Original article

Role of imposter syndrome on the relationship between perfectionism and burnout syndrome among preclinical medical students at a University Hospital

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Abstract

Background: Imposter syndrome (IS) represents internal fear and anxiety of being exposed as a fraud that actual abilities are not talented, it can lead to frustrations, stress, and burnout. Medical students have a high achievement expectation and high standard of perfectionism trait, this trait may take an important role to burnout syndrome. Transitioning and adjustment to medical school lead to stress and burnout in preclinical medical students. Moreover, medical students with IS are more at risk of burnout. There has been no investigation on this association, especially imposter syndrome as a mediator.

Objective: To investigate the relationship between perfectionism and burnout syndrome, and to examine the mediating effects of IS on the relationship between perfectionism and burnout syndrome in preclinical medical students.

Methods: We collected data from 185 preclinical medical students, including demographic data, and Clance Imposter Phenomenon scale (CIPS), revised almost perfect scale (RAPS), and Copenhagen Burnout Inventory-student survey (CBI-SS) scores. The data were analyzed using Pearson's correlation and structural equation modeling (SEM).

Results: A positive relationship between perfectionism and burnout syndrome was observed (all components $P < 0.01$). It was also found that IS partially mediated the relationship between perfectionism and burnout syndrome ($\beta = 0.246$, $P < 0.01$), and R^2 was 0.382 to 0.397.

Conclusion: Preclinical medical students with perfectionism tend to suffer from burnout syndrome. Perfectionism and imposter syndrome can predict the occurrence of burnout syndrome by about 38.2% - 39.7% probability.

Keywords: Burnout syndrome, imposter syndrome, perfectionism, preclinical medical students.

The quality-of-life issue encompasses not only a consideration of physical illnesses but also mental problems. Burnout syndrome is one mental issue that has been frequently mentioned as affecting the quality of life of professionals. This is a response to chronic stress which if improperly managed, can potentially lead to physical, emotional, and mental fatigue, and severely affecting the quality of life. Currently, burnout is not classified as a disease; the World Health Organization (WHO) treats it as an occupational disorder. [1] Burnout can contribute to physical, emotional, mental, and behavioral changes, including physical pain, exhaustion, fatigue, depression, negative attitudes toward the working environment, other mental health problems, and decreased work performance. [2 - 4]

Burnout can not only occur in working setting but also in other settings. For example, academic pressure in educational settings can increase the risk of burnout among students. In particular, medical students often experience a high and continuous level of stress, which can lead to feelings of burnout in some [5, 6], and may be especially pronounced during shifts in learning styles and study environments. [7, 8] Preclinical medical students may encounter burnout syndrome as a consequence of adjusting to medical school or interpersonal relationships, decreased motivation, academic pressure or the pressure of expectations. [9, 10] Furthermore, perfectionism is considered one of the personality traits that may play an important role in leading to burnout in some persons. [11, 12] This characteristic is a double-edged sword: on the one hand, it can be a positive / adaptive trait that motivate a person to achieve the best performance that they could anticipate, while on the other hand, it can be a negative/ maladaptive trait that bring about frustrations and negative emotions if they are unable to attain their goals and can even lead to mental health and behavioral problems. [13, 14]

Medical students tend to have a high achievement expectation and high standard of perfectionism that they may strive for, which are very necessary and beneficial for the medical profession when attending to patients with high levels of skills, knowledge, and associated responsibilities. Consequently, these perfectionism traits are commonly found in medical students. [15 - 17] In addition to perfectionism, burnout in medical students can occur and may be correlated with imposter syndrome (IS) in some. [18, 19] IS is related to an apprehension characterized by internal fear and anxiety of being revealed as a fraud in that they are not talented enough or do not deserve to be in that demanding and high-level profession. [20] Medical students with IS are more at risk of experiencing burnout syndrome. Moreover, IS can relate to perfectionism, which is a trait that is regarded as a risk factor for imposter syndrome development. [21 - 23] Consequently, researchers have aimed to investigate the relationship between perfectionism and burnout syndrome, including considering imposter syndrome as a mediator in this relationship. As a result, this can be critical in educational and clinical settings, allowing for prevention and intervention strategies development which are valuable for improving the well-being and mental health of students. For instance, stress management programs, work-life balance initiatives, and changes in organizational teaching culture and style to reduce risks of study-related burnout in preclinical medical students

Materials and methods
Participants
This research was a cross-sectional study that used a questionnaire as the key research instrument for data collection. In August 2023, the questionnaires were sent to preclinical medical students (first-, second-, and third-year students) at the Faculty of Medicine Siriraj Hospital, Mahidol University, Thailand. To calculate the required sample size needed for the study, Fisher' exact test was performed, and the appropriate sample size was determined as 175. However, to cover potential dropouts from incomplete responses, either random dropouts or incomplete forms, the sample size was supplemented by 10.0%, and thus represented 193 participants. After data gathering and recruitment process, the completed responses were 185, which is higher than the calculated sample size from the Fisher' exact test.

Research instruments
The survey questionnaire comprised four parts, described below.

Demographic questionnaire, consisting of the year of education of the medical student and their gender.

Revised almost perfect scale (RAPS), covering 23 items [24] that were self-reported with a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), separated in to three subscales of perfectionism: high standards, order, and discrepancy. The overall reliability of the RAPS was 0.90. [25]

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Thai version of the Clance Imposter Phenomenon Scale (CIPS), consisting of 20 items that were self-reported with a six-point Likert scale from 1 (not all true) to 6 (very true). The overall reliability was 0.946. [26]

Thai version of the Copenhagen Burnout Inventory-Student Survey (CBI-SS), measuring burnout syndrome in students in four areas: personal burnout, study-related burnout, colleague-related burnout, and teacher-related burnout, and consisting of 25 items [27] that were self-reported on a scale ranging from 1 (never) to 5 (always). The overall Cronbach's alpha coefficient was 0.92. [28]

Data collection

This research has been approved by the Siriraj Institutional Review Board (SIRB), MU-MOU COA no.181/2566. Informed consent was provided by all participants before their participation in the study. The questionnaire was available in a paper-based format and online in Google Forms that could be accessed via a QR code, depending on the participants convenience and preference. All participants had the right to withdraw from the study at their will without any needing to give a reason. The collected data were anonymized for confidentially to ensure no personal information could be disclosed.

Statistical analysis

Statistical analysis was performed using Statistical Package for Social Science version 20 (SPSS v20) and Jamovi software. The demographic data and research variables were reported by descriptive statistics [mean, standard deviation (SD), minimum, maximum, and percentage]. Pearson's correlations were conducted to examine the relationship between variables. Structural equation modeling (SEM) was performed via Jamovi software to examine the mediating effects.

Results
Demographic data of the participants

In total, 185 participants were included in the study, with almost approximate proportions in both the gender and study year **(Table 1)**. **Table 2** illustrates the research variables, which consisted of three subscales for the perfectionism score, indicating the tendency to strive for high standards (the expectation of a flawless result, leading to an enthusiasm for success or unrealistic expectations that could lead to failure, as reflected by positive and negative characteristics), order (desiring orderliness, neatness, and organization, reflecting positive perfectionism characteristics), or a feeling of discrepancy (an inconsistency between expectations and actual outcomes, which is a negative

Table 1. Demographic data of the participants (n = 185).

	Characteristics	**N**	**(%)**
Gender	Male	91	49.2
	Female	92	49.7
	Others	2	1.1
Year	1st year	62	33.5
	2nd year	63	34.1
	3rd year	60	32.4

Table 2. Descriptive data for the research variables (n = 185).

Variables	Mean (SD)	Min–max	N (%) Level
High standard perfectionism	35.6 (7.0)	12.0–49.0	171 (93.0)
Order perfectionism	19.7 (5.1)	5.0–28.0	162 (87.6)
Discrepancy perfectionism	44.8 (15.1)	17.0–79.0	105 (56.8)
Imposter syndrome	72.8 (14.4)	44.0–112.0	142 (76.7)
Personal burnout	2.9 (0.7)	1.0-4.8	119 (64.3) High
			66 (35.7) Low
Study-related burnout	3.0 (0.7)	1.0-4.7	130 (70.3) High
			55 (29.7) Low
Colleague-related burnout	2.3 (0.7)	1.0-4.2	60 (32.4) High
			125 (67.6) Low
Teacher-related burnout	1.9 (0.7)	1.0-4.7	37 (20.0) High
			148 (80.0) Low

characteristic). The IS average score was 72.8, indicating the respondents frequently experienced IS. As for burnout syndrome, the cut-off point was equal to 2.5 of the average score in each component. The average scores for personal burnout and study-related burnout were 2.9 and 3.0, indicating a tendency toward high levels in both components, while the scores for colleague-related burnout and teacher-related burnout were 2.3 and 1.9, respectively, indicating a tendency toward low levels in both components.

Relationship between perfectionism and burnout syndrome

Table 3 presents the relationships between the study variables. It was found that discrepancy perfectionism had a positive correlation with IS ($r = 0.678$, $P < 0.01$) and for all the components of burnout syndrome, i.e., personal burnout, study-related burnout, colleague-related burnout, and teacher-related burnout (all components, $P < 0.01$).

Role of imposter syndrome as a mediator between perfectionism and burnout

Table 4 shows the fit indices for the SEM analysis, which indicate the fit of the model. The first SEM analysis showed a standard root mean square residual

(SRMR) score of 0.079, i.e., at an acceptable level of < 0.08, while the comparative fit index (CFI) was 0.87, i.e., slightly less than the good fit index at > 0.90, and the goodness of fit index (GFI) and adjusted goodness of fit index (AGFI) were 0.996 and 0.989, i.e., at the good level of > 0.90. However, the order perfectionism subscale was found to be non-significant in this model ($\beta = -0.07$, $P > 0.05$). Consequently, a second SEM analysis was performed without the order perfectionism subscale. The results show that the SRMR was 0.059, i.e., at an acceptable level of < 0.08, while the CFI rose to 0.93, indicating a good fitting index > 0.90, and the GFI and AGFI were 0.997 and 0.99, i.e., at a good level of > 0.90.

Table 5. The first mediation analysis, with IS as a mediator, perfectionism as a predictor variable, and burnout syndrome as a dependent variable. The direct effect of perfectionism on burnout syndrome was significant ($\beta = 0.239$, 95% CI = [0.027, 0.141], P < 0.01), and the indirect effect of perfectionism on burnout syndrome via IS was positive with significance ($\beta = 0.246$, 95% CI = [0.022, 0.015], P < 0.01).

Table 6 shows the second analysis. The results show that the direct effect pathway of perfectionism to burnout syndrome was significant ($\beta = 0.302$, 95%CI = [0.025, 0.016], $P < 0.01$), and the indirect

Table 3. Spearman's correlation coefficients between variables (n = 185).

Variables	2	3	4	5	6	7	8
HS Per	0.277**	0.273**	0.166**	0.124	-0.071	0.066	-0.143
O Per	-	-0.008	-0.033	0.021	0.097	0.134	0.087
Dis Per		-	0.678**	0.538**	0.335**	0.380**	0.236**
IS			-	0.475**	0.383**	0.300**	0.280**
PS B				-	0.648**	0.429**	0.320**
StudyB					-	0.287**	0.400**
Coll B						-	0.429**
Teach B							-

** $P < 0.01$.

HS Per, high standard perfectionism score; O Per, order perfectionism score; Dis Per, discrepancy perfectionism score; IS, imposter syndrome score; PS B, personal burnout score; Study B, Study-related burnout score; Coll B, colleague-related burnout score; TeachB, teacher-related burnout score.

**Table 4.** Fit indices and R^2 from the structural equation modeling (SEM).

Fit indices	1st Analysis	2nd Analysis
Standard root mean square residual (SRMR)	0.079	0.059
Comparative fit index (CFI)	0.870	0.930
Goodness of fit index (GFI)	0.996	0.997
Adjusted goodness of fit index (AGFI)	0.989	0.990
R^2	0.382	0.397

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Table 5. First mediation analysis.

Type	Effect	SE	95% CI		β	P - value
			Lower	Upper		
Indirect effect	Perfectionism → IS → Burnout syndrome	0.033	0.022	0.015	0.246	0.008**
Component	Perfectionism IS →	1.214	2.294	7.051	0.540	< 0.001***
	IS → Burnout syndrome	0.004	0.010	0.027	0.456	< 0.001***
Direct effect	Perfectionism → Burnout syndrome	0.029	0.027	0.141	0.239	0.004**
	1st analysis R = 0.618, R² = 0.382					

*** $P < 0.001$, ** $P < 0.01$; SE, Standard error.
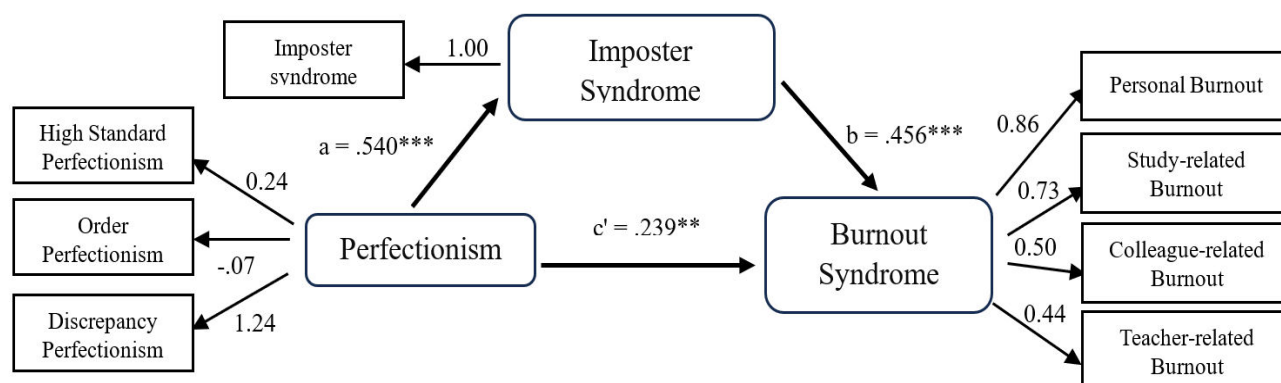
Figure 1. A first mediation of the SEM model, with perfectionism as an independent variable, imposter syndrome as a mediator, and burnout syndrome as a dependent variable.

Table 6. Second mediation analysis.

Type	Effect	SE	95% CI		β	P - value
			Lower	Upper		
Indirect effect	Perfectionism → IS → Burnout syndrome	0.031	0.014	0.135	0.246	0.02**
Component	Perfectionism → IS	1.170	2.400	6.920	0.619	< 0.001***
	IS → Burnout syndrome	0.005	0.007	0.026	3.32	< 0.001***
Direct effect	Perfectionism → Burnout syndrome	0.034	0.025	0.016	0.302	0.007**
	2nd analysis R = 0.630, R² = 0.397					

effect of perfectionism on burnout syndrome via IS was also positive with significance ($\beta = 0.246$, 95%CI = [0.022, 0.015], $P < 0.05$). These two results presented the same direction stating that IS partially mediated the relationship between perfectionism and burnout syndrome. Additionally, the R² values from the two models were 0.382 to 0.397, which indicated that perfectionism and IS can predict the occurrence of burnout syndrome by about 38.2% - 39.7% probability.

Discussion

This research illustrated that perfectionism is positively correlated with burnout syndrome, especially discrepancy perfectionism. This finding is congruent with previous studies, which found that perfectionistic concerns or discrepancy perfectionism have a positive correlation with burnout [29], particularly academic burnout in medical students. [30] Discrepancy perfectionism is a maladaptive form of perfectionism, which not only have a predictive contribution to play on burnout [14] but are also strongly related to interpersonal problems. [31] This characteristic may make individuals prone to stress, depression, negative
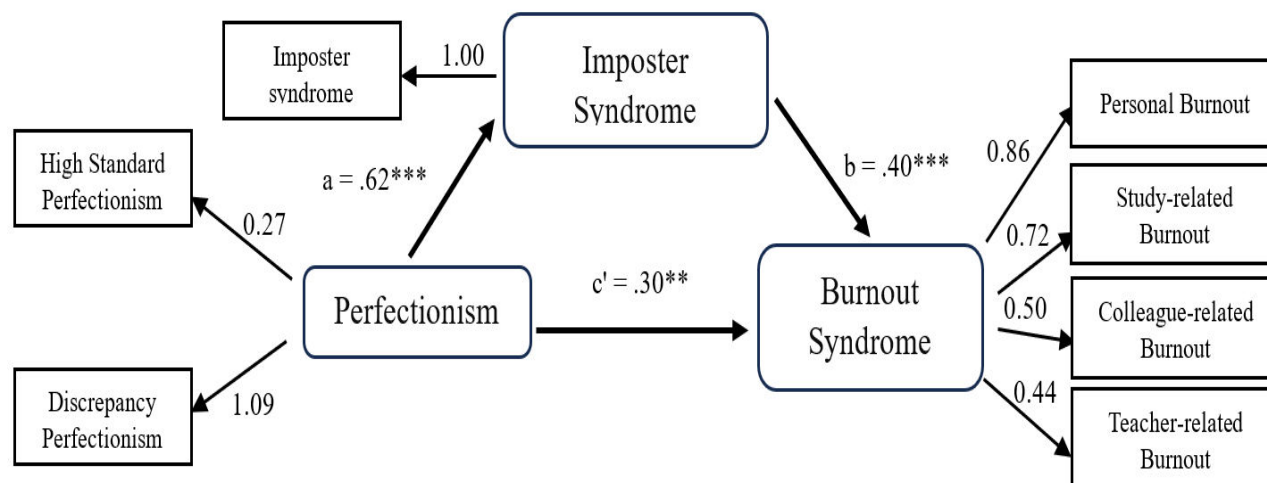
Figure 2. The second mediation of the SEM model, with perfectionism as an independent variable, imposter syndrome as a mediator, and burnout syndrome as a dependent variable.

emotions, and burnout with heightened concerns over mistakes, past failure rumination, fear of social reaction to their imperfections, and a feeling of discrepancy between the high standards they aim for and their actual abilities. Unlike discrepancy perfectionism, high standards perfectionism (a perfectionistic striving or adaptive form of perfectionism) may be a protective factor against burnout development, as indicated by striving for high standards without self-criticism when faced with failure. It is also correlated with some positive variables. For example, self-control, life satisfaction, motivation, and an adaptive coping style, which may indicate it as a beneficial form of perfectionism. [30, 32] Adaptive perfectionism was found to be correlated with a lower level of burnout. [33, 34] On the other hand, maladaptive perfectionism was negatively correlated with life satisfaction, which can cause psychological distress [35], and it is not only related to burnout, but can also predict psychological distress, such as depression, anxiety, and suicide. [36, 37]

When considering the association of perfectionism and burnout syndrome, the research findings show that IS has a partial mediating effect on this relationship. Maladaptive perfectionism was not only positively correlated with IS, but also strongly contributed to predicting IS. In a prior study, it was found to be an underlying cause of IS. [38] Impostors may feel that they want to be special or the best, reflecting perfectionism expectations in every aspect of their life to be perfect and flawless, but they also experience a fear of failure, and avoidance of criticism. [39] Individuals with these characteristics are more likely to be at risk of IS. [40, 41] Perfectionists

seem to continually be able to improve their performance, which also reflects IS thoughts and feelings, whereby perfectionism and IS reflect some of each other's characteristics. Furthermore, IS can predict negative emotions or psychological distress, such as anxiety, depression, and burnout [42], especially when persons are faced with disappointments or failures. Impostors often feel unsatisfied with their overall performances, perceiving them as less successful, and tend to overgeneralize a few mistakes as a total failure. As a result, these eventually lead to stress, decreased performance, and burnout syndrome. The result was found that IS has a partial mediation effect in this relationship, indicating that IS may take part as an associated factor in perfectionism and psychological distress, which is burnout. As for perfectionism, especially discrepancy or maladaptive perfectionism was found to be directly positive related to burnout syndrome as previous mentioned, IS seemed to be as a one of factor that may increase or trigger risks of burnout feeling expedite occurring.

This research was a cross-sectional study, with a single point of collection. Longitudinal studies that follow wider populations or expanded cohorts to clinical study would provide more beneficial information on how these variables may progress with the different study styles in preclinic and clinic year students, including the association between perfectionism and burnout syndrome. Moreover, further studies that examine the interaction of related variables to perfectionism would be valuable, such as incorporating cultural and social factors. The related factors in imposter syndrome and burnout syndrome should also be investigated, such as self-efficacy

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or self-esteem, as this could lead to a deeper comprehension of the progression of burnout syndrome. This research aimed to study specific populations, which were preclinical medical students of the Faculty of Medicine Siriraj Hospital, Mahidol University. Therefore, different populations should be studied to compare the differences. In summary, these findings provide valuable insights on this topic, but it is essential to be aware of the study limitations. Thus, future studies should aim to address these limitations with more comprehensive and longitudinal processes to better understand the complex dynamics between variables.

Conclusion

Preclinical medical students have a tendency toward burnout, in particular at high levels in terms of personal burnout and study-related burnout. Discrepancy perfectionism was found to have a positive correlation with the four components of burnout syndrome. In addition, imposter syndrome was found to partially mediate the relationship between perfectionism and burnout syndrome.

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Conflicts of interest

The authors confirm they have no conflicts of interests to declare.

Data sharing statement

Data sharing statement. All data generated or analyzed during the present study are included in this published article. Further details are available for noncommercial purposes from the corresponding author on reasonable request.

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