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Research Paper

The relationship between perfectionism, self-compassion, and repetitive negative thinking with job burnout in medical students during internship

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ABSTRACT

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Medical students are highly susceptible to psychological pressures, including perfectionism and burnout. This study investigated the relationship between perfectionism, self-compassion, repetitive negative thinking, and job burnout among medical internship students. A total of 148 participants from Guilan province were selected using Morgan's sampling table and completed standardized questionnaires, including the Perfectionism Scale, Self-Compassion Scale, Repetitive Negative Thinking Scale, and Burnout Scale. Data were analyzed using descriptive statistics and Partial Least Squares Structural Equation Modeling (PLS-SEM). The results showed that perfectionism positively predicted repetitive negative thinking ($\beta = 0.412$, $t = 6.292$, $p < 0.001$) and burnout ($\beta = 0.328$, $t = 4.998$, $p < 0.001$), and negatively predicted self-compassion ($\beta = -0.741$, $t = 23.666$, $p < 0.001$). Self-compassion, in turn, negatively predicted repetitive negative thinking ($\beta = -0.646$, $t = 12.048$, $p < 0.001$) and burnout ($\beta = -0.460$, $t = 7.608$, $p < 0.001$). Repetitive negative thinking positively predicted burnout ($\beta = 0.675$, $t = 12.436$, $p < 0.001$). The model explained 55.0% of the variance in self-compassion, 42.7% in repetitive negative thinking, and 45.9% in burnout; predictive Q^2 values for the three endogenous constructs were 0.487, 0.398, and 0.412, respectively. Overall goodness-of-fit (GOF) = 0.5141. The structural model demonstrated acceptable reliability, convergent and discriminant validity, and strong explanatory power, confirming the hypothesized relationships. These findings highlight the dual role of self-compassion and repetitive negative thinking as mediators in the perfectionism–burnout pathway. Perfectionism indirectly increases burnout by reducing self-compassion and enhancing repetitive negative thinking, underscoring the importance of addressing these mechanisms in preventive interventions. Programs designed to foster self-compassion, challenge maladaptive perfectionistic standards, and reduce ruminative and worry-related thought patterns may help protect medical students from burnout and promote their psychological well-being and academic success.

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1. Introduction

Burnout is a multifaceted condition resulting from work-related stress, characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment [1,2]. It often manifests through physical symptoms such as headaches, insomnia, and changes in eating habits, and significantly diminishes job satisfaction [3]. Burnout is highly prevalent among physicians and medical students, with reports indicating rates of 45–50% among physicians in the United States and about 35% among medical students in countries such as Pakistan and Iran [4–6]. Identifying predictors of burnout is therefore essential for prevention and early intervention [4]. Among the factors implicated in burnout, perfectionism, repetitive negative thinking, and self-compassion play a central role. Perfectionism is a self-evaluative style characterized by setting excessively high standards and persistently striving to meet them, often at the expense of psychological well-being [7–9]. While moderate levels of perfectionism may foster academic achievement, maladaptive perfectionism has consistently been linked to stress, anxiety, depression, and burnout [8,10,11]. One mechanism through which perfectionism contributes to psychological distress is repetitive negative thinking [12], defined as intrusive and persistent focus on past failures (rumination) or anticipated threats (worry) [12,13]. These transdiagnostic processes heighten vulnerability to anxiety, depression, and burnout [13].

In contrast, self-compassion functions as a protective factor. It involves treating oneself with kindness during times of failure or stress, maintaining a balanced perspective on personal shortcomings, and sustaining mindful awareness of difficulties [7,14,15]. Higher levels of self-compassion have been associated with reduced psychological distress and may buffer the negative impact of perfectionism on burnout.

Medical students are particularly vulnerable to these dynamics, as they face intense academic pressure, long working hours, and constant performance evaluation, all of which increase their risk of perfectionism, repetitive negative thinking, and burnout [16,17].

A deeper understanding of how these factors interact is crucial for developing effective interventions. Therefore, the present study investigates the relationships among perfectionism, self-compassion, repetitive negative thinking, and burnout in medical students. The conceptual framework of the study is illustrated in Figure 1.

2. Materials and Methods

2.1 Study design and participants

This descriptive-correlational study was conducted on 148 medical internship students in Guilan province. Participants were selected using Morgan's table, and all completed informed consent forms. Data were collected between June and December 2023. All procedures were performed in accordance with the Declaration of Helsinki and its later amendments [18].

2.2 Measures

Perfectionism was assessed using the 10-item Big Three Perfectionism Scale (BTPS), which evaluates self-critical, rigid, and narcissistic perfectionism [11]. Self-compassion was measured with the short-form 10-item Self-Compassion Scale, which assesses self-kindness, common humanity, and mindfulness [14,19]. Repetitive negative thinking was assessed with the 6-item short form of the Perseverative Thinking Questionnaire (PTQ), a content-independent measure of repetitive negative thought processes such as rumination and worry [20]. Burnout was measured using the 4-item short version of the Burnout Assessment Tool (BAT-4), which captures the core symptoms of work-related burnout [21]. All instruments used a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Shortened versions of the scales were employed, consistent with the adaptation used in the corresponding master's thesis. Refer to Table 1 for the reliability and validity indices.

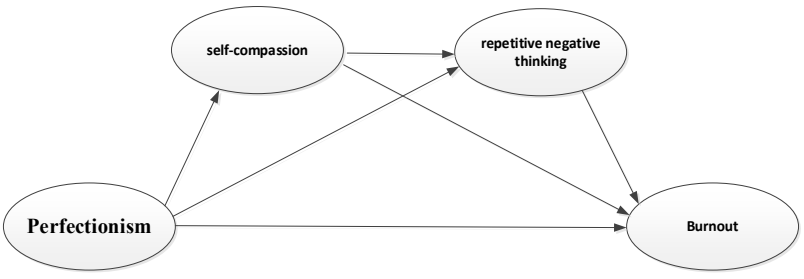

Figure 1. Conceptual research model

Table 1. Measurement instruments and variables

Construct	Cronbach's α	Composite Reliability (CR)	Average Variance Extracted (AVE)
Repetitive Negative Thinking (RNT)	0.810	0.812	0.516
Self-Compassion	0.822	0.849	0.387
Burnout	0.908	0.912	0.784
Perfectionism	0.886	0.910	0.525

2.3 *Data analysis*

Quantitative variables were summarized as mean (standard deviation), and categorical variables as frequency (percentage). Kolmogorov–Smirnov test results indicated that the study variables were normally distributed (all $p > 0.05$). Partial least squares structural equation modeling (PLS-SEM) using SmartPLS v3 was applied due to its suitability for complex models with multiple mediating relationships, rather than because of non-normality assumptions.

3. Results

The demographic analysis showed that most participants were female (52.0%), single (82.4%), and under 30 years of age (87.2%). A smaller proportion were married (17.6%), aged 30–35 years (8.7%), or older than 35 years (4.1%). The mean score of perfectionism was considerably below the expected average, while self-compassion and repetitive negative thinking were clearly above the average. Burnout scores were also higher than the expected mean.

The burnout score was higher than the average, reflecting the notable prevalence of burnout among medical students. These findings are summarized in Table 2. Normality of the data distribution was confirmed using the Kolmogorov–Smirnov test, as all variables met the assumption of normality (all $p > 0.05$). Indicator reliability and standardized loadings were satisfactory (all loadings > 0.30). Cronbach's alpha ranged from 0.810 to 0.908, and composite reliability (CR) from 0.812 to 0.912. The average variance extracted (AVE) values were as follows: Perfectionism = 0.525, RNT = 0.516, Burnout = 0.784, and Self-Compassion = 0.387. Although the AVE for self-compassion was below the 0.50 threshold (0.387), its composite reliability (0.849) and Cronbach's alpha (0.822) indicated adequate internal consistency, consistent with the thesis results. Discriminant validity was confirmed using the Fornell–Larcker criterion. The square root of AVE (diagonal) was greater than the correlations between constructs (Table 3).

The structural model demonstrated substantial explanatory power. The structural model produced $R^2 = 0.550$ (adjusted = 0.548) for self-compassion, $R^2 = 0.427$ (adjusted = 0.423) for repetitive negative thinking, and $R^2 = 0.459$ (adjusted = 0.452) for burnout. Stone–Geisser's Q^2 values were 0.487, 0.398, and 0.412, respectively, all above zero. GOF was 0.5141, indicating an acceptable overall model fit. This finding reassures us of the model's reliability and the confidence that can be placed in its conclusions. Finally, the path analysis results demonstrated that Perfectionism had a substantial adverse effect on self-compassion ($\beta = -0.741$, $p < 0.001$), and a positive impact on RNT ($\beta = 0.412$, $p < 0.001$) and burnout ($\beta = 0.328$, $p < 0.001$). Self-compassion reduced RNT ($\beta = -0.646$, $p < 0.001$) and burnout ($\beta = -0.460$, $p < 0.001$). RNT was a strong positive predictor of burnout ($\beta = 0.675$, $p < 0.001$). The complete structural paths are reported in Table 4. The final structural model with standardized coefficients is presented in Figure 2; significant paths are highlighted within this figure.

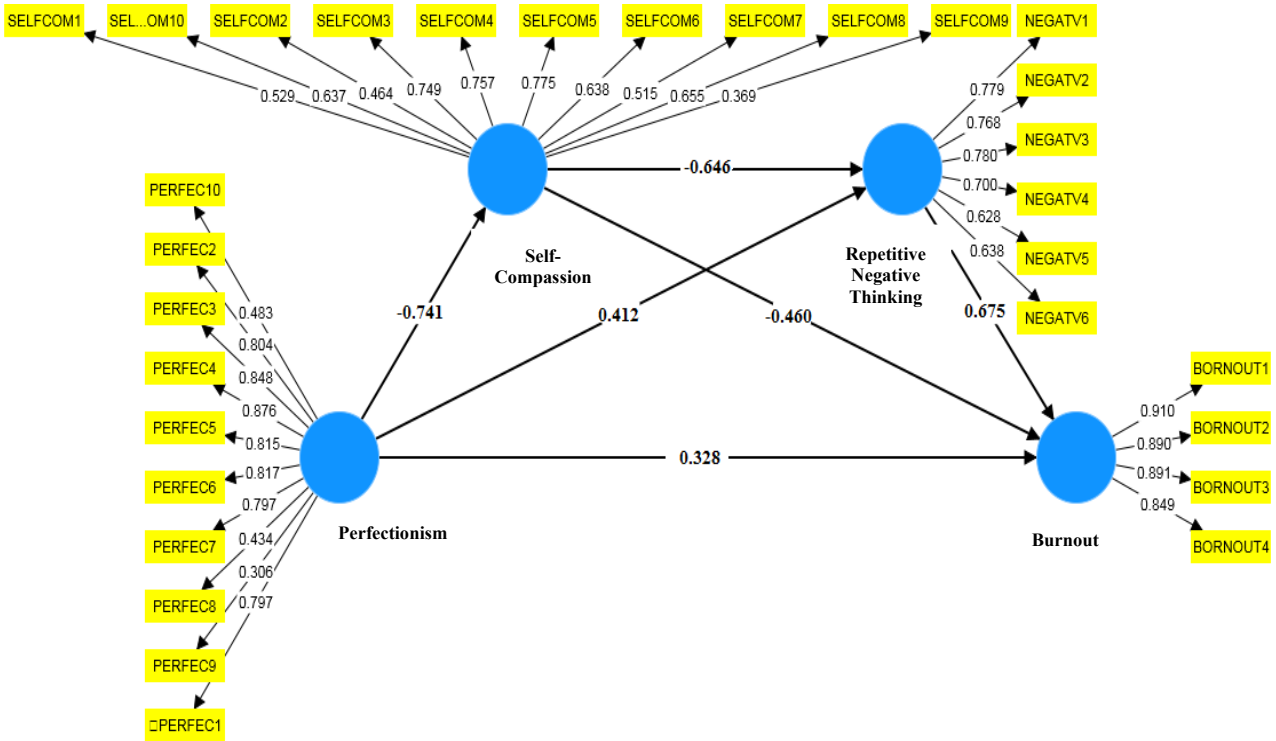

Figure 2. Final research model in the standardized coefficient estimation mode

Table 2. Descriptive statistics of study variables

Variable	N	Min	Max	Mean	SD	Variance	Skewness	Elongation
Perfectionism	148	1	5	2.5637	0.87981	0.774	0.912	-0.383
Self-Compassion	148	1.80	5	3.8576	0.74382	0.553	-0.430	-0.547
Repetitive Negative Thinking	148	1	5	3.5756	0.68746	0.473	-0.921	-0.547
Burnout	148	1	5	3.0997	0.78331	0.614	0.140	-0.698

Table 3. Fornell–Larcker discriminant validity matrix

Construct	Diagonal (√AVE)	Correlations
Perfectionism	0.725	Self-Compassion = 0.646; RNT = 0.675; Burnout = 0.412
Self-Compassion	0.622	Perfectionism = 0.646; RNT = 0.460; Burnout = 0.741
RNT	0.718	Perfectionism = 0.675; Self-Compassion = 0.460; Burnout = 0.328
Burnout	0.885	Perfectionism = 0.412; Self-Compassion = 0.741; RNT = 0.328

Table 4. Structural equation modeling results (PLS-SEM)

Path	β	t-value	p-value	Supported
Perfectionism → Self-Compassion	–0.741	23.666	< 0.001	Yes
Perfectionism → RNT	0.412	6.292	< 0.001	Yes
Perfectionism → Burnout	0.328	4.998	< 0.001	Yes
Self-Compassion → RNT	–0.646	12.048	< 0.001	Yes
Self-Compassion → Burnout	–0.460	7.608	< 0.001	Yes
RNT → Burnout	0.675	12.436	< 0.001	Yes

4. Discussion

Burnout is a consequence of individual stress and a complex social phenomenon within the workplace [9]. The findings of this study showed that the respondents' mean perfectionism score was slightly below the average value of the scale. This finding is consistent with some previous studies, which have shown that medical students experience varying levels of perfectionism due to academic pressures and high expectations. For example, a survey conducted by Aboalshamat et al. (2017) showed that medical students reported different levels of perfectionism due to the competitive environment and high academic pressures [6]. In contrast, the mean scores for self-compassion and repetitive negative thinking were slightly higher than expected. These findings are also consistent with the results of previous studies. For example, a survey by Ehring et al. (2011) revealed that medical students often engage in repetitive negative thinking and self-criticism due to constant stress and high-performance demands [20]. Additionally, a study by Craiovan et al. (2014) demonstrated that medical students require strengthening their self-compassion to effectively cope with stress and psychological challenges resulting from high academic pressures [22].

Our findings align with recent prospective studies [7] showing that self-compassion mediates the effect of perfectionism on burnout among health students. However, unlike Cunha et al. [12], who reported that repetitive negative thinking fully mediated the link between perfectionism and burnout, our results indicate that both self-compassion and repetitive negative thinking independently contribute to burnout. This discrepancy may be due to cultural differences in coping styles among Iranian students compared to European cohorts. The mean score of the burnout variable, a significant indicator of burnout prevalence, was reported to be higher than average, which is consistent with the results of many similar studies. For example, a survey by Aboalshamat et al. showed that medical students experience high levels of burnout due to high work and academic pressures [6]. Additionally, a study by Collin et al. (2020) revealed that medical students reported high levels of burnout due to a stressful environment and high performance requirements [23].

From the researcher's perspective, several factors could explain these results. First, the overwhelming academic pressures and high expectations in medical environments can lead to increased perfectionism, stress, and self-criticism among students. This finding could explain the lower mean of perfectionism compared to the expected mean, as students may struggle to meet their standards due to these high pressures. Increased self-compassion and repetitive negative thinking could be due to constant stress and the need to perform well. Medical students tend to be self-critical and have repetitive negative thinking due to the need to achieve high standards and perform well. Increased self-compassion may also help individuals respond to these pressures more effectively, thereby improving their ability to cope with psychological stress. Finally, increased burnout could also be due to the stressful environment and academic and work pressures that medical students face. These pressures can lead to emotional exhaustion and burnout, which the study results also confirm. Overall, these results indicate the need to pay more attention to mental health and provide appropriate support for medical students so that they can better cope with the psychological challenges and stresses of the academic environment.

In this study, the perfectionism variable has been examined as a general construct. The AVE for self-compassion was below 0.50 (0.387). Although

composite reliability was adequate (CR = 0.849), this indicates limited convergent validity for the shortened self-compassion scale. Future studies should consider using the full version of the self-compassion scale to improve convergent validity. In this study, perfectionism was examined based on the Big Three model (self-critical, demanding, and narcissistic). Still, other conceptualizations, such as self-oriented, other-oriented, and socially prescribed perfectionism, may also be explored in future research. Moreover, since repetitive negative thinking is closely related to rumination, future studies could include rumination as a broader construct to further clarify its role in predicting burnout.

The results of this study indicate that perfectionism contributes to burnout among medical students, both directly and indirectly. Perfectionism reduces self-compassion, which in turn increases repetitive negative thinking and ultimately leads to higher levels of burnout. On the other hand, self-compassion acts as a protective factor, reducing negative thinking and buffering the impact of perfectionism on students' mental health. These findings underscore the importance of designing interventions that prioritize promoting self-compassion and reducing repetitive negative thinking. Such programs, combined with training in realistic goal-setting and stress management, can help prevent burnout and enhance the well-being and academic performance of medical students.

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Authors' contributions

Study supervision, Design, and Resources: MH; Data collection, and Investigation: SSK; Analysis and Interpretation: SHM; Writing draft, and Critical revision: SHM and SSK. All authors have read and approved the final version of the manuscript.

Conflict of interest

No potential conflict of interest was reported by the authors.

Ethical declarations

This study was reviewed by the Ethics Working Group of the Vice-Chancellery for Research and Technology at Guilan University of Medical Sciences. It was exempt from requiring an ethics approval code. All procedures were conducted in accordance with institutional guidelines and the principles of the Declaration of Helsinki.

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