

Assessment of Burnout and Resilience Among Final-Year Medical Students in the University of Benghazi, Libya

تقييم الإرهاق النفسي والقدرة على التكيف لدى طلاب السنة النهائية في كلية الطب بجامعة بنغازي، ليبيا

Sami A. Lawgaly^{1,*},
Najat O. Buzaid¹
¹Internal Medicine,
Benghazi Medical
Center, Faculty of
Medicine,
University of
Benghazi, Libya
^{*}Department of
Medicine, Benghazi
Medical Center,
Faculty of
Medicine,
University of
Benghazi, 00218
Benghazi, Libya
Tel:
+218918958106
Email:
sami.lawgaly@uob.
edu.ly

Background: Burnout is common among medical students. Resilience is a protective and buffering response to overcome burnout and anxiety. The study aimed to assess the levels of burnout and resilience among final-year medical students at the Faculty of Medicine, University of Benghazi.

Method: A cross-sectional study of a randomly selected sample of 199 final-year medical students was carried out between 2024 and 2025. Burnout was assessed using the Maslach Burnout Inventory scale, and resilience was evaluated by the ten-item Connor-Davidson Resilience Scale.

Results: The mean resilience score was 66.6%. Most students showed resilience levels that were just above average in 47%, or above average in 34%. Regarding burnout, 110 students (55.3%) reported high exhaustion, 80 (40.2%) reported depersonalization, and 113 (56.7%) reported low self-accomplishment. In contrast, high personal accomplishment was above average in 14 students (30.4%) and average in 20 others (43.5%) ($p = 0.006$).

Conclusion: Nearly half of the studied group were at high risk of distress or had low resilience. Approximately half of them had exhaustion or low personal accomplishment, and more than one-third had high depersonalization. However, there was no significant association between resilience and gender, marital status, parenthood, working while studying, or having enough income.

Keywords: Burnout, Resilience, Medical Students, Medical Education, Libya

الخلفية: يُعدّ الإرهاق النفسي شائعاً بين طلاب الطب. وتُمثّل القدرة على التكيف استجابة وقائية وداعمة للتغلب على الإرهاق النفسي والقلق. هدفت هذه الدراسة إلى تقييم مستويات الإرهاق النفسي والقدرة على التكيف لدى طلاب السنة النهائية في كلية الطب بجامعة بنغازي.

الطريقة: أُجريت دراسة مقطعية على عينة عشوائية مُختارة من ١٩٩ طالباً وطالبة من طلاب السنة النهائية في كلية الطب خلال الفترة من ٢٠٢٤ إلى ٢٠٢٥. تم تقييم الإرهاق النفسي باستخدام مقياس ماسلاش للإرهاق النفسي، بينما تم تقييم القدرة على التكيف باستخدام مقياس كونور-ديفيدسون للقدرة على التكيف المكون من عشرة بنود.

النتائج: بلغ متوسط درجة القدرة على التكيف ٦٦,٦٪. أظهر معظم الطلاب مستويات قدرة على التكيف أعلى بقليل من المتوسط (٤٧٪)، أو أعلى من المتوسط (٤٤٪). فيما يتعلق بالإرهاق، أفاد ١١٠ طالب (٥٥,٣٪) بشعورهم بإرهاق شديد، و٨٠ طالباً (٤٠,٢٪) بشعورهم بالتبذل العاطفي، و١١٣ طالباً (٥٦,٧٪) بشعورهم بانخفاض مستوى الإنجاز الذاتي. في المقابل، كان مستوى الإنجاز الذاتي مرتفعاً لدى ١٤ طالباً (٣٠,٤٪)، ومتوسطاً لدى ٢٠ طالباً آخر (٤٣,٥٪) (قيمة $p = 0.006$).

الخلاصة: كان ما يقرب من نصف المجموعة المدروسة معرضين لخطر كبير للاضطراب النفسي أو يعانون من ضعف في المرونة النفسية. كما عانى نصفهم تقريباً من الإرهاق أو انخفاض مستوى الإنجاز الذاتي، بينما عانى أكثر من ثلثهم من شعور شديد بالتبذل العاطفي. ومع ذلك، لم تُلاحظ أي علاقة ذات دلالة إحصائية بين المرونة النفسية وكل من الجنس، والحالة الاجتماعية، والأبوة، والعمل أثناء الدراسة، أو كفاية الدخل.

الكلمات المفتاحية: الإرهاق، المرونة النفسية، طلاب الطب، التعليم الطبي، ليبيا

ارزیابی فرسودگی شغلی و تاب آوری در میان دانشجویان پزشکی سال آخر در دانشگاه بنغازی، لیبی

لیبیایی بن غازی یونیورسیتی میں آخری سال کے میڈیکل طلباء کے درمیان برن آؤٹ اور لچک کا اندازہ

زمینه و هدف: فرسودگی شغلی در میان دانشجویان پزشکی رایج است. تاب آوری یک پاسخ محافظتی و ضربه گیر برای غلبه بر فرسودگی شغلی و اضطراب است. هدف این مطالعه ارزیابی سطح فرسودگی شغلی و تاب آوری در میان دانشجویان پزشکی سال آخر در دانشکده پزشکی دانشگاه بنغازی بود.

روش: یک مطالعه مقطعی بر روی یک نمونه تصادفی انتخاب شده از ١٩٩ دانشجوی پزشکی سال آخر بین سال های ٢٠٢٤ و ٢٠٢٥ انجام شد. فرسودگی شغلی با استفاده از مقیاس فهرست فرسودگی شغلی ماسلاچ ارزیابی شد و تاب آوری با مقیاس تاب آوری ده ماده ای کانر-دیویدسون ارزیابی شد.

یافته ها: میانگین نمره تاب آوری ٦٦,٦٪ بود. اکثر دانشجویان سطوح تاب آوری را نشان دادند که در ٤٧٪ موارد کمی بالاتر از حد متوسط یا در ٣٤٪ موارد بالاتر از حد متوسط بود. در مورد فرسودگی شغلی، ١١٠ دانشجو (٥٥,٣٪) خستگی زیاد، ٨٠ نفر (٤٠,٢٪) مسخ شخصیت و ١١٣ نفر (٥٦,٧٪) خودشکوفایی کم را گزارش کردند. در مقابل، موفقیت شخصی بالا در ١٤ دانشجو (٣٠,٤٪) بالاتر از حد متوسط و در ٢٠ نفر دیگر (٤٣,٥٪) متوسط بود ($p = 0.006$).

نتیجه گیری: تقریباً نیمی از گروه مورد مطالعه در معرض خطر بالای پریشانی یا تاب آوری کم بودند. تقریباً نیمی از آنها خستگی یا موفقیت شخصی کم و بیش از یک سوم مسخ شخصیت بالا داشتند. با این حال، هیچ ارتباط معنی داری بین تاب آوری و جنسیت، وضعیت تأهل، والدین بودن، کار در حین تحصیل یا داشتن درآمد کافی وجود نداشت.

واژه های کلیدی: فرسودگی شغلی، تاب آوری، دانشجویان پزشکی، آموزش پزشکی، لیبی

پس منظر: میڈیکل طلباء میں برن آؤٹ عام ہے۔ لچک برن آؤٹ اور اضطراب پر قابو پانے کے لیے ایک حفاظتی اور بفرنگ ردعمل ہے۔ اس مطالعے کا مقصد بن غازی یونیورسٹی کی فیکلٹی آف میڈیسن میں آخری سال کے میڈیکل طلباء میں برن آؤٹ اور لچک کی سطح کا جائزہ لینا تھا۔

طریقہ: ٢٠٢٤ اور ٢٠٢٥ کے درمیان ١٩٩ آخری سال کے میڈیکل طلباء کے تصادفی طور پر منتخب کردہ نمونے کا کراس سیکشنل مطالعہ کیا گیا۔ Maslach Burnout Inventory اسکیل کا استعمال کرتے ہوئے برن آؤٹ کا اندازہ لگایا گیا، اور لچک کا اندازہ دس آئٹم Connor-Davidson Resilience Scale سے کیا گیا۔

نتائج: اوسط لچک کا سکور ٦٦,٦٪ تھا۔ زیادہ تر طلباء نے لچک کی سطح ظاہر کی جو کہ ٣٤٪ میں اوسط سے زیادہ تھی، یا ٣٣٪ میں اوسط سے زیادہ تھی۔ برن آؤٹ کے بارے میں، ١١٠ طلباء (٥٥,٣٪) نے زیادہ تھکن کی اطلاع دی، ٨٠ (٣٠,٢٪) نے ذاتی نوعیت کی تخفیف کی اطلاع دی، اور ١١٣ (٥٦,٧٪) نے کم خود کاری کی اطلاع دی۔ اس کے برعکس، ١٤ طلباء (٣٠,٤٪) میں اعلیٰ ذاتی کامیابی اوسط سے زیادہ تھی اور ٢٠ دیگر (٤٣,٥٪) میں اوسط ($p = 0.006$)۔

نتیجہ: مطالعہ کے گئے گروپ میں سے تقریباً نصف پریشانی کے زیادہ خطرے میں تھے یا ان میں لچک کم تھی۔ ان میں سے تقریباً نصف کو تھکن یا کم ذاتی کامیابی حاصل تھی، اور ایک تہائی سے زیادہ کو زیادہ ذاتی نوعیت کا ہونا تھا۔ تاہم، لچک اور جنس، ازدواجی حیثیت، ولدیت، تعلیم کے دوران کام کرنے، یا کافی آمدنی کے درمیان کوئی خاص تعلق نہیں تھا۔

کلیدی الفاظ: برن آؤٹ، لچک، طبی طلباء، طبی تعلیم، لیبی

INTRODUCTION

Burnout is a prevalent psychological syndrome arising from chronic workplace stress that has not been successfully managed. It is characterized by a triad of symptoms: overwhelming emotional exhaustion, increased mental detachment from one's job or studies (depersonalization), and a profound sense of reduced professional efficacy or personal accomplishment. As defined by the World Health Organization, this occupational phenomenon particularly occurs in high-stakes, demanding professions, with healthcare and medical education being prime examples.

Medical students are susceptible to burnout, especially during their final clinical rotations. This critical period imposes a confluence of stressors, including the burden of protracted study hours, the pressure of continuous and high-stakes assessments, including both written and clinical exams, and the novel challenges of direct patient care. Factors such as receiving lower-than-expected exam scores or negative feedback can further exacerbate feelings of inadequacy and diminish a student's sense of self-accomplishment, thereby fueling the burnout cycle (1-7).

In contrast to burnout, resilience represents the positive capacity to adapt and thrive in the face of adversity, trauma, or significant stress. It functions as a psychological buffer, enabling individuals to employ healthy coping mechanisms to withstand pressure. However, the very environment that fosters burnout can also erode resilience, leaving medical students with diminished coping resources at a time when they are most needed (8).

The aim of this study was to quantitatively assess the levels of burnout and resilience among final-year medical students completing their Internal Medicine rotation at the Faculty of Medicine, University of Benghazi.

METHODS

Study Design and Population

A cross-sectional study was conducted over a five-month period, from December 1, 2024, to April 30, 2025. The target population was final-year medical students enrolled in the Internal Medicine rotation at the University of Benghazi, Libya, during the study period. Inclusion criteria were: (1) being a registered final-year medical student, (2) actively participating in the Internal Medicine rotation during the data collection window, and (3) providing informed consent. Exclusion criteria were: (1) students on official leave of absence during the study period, and (2) those who declined to participate. A simple random sampling method was employed. A complete list of eligible students (the sampling frame) was obtained from the

departmental registrar. Using a computer-generated random number list, 199 students were selected from this frame. The response rate was 100% (n=199). The research protocol received approval from the Faculty of Medicine, University of Benghazi.

Data Collection and Instruments

Data were collected via direct interviews after obtaining informed consent from each participant. The research utilized two validated psychometric instruments:

The Maslach Burnout Inventory (MBI): This scale was employed to measure the three core dimensions of burnout: emotional exhaustion, depersonalization, and personal accomplishment (9). Scores for each subscale were calculated and categorized as high, moderate, or low based on established cut-offs for medical students.

The Connor-Davidson Resilience Scale (CD-RISC-10): This 10-item, validated questionnaire was used to assess resilience levels. Scores were interpreted as follows: 80-100% (High Resilience), 60-79% (Above Average), 40-59% (Just Above Average), and below 40% (Low Resilience) (10).

A third, researcher-designed questionnaire collected demographic data, such as age, gender, marital status, number of children, perceived income sufficiency, and whether the student was engaged in employment alongside their medical studies.

Statistical Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics (frequencies, percentages, mean, and standard deviation) were used to summarize the data. For inferential analysis, the Chi-square test was used to compare categorical variables, with Fisher's exact test applied where sample sizes were small. Pearson's correlation was used to assess the relationship between continuous MBI subscale scores and the total CD-RISC-10 score. Binary logistic regression analyses were performed to identify factors independently associated with high levels of each burnout dimension (emotional exhaustion, depersonalization, and low personal accomplishment), with the CD-RISC-10 score and demographic variables entered as covariates. A p-value of less than 0.05 was considered statistically significant.

RESULTS

General characteristics of the studied group

The mean age was 26 ± 1 years; most participants were females (68%) and single (85%), (Table 1).

Resilience and burnout among the studied group

The average resilience score was 66.6%. The distribution of resilience levels was as follows:

Most students showed resilience levels that were 'just above average' in 47.2% (n = 94), or 'above average' in 33.7% (n = 67). High resilience was reported in only 14.1% (n = 28). Those who were just above average were interpreted as at risk. 'Low resilience' was found among 5.0% (n = 10) (Figure 1).

Table 1. General characteristics of the studied group	
Variables	Frequency (%)
Gender	
Male	51 (25.6%)
Female	148 (74.4%)
Marital status	
Single	181 (91%)
Married	18 (9%)
Having children	
Yes	8 (4%)
No	191 (96%)
Working alongside studying	
Yes	75 (37.7%)
No	124 (62.3%)
Enough income	
Yes	127 (63.8%)
No	72 (36.2%)
Mean age (SD)	26 (1)

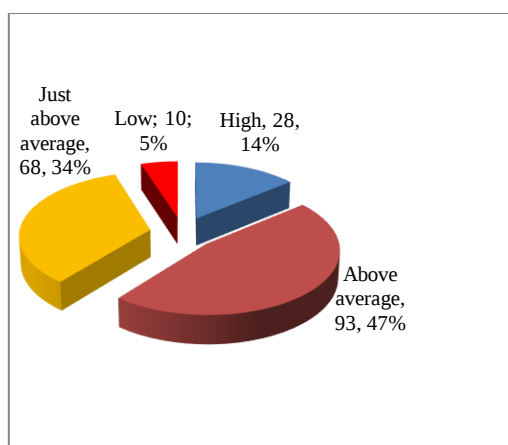


Figure 1. Resilience among the studied group

Regarding burnout, 110 (55.3%) participants had high emotional exhaustion, 80 (40.2%) had high depersonalization, and 113 (56.8%) had low personal accomplishment (Figure 2).

The relation between resilience and burnout, and the general characteristics of participants

There was a significant relationship between personal accomplishment and resilience; those with high personal accomplishment had above-average and average resilience among 14 (30.4%) and 20 (43.5%) (P = 0.006) participants. Also, students

with low self-achievement had above-average and average resilience in a frequency of 58 (51.3%) and 39 (34.5%) the participants, respectively (P= 0.006). While no significant relation was observed between exhaustion, depersonalization, and resilience. Also, there was no significant difference regarding levels of resilience and students' gender, work status, income, marital status, or parenthood (Table 2).

The high prevalence of burnout among medical students, particularly during the critical transition to clinical practice, is a well-documented global concern. Our findings, which indicate a significant level of burnout, were consistent with international data. For instance, our rates were higher than the 28% reported by Farrell et al. in New Zealand. Still, they fell within the 25-50% range identified by Villwock et al. in the USA and aligned with the minimum 40% prevalence noted in the systematic review by Erschens et al. This consistency underscored that burnout was a pervasive issue transcending geographical and cultural boundaries in medical education (11-13). However, the specific prevalence within the Arab or North African context requires further exploration, as cultural and educational system factors may modulate its expression.

Burnout during clinical training was not an isolated phenomenon; it was strongly associated with detrimental outcomes such as depression, anxiety, increased medical errors, imposter syndrome, and a decline in professionalism. In this landscape, resilience emerged as a critical buffer. While a study by Beg et al. in Pakistan reported a high prevalence of low resilience (43.9%) (14), our cohort presented a notably more favorable profile. This suggests that a significant portion of the present study participants possessed the psychological capacity to withstand the stresses of clinical training, which was linked to better psychological health, effective coping, and sustained engagement in learning.

The most significant finding from our analysis was the specific inverse relationship between resilience and low personal accomplishment. This aligns with the core construct of resilience as fostering a sense of self-efficacy and competence. Students with higher resilience were better able to maintain a sense of achievement despite the demanding environment, potentially protecting them from one of burnout's most demoralizing components. In contrast, the lack of a significant correlation with emotional exhaustion and depersonalization suggests that these dimensions may be more directly tied to overwhelming external workload and systemic factors, respectively, which may overpower individual coping resources.

The comparatively higher resilience in our sample could be plausibly attributed to several potential factors, including specific innovations within our

DISCUSSION

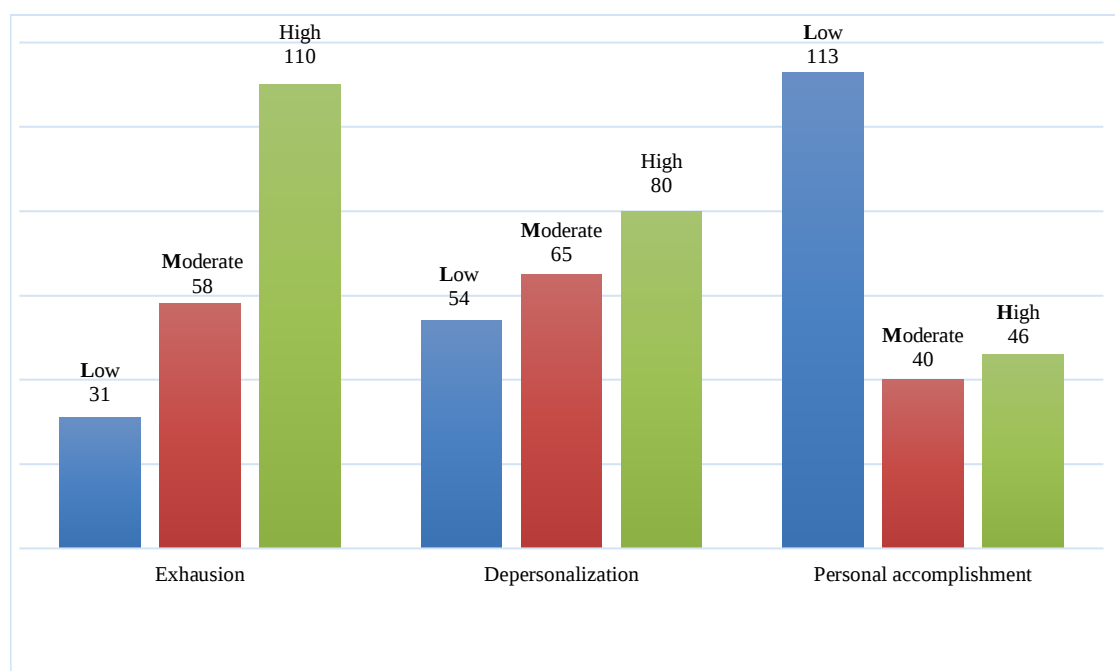


Figure 2. Burnout among the studied group

Table 2. Relation between resilience, burnout and general characteristics of participants

Variables	Resilience				p value
	High N (%)	Above average N (%)	Just above average N (%)	Low N (%)	
Exhaustion					
Low (31)	5 (16.1%)	13 (41.9%)	12 (38.7%)	1 (3.2%)	0.4
Moderate (58)	9 (15.5%)	33 (56.9%)	15 (25.9%)	1 (1.7%)	
High (110)	14 (12.7%)	47 (42.7%)	41 (37.3%)	8 (7.3%)	
Depersonalization					
Low (54)	7 (13%)	27 (50%)	18 (33.3%)	2 (3.7%)	0.6
Moderate (65)	11 (16.9%)	34 (52.3%)	17 (26.2%)	3 (4.6%)	
High (80)	10 (12.5%)	32 (40%)	33 (41.3%)	5 (6.2%)	
Personal accomplishment					
Low (113)	8 (7%)	58 (51.3%)	39 (34.5%)	8 (7.1%)	0.006
Moderate (40)	6 (15%)	15 (37.5%)	18 (5%)	1 (2.5%)	
High	14 (30.4%)	20 (43.5%)	11 (24%)	1 (2.1%)	
Gender					
Male (51)	8 (15.7%)	21 (41.2%)	19 (37.3%)	2 (3.9%)	0.9
Female (148)	20 (13.5%)	71 (48%)	49 (33.1%)	8 (5.4%)	
Marital status					
Single (181)	23 (12.7%)	86 (47.5%)	63 (34.8%)	9 (5%)	0.4
Married (18)	5 (27.8%)	7 (38.9%)	5 (27.7%)	1 (5.6%)	
Having children					
Yes (8)	3 (37.5%)	2 (25%)	2 (25%)	1 (12.5%)	0.2
No (191)	25 (13.1%)	91 (47.6%)	66 (34.6%)	9 (4.7%)	
Working while studying					
Yes (75)	13 (17.3%)	37 (49.3%)	22 (29.3%)	3 (4%)	0.8
No (124)	15 (12.1%)	56 (45.2%)	46 (37.1%)	7 (5.6%)	
Enough income					
Yes (127)	16 (12.6%)	64 (50.4%)	38 (29.9%)	9 (7.1%)	0.07
No (72)	12 (16.7%)	29 (40.3%)	30 (41.7)	1 (1.3%)	

internal medicine department's curriculum, which we hypothesize may function as protective factors.

The curriculum emphasized self-directed learning, which may enhance students' sense of control, self-confidence, and ownership over their education. Furthermore, providing a clear curriculum map and transparent assessment methods at the course's outset could reduce ambiguity and stress, allowing students to plan and manage their workload effectively. The integration of diverse learning activities, such as simulation in skills labs and active participation in clinical rounds, served to bridge theory and practice. This gradual, supported exposure may build clinical competence, which directly could improve self-efficacy and confidence, which are the key components of resilience. Other potential explanations for the favorable resilience profile include unmeasured cultural or familial support factors specific to the region, or sample characteristics. Furthermore, direct comparison with the study by Beg et al. is limited by potential differences in CD-RISC scoring interpretation or cohort characteristics. The fact that tutors for interactive learning and skills labs were primarily teaching assistants close in age to the students likely provided relatable role models. This near-peer mentorship could demystify the path to becoming a competent physician, offering both practical support and a viable model for their future selves.

Despite the overall positive resilience findings, our data crucially identified a vulnerable subgroup: students with high burnout consistently exhibited low or "just above average" resilience. While their immediate academic performance may not be affected, this group was at a significantly elevated risk for mental health challenges. The long-term consequences could profoundly impact their future job engagement, career choices, and personal relationships, highlighting an urgent need for targeted interventions (15-18).

Our findings, combined with existing literature, suggest that a multi-faceted approach to proactively build resilience could be highly effective. Creating forums for team debriefing after difficult clinical events and explicitly addressing and overcoming shame are critical. As demonstrated by Houpy et al., students who openly discuss errors and challenges with peers show higher resilience

and improved well-being (19).

Introducing elective modules and allowing students more choice in their learning objectives could further reinforce autonomy, a known antidote to burnout.

The study was a cross-sectional one, and the changes and progression of resilience and burnout could not be addressed. Also, causal inferences cannot be made. The single-center design may limit generalizability to other institutions. The reliance on self-reported measures is subject to bias.

We recommend implementing formal programs such as stress management workshops, "Resilience and Action" training, and online modules that could equip students with tangible psychological tools. However, resilience should not be an add-on for future doctors. It needs to be part of the core curriculum, which is required from day one.

CONCLUSION

Nearly half of the studied group were at high risk of distress or had low resilience. Half of them had exhaustion or low personal accomplishment, and more than one-third had high depersonalization. No significant relation of gender, marital status, parenthood, working while studying, or enough income with resilience was found in this study. Although burnout was high in the studied group, the resilience score was above average among nearly half of the participants. The key analytical finding was the significant association between higher resilience and a maintained sense of personal accomplishment.

Ethical Considerations:

Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors.

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