students, 83% showed mild anxiety, whereas 7.2% had moderate to severe levels. (Table 4).

Table 4. The frequencies and percentages of the student distribution in the different levels of anxiety

Severity	Mild	Mild to moderate	Moderate to severe	Severe
N(%)	93(83%)	11(9.8%)	7(6.3%)	1(0.9%)

3.3 Relationship between Burnout and Different Factors

Correlation between the degree of burnout and different factors was calculated. The different factors ranged from the demographic factors, and the work-related factors, to the scores on the depression and anxiety scales. The results shown in Table 5 demonstrated a statistically significant relationship between the degree of burnout and anxiety and depression levels with a p-value of less than 0.001 for both. The correlation between burnout levels and prescription errors was also significant with a p-value of 0.003. Gender didn't seem to have a relationship with burnout ($p=0.112$), neither did the number of working hours, or the number of calls every month, with a p-value of 0.68 and 0.52 respectively.

Table 5. Relationship of high burnout and other factors including depression and anxiety

		Degree of Burnout		Total (N=112)	p-value
		Not High (n=101)	High (n=11)		
Gender	Male	45 (84.9%)	8 (15.1%)	53 (47.3%)	0.112
	Female	56 (94.9%)	3 (5.1%)	59 (52.7%)	
Working Hospital	Private	87 (89.7%)	10 (10.3%)	97 (86.6%)	1.000
	Public	14 (93.3%)	1 (6.7%)	15 (13.4%)	
Maximum number of working hours without leaving the hospital	< 24 hours	20 (95.2%)	1 (4.8%)	21 (18.8%)	0.686
	≥ 24 hours	81 (89.0%)	10 (11.0%)	91 (81.3%)	
Number of calls every month	≤ 8 calls	42 (93.3%)	3 (6.7%)	45 (40.2%)	0.521
	> 8 calls	59 (88.1%)	8 (11.9%)	67 (59.8%)	
Number of days off per month	≤ 4	51 (89.5%)	6 (10.5%)	57 (50.9%)	1.000
	>4	50 (90.9%)	5 (9.1%)	55 (49.1%)	
I might make errors in my prescriptions and in my behavior due to tiredness and stress	No	46 (100.0%)	0 (0.0%)	46 (41.1%)	0.003*
	Yes	55 (83.3%)	11 (16.7%)	66 (58.9%)	
HAM-D	Normal	35 (100.0%)	0 (0.0%)	35 (31.3%)	<0.001*
	Mild depression	29 (96.7%)	1 (3.3%)	30 (26.8%)	
	Moderate depression	21 (91.3%)	2 (8.7%)	23 (20.5%)	
	Severe depression	13 (86.7%)	2 (13.3%)	15 (13.4%)	
	Very severe depression	3 (33.3%)	6 (66.7%)	9 (8.0%)	
HAM-A	Mild anxiety	87 (93.5%)	6 (6.5%)	93 (83.0%)	<0.001*
	Mild to Moderate anxiety	10 (90.9%)	1 (9.1%)	11 (9.8%)	
	Moderate to Severe anxiety	3 (42.9%)	4 (57.1%)	7 (6.3%)	
	Severe anxiety	1 (100.0%)	0 (0.0%)	1 (0.9%)	

The relationships between the levels of burnout and the different factors were elucidated for each domain of burnout: emotional exhaustion, depersonalization, and personal accomplishment.

Regarding the emotional exhaustion domain, the results showed a statistically significant relationship between emotional exhaustion and the number of calls every month ($p=0.028$) and Prescription errors ($p:0.005$) (Table 6).

Anxiety scores and depression scores also reflected statistical significance in relation to emotional exhaustion ($p= 0.019$ and 0.001 respectively), while other studied factors failed to show any significant relationship with it (Table 6).

As for depersonalization, a statistical correlation was found in relation to prescription errors ($p = 0.001$), as well as for anxiety and depression scales ($p < 0.001$) (Table 7). At the level of personal accomplishment, there was no evidence of statistical significance in relation to any of the studied factors (Table 8).

Table 6. Relationship of Emotional Exhaustion and different factors

		Emotional Exhaustion		Total	p-value
		Not High (n=70)	High (n=42)	(N=112)	
Gender	Male	31 (58.5%)	22 (41.5%)	53 (47.3%)	0.439
	Female	39 (66.1%)	20 (33.9%)	59 (52.7%)	
Working Hospital	Private	61 (62.9%)	36 (37.1%)	97 (86.6%)	1.000
	Public	9 (60.0%)	6 (40.0%)	15 (13.4%)	
Maximum number of working hours without leaving the hospital	< 24 hours	16 (76.2%)	5 (23.8%)	21 (18.8%)	0.212
	≥ 24 hours	54 (59.3%)	37 (40.7%)	91 (81.3%)	
Number of calls every month	≤ 8 calls	34 (75.6%)	11 (24.4%)	45 (40.2%)	0.028*
	> 8 calls	36 (53.7%)	31 (46.3%)	67 (59.8%)	
Number of days off per month	≤ 4	35 (61.4%)	22 (38.6%)	57 (50.9%)	0.847
	>4	35 (63.6%)	20 (36.4%)	55 (49.1%)	
I might make errors in my prescriptions and in my behavior due to tiredness and stress	No	36 (78.3%)	10 (21.7%)	46 (41.1%)	0.005*
	Yes	34 (51.5%)	32 (48.5%)	66 (58.9%)	
HAM-D	Normal	32 (91.4%)	3 (8.6%)	35 (31.3%)	<0.001*
	Mild depression	22 (73.3%)	8 (26.7%)	30 (26.8%)	
	Moderate depression	11 (47.8%)	12 (52.2%)	23 (20.5%)	
	Severe depression	5 (33.3%)	10 (66.7%)	15 (13.4%)	
	Very severe depression	0 (0.0%)	9 (100.0%)	9 (8.0%)	
HAM-A	Mild anxiety	64 (68.8%)	29 (31.2%)	93 (83.0%)	0.019*
	Mild to Moderate anxiety	4 (36.4%)	7 (63.6%)	11 (9.8%)	
	Moderate to Severe anxiety	2 (28.6%)	5 (71.4%)	7 (6.3%)	
	Severe anxiety	0 (0.0%)	1 (100.0%)	1 (0.9%)	

Table 7. Relationship of Depersonalization and different factors

		Depersonalization (DEP)		Total (N=112)	p-value
		Not High (n=83)	High (n=29)		
Gender	Male	35 (66.0%)	18 (34.0%)	53 (47.3%)	0.084
	Female	48 (81.4%)	11 (18.6%)	59 (52.7%)	
Working Hospital	Private	70 (72.2%)	27 (27.8%)	97 (86.6%)	0.346
	Public	13 (86.7%)	2 (13.3%)	15 (13.4%)	
Maximum number of working hours without leaving the hospital	< 24 hours	18 (85.7%)	3 (14.3%)	21 (18.8%)	0.269
	≥ 24 hours	65 (71.4%)	26 (28.6%)	91 (81.3%)	
Number of calls every month	≤ 8 calls	37 (82.2%)	8 (17.8%)	45 (40.2%)	0.127
	> 8 calls	46 (68.7%)	21 (31.3%)	67 (59.8%)	
Number of days off per month	≤ 4	41 (71.9%)	16 (28.1%)	57 (50.9%)	0.669
	>4	42 (76.4%)	13 (23.6%)	55 (49.1%)	
I might make errors in my prescriptions and in my behavior due to tiredness and stress	No	43 (93.5%)	3 (6.5%)	46 (41.1%)	<0.001*
	Yes	40 (60.6%)	26 (39.4%)	66 (58.9%)	
HAM-D	Normal	30 (85.7%)	5 (14.3%)	35 (31.3%)	<0.001*
	Mild depression	26 (86.7%)	4 (13.3%)	30 (26.8%)	
	Moderate depression	15 (65.2%)	8 (34.8%)	23 (20.5%)	
	Severe depression	11 (73.3%)	4 (26.7%)	15 (13.4%)	
	Very severe depression	1 (11.1%)	8 (88.9%)	9 (8.0%)	
HAM-A	Mild anxiety	73 (78.5%)	20 (21.5%)	93 (83.0%)	<0.001*
	Mild to Moderate anxiety	9 (81.8%)	2 (18.2%)	11 (9.8%)	
	Moderate to Severe anxiety	0 (0.0%)	7 (100.0%)	7 (6.3%)	
	Severe anxiety	1 (100.0%)	0 (0.0%)	1 (0.9%)	

Table 8. Relationship of low accomplishment and different factors

		Personal Accomplishment		Total (N=112)	p-value
		Not Low (n=37)	Low (n=75)		
Gender	Male	20 (37.7%)	33 (62.3%)	53 (47.3%)	0.421
	Female	17 (28.8%)	42 (71.2%)	59 (52.7%)	
Working Hospital	Private	33 (34.0%)	64 (66.0%)	97 (86.6%)	0.770
	Public	4 (26.7%)	11 (73.3%)	15 (13.4%)	
Maximum number of working hours without leaving the hospital	< 24 hours	7 (33.3%)	14 (66.7%)	21 (18.8%)	1.000
	≥ 24 hours	30 (33.0%)	61 (67.0%)	91 (81.3%)	
Number of calls every month	≤ 8 hours	16 (35.6%)	29 (64.4%)	45 (40.2%)	0.685
	> 8 hours	21 (31.3%)	46 (68.7%)	67 (59.8%)	
Number of days off per month	≤ 4	15 (26.3%)	42 (73.7%)	57 (50.9%)	0.160
	>4	22 (40.0%)	33 (60.0%)	55 (49.1%)	
I might make errors in my prescriptions and in my behavior due to tiredness and stress	No	14 (30.4%)	32 (69.6%)	46 (41.1%)	0.686
	Yes	23 (34.8%)	43 (65.2%)	66 (58.9%)	
HAM-D	Normal	13 (37.1%)	22 (62.9%)	35 (31.3%)	0.777
	Mild depression	11 (36.7%)	19 (63.3%)	30 (26.8%)	
	Moderate depression	5 (21.7%)	18 (78.3%)	23 (20.5%)	
	Severe depression	5 (33.3%)	10 (66.7%)	15 (13.4%)	
	Very severe depression	3 (33.3%)	6 (66.7%)	9 (8.0%)	
HAM-A	Mild anxiety	33 (35.5%)	60 (64.5%)	93 (83.0%)	0.213
	Mild to Moderate anxiety	2 (18.2%)	9 (81.8%)	11 (9.8%)	
	Moderate to Severe anxiety	1 (14.3%)	6 (85.7%)	7 (6.3%)	
	Severe anxiety	1 (100.0%)	0 (0.0%)	1 (0.9%)	

4. Discussion

Burnout places a huge burden of stress on the affected individual. It is an evolving issue invading many working sectors, including policemen, teachers, and healthcare professionals. All these professions pose great emotional stress on the person rendering them more prone to burnout (Keel P, 1993). Resident physicians and medical students during their rotations in hospitals spend a lot of time working in such stressful conditions, so recent studies assessing the amount of distress experienced by these future doctors showed increased levels of burnout in this population (Cohen JS, 2008)(Dyrbye LN, 2013). The objectives of this study were to estimate the prevalence of burnout in Lebanese University medical students and to study the association between burnout on one hand, and anxiety, depression, and several other factors on the other hand.

The results of this study showed a high prevalence of burnout among the 7th-year medical students with 84.8% of the students having high burnout in at least one domain of the three. These results coincide with the literature, where a high prevalence of burnout among medical students was detected in the study by Boni RA et al.(2018), and the meta-analysis by Frajeman et al.(2019) that also depicted high burnout levels, especially in the region of Middle East and Oceania. The highest percentage of burnout was evident in the personal accomplishment domain(67%) compared to others, which falls in line with results obtained in the study on medical students in Saudi Arabia by Altannir et al.(2019). However, other studies by Santen SA, Holt DB, Kemp JD, Hemphill RR.

(2010) on medical students in the United States, and Cecil J, McHale C, Hart J, Laidlaw A. (2014) on medical students in the United Kingdom showed the dominance of burnout at the level of emotional exhaustion. This difference may be attributed to the nature of the culture in Lebanon and the Middle East, where social bonds and family support still prevail. On the other hand, the enormous burden brought by the Lebanese economic crisis and the COVID-19 pandemic may have led to setbacks on personal accomplishment level, however, this topic still needs further studying to elucidate contributing factors.

For depression, 41.9% of medical students showed moderate to very severe depression, and 7.2% showed moderate to severe anxiety, which was a comparable result to the depression prevalence in medical students in India found by Kumar B. et al.(2019), where 57.6% of the students showed moderate to extremely severe depression. However, 74% of medical students in India suffered from moderate to severe anxiety as well. Similarly, other studies by Kumar S, H.S. K, Kulkarni P, Siddalingappa H, Manjunath R (2016), Rotenstein et al. (2016), Puthran R, Zhang MWB, Tam WW, Ho RC. (2016), and Mao et al. (2019) also revealed a high prevalence of depression and anxiety in medical students of different backgrounds.

Our results show no significant difference between males and females with respect to burnout in all domains. Although this falls in line with the results of a meta-analysis by Frajerman et al. (2019) and a study on US medical students by Dyrbye LN et al. (2014), previous studies have shown that being a female correlates with developing severe burnout like the study on Lebanese resident physicians by Ashkar K et al. (2010). In contrast, another study on medical students in China by Chunming WM, Harrison R, MacIntyre R, Travaglia J, Balasooriya C. (2017) showed that being a male is a factor in developing burnout. All this contrast, be attributed to cultural differences and the pressure of assumed gender roles in each society.

This study also shows no significant difference in burnout levels between students working in public hospitals and private ones. The fact that the majority of the surveyed students (86.6%) rotated at private hospitals may have distorted the results. A previous study in Mexico also showed no difference in the prevalence of burnout between private and public hospitals, however, higher scores at the level of emotional exhaustion and depersonalization were seen in public hospitals (Miranda-Ackerman RC et al, 2019).

In addition, prescription errors were significantly correlated with high burnout levels ($p= 0.003$), and their prevalence was especially high for EE and DEP. These results contrast a previous study on US pediatric resident physicians by Fahrenkopf et al. (2008), where burnout levels did not correlate with the risk of medical errors. This difference may be attributed to the fact that the latter study targeted resident physicians who are more experienced than medical students in prescribing medications and providing medical care.

Regarding the maximum working hours spent in the hospital, the number of calls per month, and the number of days off per month, only the number of calls per month was found to be correlated with a high emotional exhaustion level ($p=0.028$). These results are inconsistent with the ones obtained in a study by Shanafelt TD et al (2002) where the number of working hours was an independent factor in predicting high burnout levels.

Regarding the relationship between anxiety, depression, and high burnout in medical students, the results showed that high anxiety and depression levels are correlated with high burnout ($p < 0.001$), and this is consistent with studies published in the literature (Koutsimani P et al, 2019) (Fitzpatrick O et al, 2019).

5. Conclusion

This study has several limitations. The studied population is only the 7th-year medical students in the Lebanese University, which is the last year before finishing medical school. The high level of stress during this critical year may inflate the burnout, anxiety, and depression levels, making this study less generalizable over all medical students in Lebanon. Moreover, the occurrence of the COVID-19 pandemic along with the economic and political crises in Lebanon poses additional stress factors. In addition, the cross-sectional nature of the study does not allow the study of causality between the variables.

In conclusion, the burden of burnout, especially in the Personal accomplishment domain, along with anxiety and depression appears to be at its peak among medical students. Prescription errors prevailed with increasing work-related stressors, and gender difference did not seem to have a huge impact on burnout level. As burnout may adversely affect the competency of doctors as well as the quality of care provided to patients, further research, addressing the causality among the variables affecting burnout and including bigger sample size and different universities in Lebanon, is needed to identify effective measures to address and prevent exhaustion in medical trainees.

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References

- Altannir Y & Alnajjar W & Ahmad S.O & Altannir M & Yousuf F & Obeidat A & Al-Tannir, M. (2019). Assessment of burnout in medical undergraduate students in Riyadh, Saudi Arabia. *BMC Medical Education*, 19(1), 1–8. <https://doi.org/10.1186/s12909-019-1468-3>
- Ashkar K & Romani M & Musharrafieh U & Chaaya M. (2010). Prevalence of burnout syndrome among medical residents: Experience of a developing country. *Postgraduate Medical Journal*, 86(1015), 266–71. <https://doi.org/10.1136/pgmj.2009.092106>
- Boni R.A. Dos.S. & Paiva C.E & de Oliveira M.A & Lucchetti G & Fregnani J.H.T.G. & Paiva B.S.R. (2018). Burnout among medical students during the first years of undergraduate school: Prevalence and associated factors. *PLoS ONE*, 13(3). <https://doi.org/10.1371/journal.pone.0191746>
- Chunming W.M & Harrison R & MacIntyre R & Travaglia J & Balasooriya C. (2017). Burnout in medical students: A systematic review of experiences in Chinese medical schools. *BMC Medical Education*. BioMed Central Ltd, 17. <https://doi.org/10.1186/s12909-017-1064-3>
- Cohen J.S & Leung Y & Fahey M & Hoyt L & Sinha R & Cailler L & ..., Patten, S. (2008). The happy docs study: A Canadian Association of Internes and Residents well-being survey examining resident physician health and satisfaction within and outside of residency training in Canada. *BMC Research Notes*, 1. <https://doi.org/10.1186/1756-0500-1-105>
- Cecil J & McHale C & Hart J & Laidlaw A. (2014). Behaviour and burnout in medical students. *Medical Education Online*, 19, 25209. <https://doi.org/10.3402/meo.v19.25209>
- Dyrbye L.N & Varkey P & Boone S.L & Satele D.V. & Sloan J.A & Shanafelt T.D. (2013). Physician satisfaction and burnout at different career stages. *Mayo Clinic Proceedings*, 88(12), 1358–67. <https://doi.org/10.1016/j.mayocp.2013.07.016>
- Dyrbye L.N & West .C.P & Satele D & Boone S & Tan L & Sloan J & Shanafelt, T.D. (2014). Burnout among u.s. medical students, residents, and early career physicians relative to the general u.s. population. *Academic Medicine*, 89(3), 443–51. <https://doi.org/10.1097/ACM.0000000000000134>
- Freudenberger H.J. (1974). Staff Burn-Out. *Journal of Social Issues*, 30(1), 159–65. <https://doi.org/10.1111/j.1540-4560.1974.tb00706.x>
- Frajerman A & Morvan Y & Krebs M.O & Gorwood P & Chaumette B. (2019). Burnout in medical students before residency: A systematic review and meta-analysis. *European Psychiatry*. Elsevier Masson SAS, 55, 36–42. <https://doi.org/10.1016/j.eurpsy.2018.08.006>
- Fahrenkopf A.M & Sectish T.C & Barger L.K & Sharek P.J & Lewin D & Chiang V.W & ..., Landrigan C.P. (2008). Rates of medication errors among depressed and burnt out residents: Prospective cohort study. *BMJ*, 336(7642), 488–91. <https://doi.org/10.1136/bmj.39469.763218.BE>
- Fitzpatrick O & Biesma R & Conroy R.M & McGarvey A. (2019). Prevalence and relationship between burnout and depression in our future doctors: A cross-sectional study in a cohort of preclinical and clinical medical students in Ireland. *BMJ Open*, 9(4). <https://doi.org/10.1136/bmjopen-2018-023297>
- HAMILTON M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology*, 32(1), 50–5. <https://doi.org/10.1111/j.2044-8341.1959.tb00467.x>
- HAMILTON M. (1960). A rating scale for depression. *Journal of neurology, neurosurgery, and psychiatry*, 23(1), 56–62. <https://doi.org/10.1136/jnnp.23.1.56>
- Kumar B & Shah M.A.A & Kumari R & Kumar A & Kumar J & Tahir A. (2019). Depression, Anxiety, and Stress Among Final-year Medical Students. *Cureus*, 11(3). <https://doi.org/10.7759/cureus.4257>
- Kumar S.D & Kavitha H.S. & Kulkarni P & Siddalingappa H & Manjunath R. (2016). Depression, anxiety and stress levels among medical students in Mysore, Karnataka, India. *International Journal of Community Medicine and Public Health*, 3(1), 359–62. <https://doi.org/10.18203/2394-6040.ijcmph20151591>
- Keel P. (1993) Psychische Belastungen durch die Arbeit: Burnout-Syndrom. *Sozial- und Präventivmedizin SPM*, 38(2), S131–2. <https://doi.org/10.1007/BF01305364>
- Koutsimani P & Montgomery A & Georganta K. (2019). The relationship between burnout, depression, and anxiety: A systematic review and meta-analysis. *Frontiers in Psychology*. *Frontiers Media S.A.*, 10. <https://doi.org/10.3389/fpsyg.2019.00284>

- Miranda-Ackerman R.C & Barbosa-Camacho F.J & Sander-Möller M.J & Buenrostro-Jiménez A.D & Mares-País R & Cortes-Flores A.O &..., Gonzalez-Ojeda, A. (2019). Burnout syndrome prevalence during internship in public and private hospitals: a survey study in Mexico. *Medical Education Online*, 24(1). <https://doi.org/10.1080/10872981.2019.1593785>
- Maslach C & Jackson SE. (1981). The measurement of experienced burnout. *Journal of Organizational Behavior*, 2(2), 99–113. <https://doi.org/10.1002/job.4030020205>
- Maslach C & Jackson SE & Leiter M. The Maslach burnout inventory manual (1996). Paolo Alto, California. <https://www.researchgate.net/publication/277816643>
- Maslach C & Schaufeli W.B & Leiter M.P. (2001). Job burnout. *Annual Review of Psychology*, 52, 397–422. <https://doi.org/10.1146/annurev.psych.52.1.397>
- Mao Y & Zhang N & Liu J & Zhu B & He R & Wang X. (2019). A systematic review of depression and anxiety in medical students in China. *BMC Medical Education*, 19(1), 1–13. <https://doi.org/10.1186/s12909-019-1744-2>
- Puthran R & Zhang M.W.B & Tam W.W & Ho R.C. (2016). Prevalence of depression amongst medical students: A meta-analysis. *Medical Education*, 50(4), 456–68. <https://doi.org/10.1111/medu.12962>
- Quek T.T.C & Tam W.W.S & Tran B.X & Zhang M & Zhang Z & Ho C.S.H. (2019). The global prevalence of anxiety among medical students: A meta-analysis. *International Journal of Environmental Research and Public Health*. MDPI AG, 16. <https://doi.org/10.3390/ijerph16152735>
- Rotenstein L.S & Ramos M.A & Torre M & Bradley Segal J & Peluso M.J & Guille C & Mata, D.A. (2016). Prevalence of depression, depressive symptoms, and suicidal ideation among medical students a systematic review and meta-analysis. *JAMA - Journal of the American Medical Association*. American Medical Association, 316, 2214–36. <https://doi.org/10.1001/jama.2016.17324>
- Shanafelt T.D, Bradley K.A, Wipf J.E & Back A.L. (2002). Burnout and self-reported patient care in an internal medicine residency program. *Annals of Internal Medicine*, 136(5), 358–67. <https://doi.org/10.7326/0003-4819-136-5-200203050-00008>
- Santen S.A & Holt D.B & Kemp J.D & Hemphill R.R. (2010). Burnout in medical students: Examining the prevalence and associated factors. *Southern Medical Journal*, 103(8), 758–63. <https://doi.org/10.1097/SMJ.0b013e3181e6d6d4>

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