
The Correlation of Grit and Resilience with Burnout Among Medical Students

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ABSTRACT

Objective: Grit and resilience are psychological traits that affect the stress and burnout of most medical students. This study aimed to determine the predictive relationship between grit and resilience with burnout among medical students. It was hypothesized that an increase of grit and resilience would show a decrease in burnout.

Methods: This is an analytic cross-sectional study of relationship between grit, resilience, and burnout among 149 enrollees (30 1st-year, 70 2nd-year, 34 3rd-year, and 15 4th-year) medical students of Far Eastern University – Dr. Nicanor Reyes Medical Foundation. Data were collected through a self-administered online questionnaire consisting of Short Grit Scale (Grit-S), Maslach Burnout Inventory–Student Survey (MBI-SS), and Connor–Davidson Resilience Scale–10 (CD-RISC-10). Multiple logistic regression was used to assess the effects of grit and resilience on burnout among regular students, with stratified analysis for midyear students.

Results: Grit and resilience showed moderate levels among 149 medical students, while burnout was high. The model was significantly revealed by the regression analysis. Burnout was reduced significantly by grit, whereas resilience showed a significant positive association. No interaction effect was found, and academic workload was not significantly associated with burnout.

Conclusions: Grit and resilience are significant but modest predictors of burnout among medical students, with grit showing a protective effect while resilience shows a complex positive association. These findings imply that interventions should concentrate on strengthening grit to reduce burnout. The limited explanatory power highlights the need to address additional factors such as workload, mental health, and support systems. Future research should explore broader determinants to better inform targeted strategies for refining student well-being and preventing burnout.

Key words: Grit, resilience, burnout, medical students, cross-sectional

Medical education is widely recognized as one of the most demanding academic paths a student can pursue. During a medical student's academic career, they undergo a significant amount of stress, and if left unmanaged, may result in burnout — a condition

marked by emotional exhaustion, depersonalization, and a diminished sense of personal accomplishment (Maslach & Leiter, 2016). Moreover, research has shown that certain traits such as grit and resilience have shown to be significant factors in the ability of students to cope effectively. Factors such as age, sex, cultural, educational, and institutional differences may influence how students effectively cope with stressors, potentially affecting their levels of grit, resilience, and burnout.

From the FEU-NRMF School of Medicine

Burnout among medical students remains a prevalent issue, with students who are in their higher academic years experiencing more rates of burnout. There are several existing studies both local and international on burnout trends among Filipino medical students. However, previous studies held abroad may not fully capture the unique culture and institutional factors within the Philippine context and how they may affect grit and resilience as protective factors against burnout.

Grit, which is defined as persistence and sustained commitment to pre-determined and long-term goals, has been linked to lower burnout levels and greater professional fulfillment among medical students (Hirschi et al., 2020; Phetrasuwan et al., 2025; Koenig et al., 2024). However, its role remains complex and sometimes inconsistent. Some studies suggest that the protective effect of grit weakens when resilience and social support are considered, while excessive perseverance without adaptability may increase emotional exhaustion (Bashir et al., 2023; Musso et al., 2023). Furthermore, questions regarding its overlap with personality traits such as conscientiousness (Credé, 2022) and its culturally influenced expression in collectivist societies like the Philippines complicate its interpretation (Kim & Lee, 2023; Hofstede, 2001). These findings highlight that resilience, defined as the capacity to recover and adapt to stress, may function either as a mediator or an independent predictor in the relationship between grit and burnout (Thamissarukul et al., 2024).

Intervention studies indicate that resilience is more amenable to development and may offer greater benefits in reducing burnout. Structured resilience-building programs, along with multilevel interventions such as mindfulness, peer support, and curricular reforms, have demonstrated significant improvements in coping and well-being (Farrel et al., 2024; *Frontiers in Medicine*, 2024). Beyond burnout, grit has also been linked to academic success, sustained motivation, and higher rates of program completion, emphasizing its importance in both undergraduate and postgraduate medical training (Fernandez-Martin et al., 2020; Lin, 2024). Nevertheless, demographic factors such as age, sex, and level of training influence these relationships, with mixed findings reported across studies. Older or more advanced students may exhibit greater resilience due to experience, yet also face increased burnout due to clinical demands, while sex differences in burnout remain inconsistent (Ilic & Ilic, 2021; Liu et al., 2023).

Burnout, grit, and resilience are interrelated constructs shaped by individual, curricular, and sociocultural factors. The structure of medical education, particularly the transition to clinical training, significantly contributes to stress and burnout risk (Dyrbye et al., 2021). At the same time, institutional support systems such as mentorship and wellness initiatives can enhance resilience and mitigate these effects (Rotenstein et al., 2018; WHO, 2023). In the Philippine setting, collectivist values and strong social support networks may both buffer stress and increase pressure to succeed (Falguera et al., 2025; Hofstede, 2001). Understanding these multidimensional influences is essential for developing context-specific strategies that promote psychological well-being and support the formation of competent and resilient physicians.

MATERIALS AND METHODS

Study Design

This study utilized an analytic cross-sectional design to examine the association of grit, resilience with burnout among medical students.

Setting

The study population consisted of medical students enrolled in the Far Eastern University – Dr. Nicanor Reyes Medical Foundation (FEU-NRMF) College of Medicine, from enrolled first year to fourth year, during Academic Year 2025–2026. The study was conducted both within the university premises and through its official online platforms. Data were collected using a self-administered online questionnaire developed via Google Forms. The survey was available for two weeks. The average time to complete the survey was approximately 15 minutes. Responses were recorded in Google Sheets to ensure data accuracy, confidentiality, and participant anonymity.

Participants

The participants included students who are enrolled in the Doctor of Medicine program at FEU-NRMF School of Medicine during the academic year 2025–2026. Students diagnosed with mental health disorders (e.g., depression, anxiety, psychosis, or other psychiatric conditions) were excluded. Eligible

students were invited communication channels (e.g., Messenger). It included a brief introduction and description of the study, an electronic informed consent form, and a link to the online questionnaire. Participation was completely voluntary, and informed consent was obtained before survey access. Class coordinators were asked to assist in distributing the link to their respective sections. A designated research assistant monitored response rates and sent follow-up reminders as needed.

Variables

The dependent variable was burnout in which it is a psychological syndrome characterized by emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment resulting from prolonged academic or professional stress (Maslach & Jackson, 1981). This was measured using the MBI-SS. Higher scores in Emotional Exhaustion and Cynicism, together with lower Academic Efficacy, indicate greater burnout.

The independent variables included grit and resilience. Grit refers to an individual's perseverance and passion for long-term goals, encompassing sustained effort and consistency of interest over time despite challenges or setbacks (Duckworth et al., 2007). Resilience is the capacity to adapt successfully and recover quickly from adversity, stress, or academic challenges (Connor & Davidson, 2003). In this study, resilience represents a dynamic psychological process that enables students to cope effectively with the demands of medical education.

The control variables consisted of the Year Level (First, Second, Third, or Fourth Year), Sex (Male or Female), and Academic Status (Regular or Irregular).

Data Sources / Measurement

Data were collected through a self-administered questionnaire distributed via Google Forms among medical students of FEU-NRMF. Grit was measured using the Short Grit (Grit-S), an 8-item self-report instrument assessing perseverance and passion for long-term goals, with responses rated on a 5-point Likert scale and negatively worded items reverse-scored; higher mean scores indicate greater grit. Resilience was assessed using the Connor-Davidson Resilience Scale-10 (CD-RISC-10), a 10 item measure rated on a 5-point scale, with total scores ranging from 0 to 40, where higher scores reflect greater resilience.

Burnout was measured using the Maslach Burnout inventory-Student Survey (MBI-SS), which evaluates emotional exhaustion, cynicism, and academic efficacy using a 7-point Likert Scale; higher scores in emotional, exhaustion and cynicism, along with lower academic efficacy, indicate higher burnout. Demographic and control variables, including age, sex, year level, and academic status, were obtained through a personal data sheet included in the questionnaire. All instruments were administered uniformly through the same online platform to ensure consistency in data collection.

Furthermore, all participants, regardless of year level or academic status, were assessed using the same standardized instruments and procedures, ensuring comparability across groups and minimizing measurement bias.

Bias

Several potential sources of bias were considered in this study. Selection bias may have been introduced due to voluntary participation however it was minimized by distributing questionnaires across all year levels. Since data were self-reported, there was also a risk for response bias. To address this bias, the survey was conducted anonymously, and no identifying information was collected. Additionally, information bias may have occurred due to inaccurate reporting or misunderstanding of the question. To reduce this, clear instructions and validated instruments were used. Measurement bias was reduced by using validated instruments such as Maslach Burnout Inventory-Student Survey (MBI-SS), Grit Scale, and Connor-Davidson Resilience Scale. Researcher bias was also considered and minimized by using objective statistical analysis to reduce subjective interpretation of the results.

Study Size

The required study size was determined based on previous studies (Gong et al., 2021; Lin et al., 2024), correlations between grit/resilience and burnout range from $r = -0.23$ to -0.47 . Using GPower* (effect size $f^2 = 0.08$, $\alpha = 0.05$, power = 0.80), the minimum required sample size is 160. To account for nonresponse and subgroup analyses, the final target sample was set at 180 students.

Quantitative Variables

The quantitative variables in the study were handled using continuous scoring based on their respective validated scales. Grit, resilience, and burnout were treated as continuous variables and their raw scores were subsequently summarized through means and standard deviations and analyzed using validated instruments. Only the Short Grit Scale required reverse coding, while the Maslach Burnout Inventory and the Connor-Davidson Resilience Scale - 10 did not require any reverse coding in their scoring procedures.

Statistical Methods

All data collected were exported from Google Forms into Microsoft Excel where data were checked for completeness prior to analysis using Jamovi. Descriptive statistics were used to summarize participants' characteristics and study variables.

Multiple linear regression analysis was performed to assess the association of grit and resilience with burnout while controlling for demographic variables. Statistical significance was set at $p < 0.05$, and results were reported as regression coefficients (β), p -values, and coefficients of determination (R^2).

RESULTS

Participants

A total of 149 individuals were screened and evaluated. All met the eligibility criteria for inclusion

and were enrolled in the study. They all completed the study thus, the final sample consisted of 149 respondents.

The mean age of the respondents was 25 years old ($SD = 1.33$), indicating a relatively homogeneous age distribution. Majority of participants were female (65.8%, $n = 98$), while male participants accounted for 34.2% ($n = 51$).

In terms of year level, most participants were 2nd year (47.0%), followed by 3rd year (22.8%), 1st year (20.1%), and 4th year (10.1%). In terms of academic status, the majority were regular students 81.2% ($n = 121$), while 18.8% ($n = 28$) were irregular or midyear students.

Descriptive Data

The study participants had a total of 149 medical students with no missing data on all variables. In terms of demographic profile of the participants, the mean age was 25 years ($SD = 1.33$), indicating that the participants were in a relatively homogenous age distribution. The majority of the participants were female (65.8%, $n = 98$), while male participants consisted 34.2% ($n = 51$).

In terms of year level, the majority of participants were second-year students (47.0%), followed by third-year students (22.8%), first-year students (20.1%), and fourth-year students (10.1%), indicating that the sample was predominantly composed of second-year students.

Based on academic status, most participants were regular students (81.2%, $n = 121$), whereas 18.8% ($n = 28$) were irregular or midyear students.

Table 1. Frequency distribution.

Year Level	Counts	% of Total
1st Year	30	20.1%
2nd Year	70	47.0%
3rd Year	34	22.8%
4th Year	15	10.1%
Sex		
Female	98	65.8%
Male	51	34.2%
Status		
Regular	121	81.2%
Irregular/ Midyear	28	18.8%

Note: N (Sample size): 149; Missing; 0

There were no missing data for any variables. All the participants had complete demographic and outcome data (grit, resilience, and burnout)

Outcome Data

The mean grit score was 27.1 (SD = 5.15) with values ranging from 13 to 40, indicating a moderate level of grit. The mean of the resilience score was 30.7 (SD = 6.67) ranging from 7 to 40, corresponding to moderate level of resilience. In contrast, the mean score for burnout was 59.6 (SD = 12.2) with scores ranging from 20 to 85, indicating a high level of burnout among the respondents.

Main Results

Association between grit, resilience, and burnout was assessed using multiple linear regression analysis. In the unadjusted model, both grit and resilience were included as predictors of burnout. The overall

model was statistically significant, $F(2,146) = 7.16$, $p = 0.001$. Based on the model output, the model explained approximately 8.4% of the variance in burnout ($R^2 = 0.08393$; adjusted $R^2 = 0.0768$).

All variables were analyzed as continuous measures based on their respective validated scales. No categorization into discrete groups (e.g., low, moderate, high) was performed.

Based on calculated data, grit was significantly associated with burnout ($\beta = -0.314$, $p < 0.001$), indicating that higher levels of grit were associated with lower burnout. In contrast, resilience demonstrated a small but statistically significant positive association with burnout ($\beta = 0.173$, $p = 0.043$), suggesting that higher resilience was associated with higher burnout levels.

Further analysis examining the relationship between grit and resilience showed no statistical significance ($\beta = -0.100$, $p = 0.162$). The model was likewise not significant overall, $F(1,147) = 1.97$, $p = 0.162$. This indicates that grit does not significantly

Table 2. Average mean scores.

Sex	Grit	Resilience	Burnout
Female	27.11 $\pm$ 4.57	30.39 $\pm$ 7.07	61.13 $\pm$ 19.82
Male	26.89 $\pm$ 5.38	31.29 $\pm$ 5.85	57.66 $\pm$ 23.99
Year Level			
1st Year	27.17 $\pm$ 5.15	31.03 $\pm$ 6.59	57.47 $\pm$ 12.34
2nd Year	26.83 $\pm$ 5.15	30.66 $\pm$ 6.73	64.34 $\pm$ 10.53
3rd Year	26.91 $\pm$ 5.15	30.79 $\pm$ 7.08	60.18 $\pm$ 10.54
4th Year	27.94 $\pm$ 5.15	30.00 $\pm$ 6.21	52.93 $\pm$ 8.79
Status			
Regular	27.25 $\pm$ 4.70	30.78 $\pm$ 6.60	59.24 $\pm$ 21.25
Irregular/ Midyear	26.14 $\pm$ 5.15	30.07 $\pm$ 7.25	62.87 $\pm$ 21.90

Table 3. Descriptive mean of grit, burnout, and resilience.

Descriptives	Age	Sex	Year Level	Status	Grit	Burnout	Resilience
Mean	25.0				27.1	59.6	30.7
Median	25				27	60	31
Standard deviation	1.33				5.15	12.2	6.67
Minimum	18				13	20	7
Maximum	27				40	85	40

Note: N (Sample size): 149; Missing; 0

modify the relationship between resilience and burnout.

In the adjusted model, academic status was not significantly associated with burnout ($\beta = 0.452$, $p = 0.857$). This suggests that differences in academic status (regular vs. irregular/midyear) do not significantly influence burnout levels in this sample.

Grit remained a strong and significant negative predictor of burnout ($\beta = -0.745$, $p < 0.001$), while resilience remained a significant positive predictor ($\beta = 0.322$, $p = 0.043$), consistent with the primary model.

DISCUSSION

Key Results

This study examined the relationship between grit and resilience with burnout among medical students. The findings showed that grit was significantly associated with lower levels of burnout while resilience demonstrated a small but significant positive association with burnout.

The inverse relationship between grit and burnout observed in this study is consistent with existing literature (Hirschi et al., 2020; Koenig et al., 2024;

Table 4. Model fit measures.

Model	R	R ²	Adjusted R ²	Overall Model Test			
				F	df1	df2	p
1	0.299	0.08393	0.0768	7.16	2	146	0.001

Note: Models estimated using sample size of N=149

Predictor	Estimate	SE	t	p	Stand. Estimate
Intercept	70.070	5.873	11.93	<.001	
Grit	-0.746	0.201	-3.71	<.001	-0.314
Resilience	0.318	0.155	2.05	0.043	0.173

Table 5. Model coefficients - burnout.

Predictor	Estimate	SE	t	p	Stand. Estimate
Intercept	63.84710	3.15562	20.23	<.001	
Resilience * Grit	-0.00499	0.00355	-1.40	0.162	-0.100

Table 6. Academic load: model coefficient - burnout.

Predictor	Estimate	SE	t	p
Intercept	69.846	6.022	11.599	<.001
Grit	-0.745	0.202	-3.692	<.001
Resilience	0.322	0.158	2.044	0.043
Academic Status:				
1-0	0.452	2.505	0.181	0.857

Kang & Choi, 2022). Grit, defined as perseverance and sustained passion toward long-term goals (Duckworth et al., 2007), may enable students to cope more effectively with academic demands and stressors. Individuals with higher levels of grit are more likely to maintain motivation and commitment despite challenges, which may reduce emotional exhaustion and disengagement—key components of burnout (Tang et al., 2021; Teuber et al., 2020).

These findings align with prior studies suggesting that grit is associated with improved academic performance, persistence, and psychological well-being. In the context of medical education, where prolonged stress and high expectations are common, grit may serve as an important internal resource that promotes endurance and resilience over time.

In contrast, resilience demonstrated a small but significant positive association with burnout, suggesting that students with higher resilience scores experience higher rates of burnout. While resilience is typically conceptualized as a protective factor, this finding suggests a different interpretation.

One possible explanation is that resilience represents an adaptive response to sustained stress rather than a preventive trait. Students experiencing higher levels of burnout may be those who are continuously exposed to academic and emotional demands, thereby requiring greater adaptive capacity. As a result, higher resilience scores may reflect individuals who are actively coping with or enduring high levels of stress, rather than those who are shielded from it.

This interpretation supports a “stress-exposure” or “resilience activation” model, wherein burnout acts as a stimulus that tests and strengthens resilience. In this context, resilience may coexist with burnout rather than prevent it, particularly in high-pressure environments such as medical training.

The interaction between grit and resilience was not statistically significant, suggesting that grit does not modify the relationship between resilience and burnout. This indicates that these constructs may operate independently rather than synergistically in influencing burnout outcomes.

These findings have important implications for medical education. While enhancing resilience remains a common focus of student wellness programs, this study suggests that resilience alone may not be sufficient to reduce burnout. Interventions that also cultivate grit—such as goal-setting, perseverance

training, and long-term motivation—may also be beneficial.

Furthermore, the positive association between resilience and burnout highlights the need to address systemic and environmental factors contributing to student stress. Institutional strategies, including workload management, mentorship programs, and accessible mental health support, are essential to complement individual-level interventions.

Limitations

Due to the time constraint, the original proposed number of respondents was not met. Only 149 out of the targeted 160 respondents were collected. This reduction in the number of participants may introduce a statistical imprecision which could potentially limit the study to detect significant correlations between the variables.

There is unequal distribution of respondents per year level with second year students being notably overrepresented while participation from the third and fourth year were significantly reduced. This imbalance is a possible source of selection bias, because academic workload and the root cause of stressors can shift between earlier and later years of study. Focusing heavily on the second year experience likely influences the direction of the result. Certain subgroups may be underrepresented influencing the inaccuracy of comparison among the different year levels.

Another limitation is the study design because it cannot determine which came first thereby preventing the authors from generalizing whether it is burn-out that increases the resilience or the other way around.

Interpretation

The present findings indicate that grit and resilience serve as statistically significant but modest predictors of burnout among medical students. Grit consistently demonstrated a protective effect while resilience showed a small yet positive association with burnout, suggesting that students with higher resilience may still report elevated burnout levels.

Notably, the model accounted for only a limited proportion of the variance in burnout, underscoring that burnout is a multifactorial construct likely influenced by additional unmeasured variables such as academic workload, psychological distress, sleep

quality, and social support systems. This limited explanatory power highlights the complexity of burnout in academic populations.

The inverse relationship between grit and burnout aligns with prior empirical evidence (e.g., Teuber et al., 2020; Tang et al., 2021; Kang & Choi, 2022), which consistently identifies grit as a protective factor associated with reduced academic exhaustion and improved persistence under stress. However, the observed positive association between resilience and burnout diverges from conventional theoretical expectations, suggesting a potentially more nuanced or context-dependent relationship, wherein resilience may emerge alongside heightened stress exposure.

These findings should be interpreted with caution due to several methodological constraints, including sample size limitations, unequal distribution across year levels, and overrepresentation of second-year students, all of which may have influenced the stability and generalizability of the results. Furthermore, the inclusion of multiple statistical tests increases the possibility of Type I error, indicating that the findings should be considered exploratory in nature.

Despite these limitations, the study contributes meaningful insight into the psychological determinants of burnout in medical students. The results emphasize the need for further research incorporating broader psychosocial variables and more balanced sampling strategies to better elucidate the complex interplay between grit, resilience, and burnout.

Generalisability

The study is limited due to the utilized methods and samples gathered. The population includes the medical students of FEU NRMF College of Medicine with the value of $N = 149$. Containing a relatively homogenous age distribution (Mean Age = 25 years), limiting the usage of the findings for broader populations.

Furthermore, the data gathered showed unequal distribution across the year level, with 2nd year students containing the largest proportion (47%) followed by 3rd year (22.8%), 1st year (20.1%) and 4th year (10.1%). This data may have produced bias in terms of experience of burnout, grit and resilience.

The sample was predominantly female (65.8%) and the results may not extensively represent groups where both genders are more evenly distributed. It was composed largely of regular academic students (81.2%), the external validity of the research was

strongest when applied to cohorts sharing these specific characteristics. This study utilized a limited number of participants and did not include some important factors like mental health, workload, and support systems, so the outcome may not fully represent all students. Therefore, the data can only be applied to similar populations and should be utilized with caution in other settings. Consequently, while these findings provide a meaningful snapshot of student well-being, they should be extrapolated to other disciplines or settings with careful consideration of their distinct environmental and demographic demands.

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