**Academic burnout among medical students: Respective importance of risk and protective factors**

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**Declaration of interest**

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**Highlights**

* Academic burnout has a high prevalence among medical students.
* Academic burnout significantly changed according to the study year.
* Perceived stress was a strong risk factor for academic burnout.
* Cognitive empathy had a double edge effect on academic burnout.
* Perceived social support had a modest protective impact on academic burnout.

**Abstract**

**Objectives**

Prior research has found a high prevalence of academic burnout among medical students (33-55%), and medical education institutions have begun to address the issue. In this research, we hypothesized an increase in academic burnout during medical education, as supported by previous findings. The second purpose was to identify the significant predictors (among perceived stress, empathy, and perceived social support) of academic burnout and determine their respective importance.

**Study design**

The study design was a cross-sectional online and anonymous survey.

**Methods**

We recruited medical students (*N*=342) from four education year-groups (i.e., Bachelor 1 & 3; Master 1 & 3). All participants voluntarily responded to our anonymous study and filled in four questionnaires assessing academic burnout, perceived stress, empathy, and perceived social support. We performed a MANOVA on academic burnout and hierarchical regression analyses to determine the respective importance of risk and protective factors of academic burnout.

**Results**

We found that two academic burnout domains (i.e., emotional exhaustion and cynicism) significantly changed according to the study year. Cynicism increased as the academic years progressed (*F(3,334)* = 9.50; *p* < .001), and emotional exhaustion was highest at critical graduation moments during the academic curriculum (i.e., Bachelor 3 and Master 3; *F(3,334)* = 11.2; *p* < .001). Overall, women presented higher academic burnout traits than men (***ᴧ***= .963; *F(3,332)* = 4.26; *p* = .006), but univariate analysis revealed that they especially displayed higher emotional exhaustion (*F(1,334)* = 12.1; *p* < .001). Hierarchical regression analyses showed that perceived stress, cognitive empathy, and perceived social support were significant predictors of academic burnout. We found that perceived stress was a major predictor of academic burnout (from 10 to 28% of the part of variance) in comparison to other factors such as empathy (around 5%) and perceived social support (around 6%).

**Conclusions**

We found that emotional exhaustion and cynicism significantly changed over medical education and that women presented greater vulnerability than men for emotional exhaustion. Furthermore, risk and protective factors of academic burnout were identified: (1) perceived stress was a decisive risk factor; (2) paradoxically, cognitive empathy had a double edge nature (the two cognitive empathy domains had opposite effects); (3) lastly, perceived social support was identified as a protective factor. Thus, a novel dimension of this research was to investigate and describe the importance of several predictors of academic burnout. The implications are crucial for education, and several recommendations are discussed to prevent academic burnout.

**Keywords**

Academic burnout; Stress; Empathy; Social Support; Educational Improvement.

**Introduction**

Individuals present salient difficulties associated with burnout when they are exposed to chronic professional stressors.1 Burnout is described in terms of three main components: emotional exhaustion, depersonalization or cynicism, and decreased sense of personal accomplishment.1,2 Emotional exhaustion has been defined as “*feeling emotionally depleted by one’s work, which can result in both psychological and physical symptoms of fatigue*.” The depersonalization/cynicism component refers to “*treating others as impersonal objects or diagnoses rather than as people*.” Lastly, the decreased sense of personal accomplishment is described as “*feeling a lack of intrinsic work-related satisfaction*.” 3(p296)

Burnout has been studied among physicians,4 nurses,5 and medical and nursing students.6,7 While authors have estimated that between 25% and 75 % of physicians present symptoms of burnout,8-13 Frajerman et al. estimated its presence to be between 33.4% and 55% among medical students.14 However, despite the burnout phenomenon’s breadth, it is still not recognized as an official diagnosis in the *Diagnostic and Statistical Manual of Mental Disorders*, *Fifth Edition*,15 or in the *International Classification of Diseases, 10th Revision.*16 Instead, burnout is a significant factor influencing individuals’ health status or influencing recourse to health services14 and is recognized as a type of psychological stress.17 Therefore, it is not yet possible to establish a precise rate of burnout within the population.18 As it is a public health event of international concern, it raises substantial interest in scientific research. Through a meta-analysis and systematic review, West et al.19 showed that physician burnout has reached epidemic levels and has several adverse effects on patient care, professionalism, physicians’ health and safety, and healthcare systems’ viability. Beneficial interventions are thus needed to prevent and reduce this phenomenon. The same negative impacts are found among residents and medical students.20 In a recent study, Dyrbye et al. mentioned that there is a moral and public health imperative to reduce medical students’ burnout and depression, and actions are required for their sake, the sake of society, and the patients to whom these students provide care and cure.20

Nevertheless, studying the phenomenon among various populations remains crucial. Several authors pointed out that burnout is strongly associated with major depression, suicide ideas or suicide, and/or substance abuse.21,22 In our study, we focused our investigation on medical students for two main reasons: (1) there is a high prevalence rate of burnout symptoms among this population; (2) education is considered to be a work-like activity: students attend classes, produce papers, and have to fulfill several requirements.23,24 In line with this, Schaufeli et al. have defined burnout among students as “*feeling exhausted because of study demands, having a cynical and detached attitude toward one’s study, and feeling incompetent as a student.*”25(p465) Furthermore, medical students suffering from burnout are reported to be less effective at an educational and professional level.26 They present more school failure and more absenteeism, and they drop out of school more frequently.27,28 They are more prone to adopting unprofessional attitudes, which manifests in behaviors such as cheating or cribbing.26 They also provide less accurate medical care and commit more medical errors.12,29 Moreover, people with higher burnout scores had a higher propensity to consume substances such as alcohol, tobacco, and/or drugs.30-33 Despite these performance declines, the fear of stigma leads few medical students to ask for help.34

***Factors influencing burnout***

Stress is a major predictor of burnout.1,35-38 Lazarus and Folkman defined stress as a “*transactional process occurring when an event is perceived as relevant to an individual’s well-being, has the potential for harm or loss, and requires psychological, physiological, and/or behavioral efforts to manage the event and its outcomes.*”39(p19) They described stress in terms of two main components: (1) the perceived stress (i.e., perceiving and identifying a stressful situation), and (2) the perceived control (i.e., assessing resources to face a stressful situation).

Several studies focused on perceived stress. For instance, Dahlin, Joneborg, and Runeson40 have studied the link between perceived stress and burnout among medical students, and Santen et al.36 have shown that stress positively and significantly predicts burnout. Fares et al.38 claimed that burnout results from an interaction between stressful personal life events (e.g., financial concerns, negative personal life events, personal illnesses, or family stressors); internship-specific stressors (e.g., first death experience or human dissection); and academic stressors (e.g., poor learning environment, inadequate support from faculty, poor supervision, mistreatment, competition, high stake assessments, or uncertainty). Furthermore, as individuals from the general population, medical students face major personal life events (e.g., illnesses, deaths of family members, or children’s births), contributing to anxiety, depression, and substance abuse.41,42

Recently, authors determined that age,43,44 gender,45,46 and year of study30 represent three variables influencing the burnout phenomenon. People advancing in age tended to present more burnout traits.43,44 Concerning gender, women showed significantly higher emotional exhaustion scores,45,46 while men displayed significantly higher depersonalization scores and lower personal accomplishment scores.30,45,47 Lastly, several authors reported a main effect of the year of study on burnout: academic burnout significantly increased from the first year to the last year of study.3,36,48

***Empathy and academic burnout***

Paro et al.46 pointed out that burnout had negative impacts at a relational level: people suffering from burnout reported lower empathy scores. Empathy is defined as “*the ability to experience and understand what others feel without confusion between oneself and others.*”49(p1146) Jean Decety50(p1) divided the empathy phenomenon into three main components: affective sharing (i.e., “*the capacity to share the other’s emotional state in terms of valence and arousal*”), perspective taking (i.e., “*the ability to consciously put oneself into the mind of another and understand what that person is thinking or feeling*”), and empathic concern (i.e., “*the motivation to care for another’s welfare*”). Empathy is crucial in human relationships51,52 and clinical settings. Professionals with high degrees of empathy are reported: (1) to be more accurate in their diagnoses, (2) to positively influence the patients’ engagement in their health care, and (3) to improve their patients’ adherence to the treatment plan and attention to their health.50,53,54 Recently, authors found that empathy skills among medical students were strongly influenced by the intergroup bias55 and facilitated by focusing (i.e., an embodied practice where one attends to a bodily felt sensation and uses it to understand the self and situations).56 Significant links were also found between empathy and burnout. For instance, Lamothe et al.57 reported that the perspective-taking and empathic concern components negatively predicted burnout, while personal distress, another domain associated with affective empathy, positively predicted burnout.3 In other words, perspective-taking and empathic concern might be considered as protective factors from burnout, while personal distress is instead a risk factor.

In line with the significant links mentioned previously between empathy and burnout, it is essential to investigate both factors in a medical student population. This is especially important because several authors reported an empathy decline among medical students during their educational curriculum.52,58-62

***The role of perceived social support***

As a social species, perceived social support (PSS) appears as a protective factor from mental disorders. PSS promotes mental health63 and stimulates better clinical outcomes in alexithymia and openness to emotions,64 in depression, schizophrenia, bipolar, and anxiety disorders.65 Bruchon-Schweitzer66 and Procidano & Heller described PSS as “*the impact networks have on the individual*” and defined it as “*the extent to which an individual believes that his/her needs for, support, information, and feedback are fulfilled.*”67(p2) PSS was reported to reduce the three burnout components: emotional exhaustion,68 depersonalization, and a decreased sense of personal accomplishment.69

To our knowledge, no research has yet been conducted to investigate whether perceived stress, empathy, and PSS, taken together, significantly predicted academic burnout and studied the part of variance explained by these factors in a population of medical students.

**Hypotheses**

In summary, this research aimed to study the significant changes in academic burnout according to gender and the years of study and the predictive effects of perceived stress, empathy, and PSS on academic burnout. We hypothesized we would find a significant increase of academic burnout from the first year of study to the last one,3,36,48 and, in the predictive design: (1) that perceived stress would have a highly significant predictive effect on academic burnout;35,36,38 (2) that perspective-taking and empathic concern would have significant adverse predictive effects on academic burnout,57 while personal distress would have a significant and positive predictive effect;3 and (3) that PSS would significantly reduce academic burnout.68,69 A novel dimension of this research was to analyze the respective importance of risk and protective factors (i.e., the part of variance explained by these factors) on academic burnout among medical students.

**Method**

***Participants***

Initially, three hundred and forty-three medical students voluntarily participated in this anonymous study. They were recruited via email and through an advertisement on the university campus. Following our inclusion criteria, only one 48-year old participant was removed from the study. Therefore, the final sample (*N* = 342) was composed of 253 women and 89 men (*Mage* = 21.7; *SDage* = 2.80). The participation rate was 25% (overall, 1369 students (*nwomen* = 835) were registered in medicine at the University of Liège (Belgium) during the 2018-2019 academic year. Through a cross-sectional design, participants were selected from four education year-groups: first (*n* = 83, women = 60) and third (*n* = 96, women = 69) years of Bachelor; first (*n* = 92, women = 73) and third (*n* = 71, women = 51) years of Master. It is important to note that the medical school curriculum at the University of Liège (Belgium) consists of three years of Bachelor and three years of Master. Since 1998, 48 European countries follow the Bologna Process (BP) in higher education. BP introduces a three-cycle higher education system consisting of Bachelor’s, Master’s, and Doctoral studies. The main purpose of the BP is to ensure mutual recognition of qualifications and to promote student exchanges between universities.

The inclusion criteria were active enrollment as a medical student at the University of Liège (Belgium), minimum age 18, maximum age 35 years old, and French fluency. Students were recruited from amphitheaters and by email. Those who agreed to participate received a link to complete the anonymous online survey.

The “Hospitalo-facultaire” Ethics committee approved this study (Reference: 2019/77). All participants received information about the aims and the scope of the study. The study was anonymous, and study data were protected. Because we anonymously assessed academic burnout, we provided addresses of help services and phone numbers of hotlines to all participants at the end of the participation period.

***Materials***

We measured four main variables from our medical students’ sample: academic burnout, perceived stress, empathy, and PSS (see Table 1).

[TABLE 1 ABOUT HERE]

***Demographic variables***. We collected self-reported gender, age, and psychiatric history were collected. Note that we asked participants to report if they have a psychiatric history (i.e., a psychiatric disorder diagnosed by a psychiatrist or a psychologist) and briefly describe it.

***Academic Burnout.*** The “Maslach Burnout Inventory, Student Survey” questionnaire assesses academic burnout,25 French version.70 It contains fifteen items that refer to three domains: emotional exhaustion, which refers to emotional fatigue due to the requirements of one’s studies (five items); cynicism, which is defined as a detached attitude towards one’s studies (four items); and academic effectiveness, which describes the sense of achievement as a student (six items; all items of this domain are reverse scored). This scale is a self-reported measurement with a seven-point Likert scale, from 0 (never) to 6 (always). High scores on emotional exhaustion and cynicism and low scores on academic effectiveness are indicative of burnout.

***Perceived Stress.*** The ‘‘Higher Education Stress Inventory’’ assesses perceived stress.40 This is a 33-item scale where participants are asked to respond to each item on a four-point Likert scale ranging from 1 (totally disagree) to 4 (totally agree).

***Empathy.*** The “Interpersonal Reactivity Index” measures empathy,71,72 French version.73 It is a self-reported measurement composed of twenty-eight items (9 items are negatively keyed) and uses a five-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). The IRI assesses four domains exploring the affective and cognitive aspects of empathy. The affective aspect is explored by the Empathic Concern and Personal Distress domains, while cognitive empathy is evaluated through the Perspective-Taking and Fantasy domains.

***Perceived Social Support.*** The “Multidimensional Scale of Perceived Social Support” is a 12-item questionnaire assessing PSS,74 French version.75 Participants are invited to respond on a seven-point Likert scale ranging from 1 (completely disagree) to 7 (strongly agree), and a total score is calculated.

***Statistical procedures***

We performed a MANOVA on academic burnout with gender and year of study as independent variables and Bonferroni’s *posthoc* tests using SPSS version 27.76 Then, hierarchical regression analyses were run on academic burnout. Each domain of academic burnout was introduced separately as a dependent variable with the following four blocks of predictors. The demographic variables block (Step 1): gender (coded 0 for men and 1 for women); age; psychiatric history (coded 0 for none and 1 for those who had reported a psychiatric history); the empathy block (Step 2): empathic concern, personal distress, fantasy and perspective-taking; the PSS block (Step 3); and the perceived stress block (Step 4). We used the Jamovi computer software version 1.6.3.77

Find the raw data file here; DOI: 10.17605/OSF.IO/BQTYX.

**Results**

***Changes in academic burnout***

The MANOVA revealed two significant main effects for gender (*ᴧ* = .96; *F(3,332)* = 4.25; *p* = .006; *η²p* =.045) and year of study (*ᴧ* = .84; *F(9,808)* = 6.9; *p* < .001; *η²p* =.045), and no significant interaction effect was found between gender and year of study (*ᴧ* = .989; *F(9,808)* = .401; *p* = .935). See Table 2 for descriptive statistics and Table 3 for MANOVA results. Significant gender differences were especially found for the emotional exhaustion domain (*F(1,334)* = 14.9; *p* < .001; *η²p* =.043). Overall, women displayed significant higher emotional exhaustion scores than men (*Mwomen* = 17.8; *SEwomen* = .387; *Mmen* = 14.8; *SEmen* = .652). Significant year of study differences were found for the emotional exhaustion (*F(3,334)* = 7.85; *p* < .001; *η²p* =.066, see Figure 1A) and cynicism (*F(3,334)* = 6.96; *p* < .001; *η²p* =.059, see Figure 1B) domains, but no significant differences were found for academic effectiveness (*F(3,334)* = .646; *p* = .586, see Figure 1C). Bonferroni’s *posthoc* tests were performed and significant differences were flagged on each figure.

[TABLES 2 & 3: ABOUT HERE]

[FIGURE 1: ABOUT HERE]

***Predictive variables of academic burnout***

We found that gender (*B* = 1.31; *p* = .038) and age (*B* = .22; *p* = .014) were significant predictors of emotional exhaustion (being a woman predicts higher emotional exhaustion scores) and academic effectiveness scores, respectively. Taken together, demographical variables had modest predictive effects on emotional exhaustion and cynicism (these variables explain 6 to 8% of the variance) and small predictive effects on academic effectiveness (around 2%).

Regarding empathy, we found that cognitive empathy had a double edge predictive effect on academic burnout: perspective-taking significantly predicted emotional exhaustion (*B* = -.13; *p* = .036) and academic effectiveness (*B* = .15; *p* = .005), but fantasy significantly and positively predicted cynicism (*B* = .11; *p* = .029). The part of variance explained by empathy was relatively modest, around 5% (see Table 4).

PSS significantly predicted all academic burnout domains (emotional exhaustion: *B* = -.05; *p* = .023; cynicism: *B* = -.06; *p* = .001; and academic effectiveness: *B* = .07; *p* < .001). Like empathy, the part of variance explained by PSS was modest (around 4% for emotional exhaustion, 6% for cynicism, and 7% for academic effectiveness, see Table 4).

Lastly, the hierarchical regression analyses showed that Perceived Stress was the strongest predictive variable of academic burnout (*B* = .41 for emotional exhaustion, .37 for cynicism, and -.18 for academic effectiveness; *p* < .001). The part of variance explained by Perceived Stress accounted for 28% for emotional exhaustion, 26% for cynicism, and 10% for academic effectiveness (see Table 4).

[TABLE 4: ABOUT HERE]

**Discussion**

***Academic burnout in medical education***

Academic burnout significantly differed between men and women. Indeed, women presented significantly higher scores than men, especially on emotional exhaustion. This result is in line with previous research showing the same pattern.38,45,46 We also found that academic burnout increased during specific years of study. Peak scores for emotional exhaustion were highest during the third year of the bachelor’s and master’s degrees. They represent critical moments in academic education because both are terminal degree-conferring years. Therefore, the higher academic requirements of these specific years may be factors that contribute to these increases. Recently, von Harscher et al.3 found a significant increase in emotional exhaustion and cynicism and a significant decrease in academic effectiveness over three years of medical school. We replicated the significant increase in cynicism; that is, students presented higher scores as the academic years progressed. As found in the regression analyses, it appears that the significant increase in cynicism is strongly predicted by perceived stress. We also found that fantasy (a cognitive empathy domain) positively predicted cynicism (see next section for detailed explanations). Concerning emotional exhaustion, as explained earlier, we found this increase to peak during graduation years. However, in contrast to the findings of von Harscher et al.,3 academic effectiveness did not significantly vary over the year of medical education.

***Predictors of academic burnout***

Considering demographic variables, gender and age predicted significantly academic burnout (respectively, emotional exhaustion and academic effectiveness). Previous research showed gender differences in burnout. However, our study partly replicates these previous findings. Like Worly et al.45 and Paro et al.,46 we found that women display higher emotional exhaustion scores than men, but contrary to Cecil et al.30 and Lapinski et al.,47 we did not found that men scored higher in cynicism and academic effectiveness.

Age was a positive predictor of academic effectiveness, meaning that getting older increases the feeling of competence in academic settings. As an interpretation, this age effect might be a function of academic progression, helping students gain confidence in their (medical) capacities. However, other authors found a different relation between age and burnout. People advancing in age tended to present more burnout traits.43,44 The observed discrepancy is probably due to the exclusion of the academic effectiveness domain in the study performed by Dyrbye et al.,43 the use of a 10-item burnout measure in Talih et al.’s experiment,44 and the longer age frame of Dyrbye et al.43 and Talih et al.’s 44 samples compared to ours.

Surprisingly, psychiatric history was not a significant predictor of academic burnout. A slight effect was only found in the cynicism domain: students who experienced psychological difficulties in the past (for most, mood disorders) might be more susceptible to presenting higher cynicism levels toward medical education. Psychiatric history has been poorly investigated as a risk factor in the field of burnout research. Only a few authors have shown that psychiatric history increased the degree of severity of burnout symptoms.78,79

It comes as no surprise that perceived stress was an important predictor of academic burnout. A clear consensus exists about the harmful effect of stress[[1]](#footnote-1) on mental health. Several authors found that stress significantly predicts burnout.34,36,38 Dahlin and Runeson also showed that perceived stress significantly predicted academic burnout of medical students.78 Our findings made it especially clear that its influence is major (from 10 to 28% of the part of variance) compared to other factors such as empathy and PSS. However, to our knowledge, no previous research showed its importance on academic burnout in contrast to other demographical variables, empathy, or PSS in a sample of medical students.

Our results also showed a double edge predictive effect of cognitive empathy on academic burnout. We found that perspective-taking was a protective factor of emotional exhaustion and academic effectiveness, while fantasy predicted cynicism increases. Our findings showed that having higher abilities to put themselves in someone else’s shoes predicted lower degrees of emotional exhaustion and higher degrees of academic effectiveness, which is in line with scientific literature.46,57,81,82 Lamothe et al.57 pointed out a key association: cognitive empathy and emotional regulation skills are protective factors from stress. Following these results, we speculate that emotional regulation skills probably mediate the relation between empathy and academic burnout. However, other findingsshed additional light on the role played by affective empathy by showing that personal distress and empathic concern, two affective empathy components, had opposite influences on academic burnout.3,83 Moreover, Decety et al. showed that people with higher affective sharing abilities but poor emotional regulation skills (i.e., people presenting frailties in affective empathy) are more likely to present higher degrees of personal distress, compassion fatigue, and burnout.83 According to their results, empathic concern played a protective role against academic burnout, while personal distress was a risk factor. These discrepancies between authors reveal the need for replication studies and identification of mediator factors influencing empathy and burnout.

In contrast to our expectations, higher fantasy levels (another domain of cognitive empathy) predicted an increase in cynicism. Fantasy had been defined by Davis as the “*tendency to become deeply involved in the fictitious world of books, movies, and plays*” 72(p115), and cynicism assesses people’s investment attitude or enthusiasm toward (medical) academic education. Therefore, according to our results, it seems that medical students who can become absorbed by fictional characters have a higher propensity to be less attracted to their medical curriculum. As an interpretation, we hypothesize that students presenting higher fantasy levels create higher ideals (generated from movies, TV shows, or books) concerning the medical profession. Those high expectations might contrast starkly with the reality of medical education, leading them to present marked cynical attitudes toward their education.

Lastly, PSS was a protective factor for all academic burnout domains, as Boren, Jacobs, and Dodd found.68,69 Several authors pointed out the positive effects of PSS on burnout,84,85 well-being,86 and emotional factors such as alexithymia.64 Karasek and Theorell87, in their Job Demand-Control-Support model, showed the importance of social support. As Alarcon et al. stated,88 PSS represents a great asset for helping students experiencing difficulties.

**Conclusion**

In conclusion, we showed that academic burnout presents significant differences over the medical education years, especially for emotional exhaustion and cynicism. Furthermore, as a common gender difference, we found that women scored higher in emotional exhaustion than men. Our study also supports the strong influence of perceived stress on academic burnout compared with empathy and PSS that were modest predictors. Finally, we found that cognitive empathy has a particular double edge effect on academic burnout and that PSS appears as a consistent protective factor.

In order to prevent academic burnout, a concomitant association of several conditions is required. Our findings showed the respective importance of several factors in predicting academic burnout. Therefore, educative settings should prevent students from stress by planning brief periods of acute stress rather than a long period of stress. Studies highlighted that planned acute stress appeared more controllable (e.g., “*anticipation and reappraisal reduce the stressfulness of an event by making its meaning more benign*”),90(p681) while chronic stress has more pernicious damage on physical and mental health.89-91 We recommend providing acute support cells for students during these critical periods. In addition, promoting empathy skills in medical education would be another recommendation. Although research on this subject is sparse, Bonvicini et al. showed that communication training sharply improved physicians’ empathic expression.92 More recently, Nasello and Triffaux found that focusing (i.e., an embodied practice where one attends to a bodily felt sense and uses it in understanding the self and situations) positively and significantly predicted empathy (especially cognitive empathy domains).56 As a crucial skill for medical professionals, these results show that empathy can be improved and integrated into the academic curriculum.

Furthermore, informative sessions explaining the concrete aspects of medical practice from several medical practitioners might help counteract fantasy’s effect on cynicism for future medical students. A third recommendation would be to promote PSS by developing peer support, an *esprit de corps* or peer solidarity among students, and a less competitive climate. Lastly, (non-invasive) specific attention should be devoted to women and students presenting a psychiatric history by displaying, for example, informative signs in the medical department of academic burnout risk factors and the available academic support.

These recommendations complete the ten strategies outlined by Dyrbye et al.20 New actions are emerging to reduce academic burnout, and several improvements in medical education are possible, even though some aspects still require further scientific investigations.

**Limitations and future directions**

This study presents several limits. First, our findings were derived from a cross-sectional and correlational design, and, therefore, our interpretations do not represent causal inferences. Second, our participation rate was 25%, which might also limit the generalizability of our results. Furthermore, the participation rate between men and women was different. This discrepancy might be explained by the initial higher rate of women registered in medicine (around 61%). However, more extensive investigations of gender differences in academic burnout are required to confirm our findings. Lastly, we invite readers to keep in mind that we collected self-reported measures and cannot exclude bias associated with self-assessment, such as social desirability. Nevertheless, qualitative studies might bring a significant complement of information.

Future studies might explore the potential mediating effect of emotion regulation in the empathy-academic burnout relationship. Furthermore, it is of huge interest to target and manipulate specific variables to determine their causal nature on academic burnout. Lastly, investigations are required to test the application of the suggested recommendations and their effects on academic burnout.

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|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Instruments** | **Items** | **α** |
| **Academic Burnout** | Maslach Burnout Inventory, Student Survey23,68 | 15 | .87 |
| Emotional Exhaustion |  | 5 | .84 |
| Cynicism |  | 5 | .84 |
| Academic Effectiveness |  | 5 | .67 |
|  |  |  |  |
| **Perceived Stress** | Higher Education Stress Inventory38 | 33 | .87 |
|  |  |  |  |
| **Empathy** | Interpersonal Reactivity Index69,70 | 28 | .83 |
| Empathic Concern |  | 7 | .75 |
| Personal Distress |  | 7 | .83 |
| Fantasy |  | 7 | .81 |
| Perspective-Taking |  | 7 | .79 |
|  |  |  |  |
| **Perceived Social Support** | Multidimensional Scale of Perceived Social Support72,73 | 12 | .92 |

**Table 1. Measurement instruments**

This table displays all instruments used in this study, the total number of items for each scale and their domains, and their respective Cronbach’s alphas.

**Table 2. Descriptive statistics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variables | *N* | *Mean* | *SD* | *Min* | *Max* |
| Age | 342 | 21.7 | 2.80 | 18 | 35 |
| Women | 253 | 21.7 | 2.78 | 18 | 35 |
| Men | 89 | 21.7 | 2.85 | 18 | 35 |
|  |  |  |  |  |  |
| Academic burnout |  |  |  |  |  |
| *Emotional Exhaustion* | 342 | 16.9 | 6.43 | 3 | 30 |
| Women | 253 | 17.6 | 6.25 | 3 | 30 |
| B1 | 60 | 16.4 | 6.05 | 5 | 28 |
| B3 | 69 | 19.1 | 5.40 | 3 | 30 |
| M1 | 73 | 15.2 | 6.18 | 4 | 29 |
| M3 | 51 | 20.3 | 6.24 | 4 | 30 |
| Men | 89 | 15 | 6.59 | 3 | 29 |
| B1 | 23 | 14.3 | 6.42 | 3 | 29 |
| B3 | 27 | 16.4 | 6.71 | 5 | 18 |
| M1 | 19 | 12.2 | 6.16 | 4 | 22 |
| M3 | 20 | 16.5 | 6.48 | 5 | 27 |
|  |  |  |  |  |  |
| *Cynicism* | 342 | 7.6 | 5.98 | 0 | 24 |
| Women | 253 | 7.84 | 5.87 | 0 | 23 |
| B1 | 60 | 5.22 | 5.12 | 0 | 23 |
| B3 | 69 | 8.8 | 5.85 | 0 | 23 |
| M1 | 73 | 7.44 | 5.33 | 0 | 21 |
| M3 | 51 | 10.2 | 6.30 | 0 | 23 |
| Men | 89 | 6.97 | 6.27 | 0 | 24 |
| B1 | 23 | 5.22 | 5.28 | 0 | 17 |
| B3 | 27 | 7.44 | 6.66 | 0 | 24 |
| M1 | 19 | 6.00 | 5.30 | 0 | 17 |
| M3 | 20 | 9.25 | 7.23 | 0 | 20 |
|  |  |  |  |  |  |
| *Academic Effectiveness* | 342 | 22.7 | 4.80 | 6 | 34 |
| Women | 253 | 22.5 | 4.57 | 6 | 33 |
| B1 | 60 | 22.6 | 4.64 | 12 | 33 |
| B3 | 69 | 21.6 | 4.35 | 6 | 32 |
| M1 | 73 | 23.4 | 4.50 | 13 | 33 |
| M3 | 51 | 22.2 | 4.72 | 11 | 33 |
| Men | 89 | 23.2 | 5.39 | 11 | 34 |
| B1 | 23 | 22.2 | 6.23 | 13 | 33 |
| B3 | 27 | 23.4 | 4.42 | 11 | 30 |
| M1 | 19 | 23.5 | 5.55 | 13 | 33 |
| M3 | 20 | 23.6 | 5.67 | 11 | 34 |
|  |  |  |  |  |  |
| Empathy |  |  |  |  |  |
| *Empathic Concern* | 342 | 27.7 | 4.25 | 11 | 35 |
| *Perspective Taking* | 342 | 25.3 | 4.72 | 8 | 35 |
| *Personal Distress* | 342 | 17.9 | 5.09 | 7 | 35 |
| *Fantasy* | 342 | 20.9 | 5.14 | 8 | 30 |
|  |  |  |  |  |  |
| Perceived Stress |  |  |  |  |  |
| *Total* | 342 | 52.1 | 9.24 | 28 | 74 |
|  |  |  |  |  |  |
| Perceived Social Support |  |  |  |
| *Total* | 342 | 68,2 | 13.8 | 23 | 84 |

**Table 3. Academic burnout: Multivariate Analysis of Variance**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variables** | **Type of test** | ***ᴧ*** | ***F*** | ***Df*** | ***p*** |
| **Academic burnout** | Multivariate |  |  |  |  |
| Gender |  | .963 | 4.26 | 3,332 | .006 |
| Year of Study |  | .835 | 6.9 | 9,808 | < .001 |
| Gender\* Year of Study |  | .989 | .401 | 9,808 | .935 |
|  |  |  |  |  |  |
| **Emotional Exhaustion** | Univariate |  |  |  |  |
| Gender |  | - | 12.1 | 1,334 | < .001 |
| Year of Study |  | - | 11.2 | 3,334 | < .001 |
| Gender\* Year of Study |  | - | .204 | 3,334 | .894 |
|  |  |  |  |  |  |
| **Cynicism** | Univariate |  |  |  |  |
| Gender |  | - | 1.51 | 1,334 | .220 |
| Year of Study |  | - | 9.50 | 3,334 | < .001 |
| Gender\* Year of Study |  | - | .217 | 3,334 | .885 |
|  |  |  |  |  |  |
| **Academic Effectiveness** | Univariate |  |  |  |  |
| Gender |  | - | 1.40 | 1,334 | .238 |
| Year of Study |  | - | 1.37 | 3,334 | .252 |
| Gender\* Year of Study |  | - | .792 | 3,334 | .499 |

**Table 4. Academic burnout: hierarchical regression analyses**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **Final B** | ***F*** | ***df*** | ***p*** | ***R²*** | ***ΔR²*** |
| **Emotional Exhaustion** |  |  |  |  |  |  |
| *Step 1: Demographic variables* |  | 7.51 | 3,338 | < .001 | .063 | - |
| Gender | 1.31 |  |  | .038 |  |  |
| Age | -.14 |  |  | .166 |  |  |
| Psychiatric history | .623 |  |  | .442 |  |  |
| *Step 2: Empathy* |  | 6.05 | 7,334 | < .001 | .113 | .05 |
| Empathic Concern | .01 |  |  | .197 |  |  |
| Personal Distress | .08 |  |  | .154 |  |  |
| Fantasy | .06 |  |  | .318 |  |  |
| Perspective Taking | -.13 |  |  | .036 |  |  |
| *Step 3: Perceived Social Support*  |  | 7.45 | 8,333 | < .001 | .152 | .04 |
| Total | -.05 |  |  | .023 |  |  |
| *Step 4: Perceived Stress*  |  | 28.1 | 9,332 | < .001 | .432 | .28 |
| Total | .41 |  |  | <.001 |  |  |
|  |  |  |  |  |  |  |
| **Cynicism** |  |  |  |  |  |  |
| *Step 1: Demographic variables* |  | 9.2 | 3,338 | < .001 | .076 | - |
| Gender | .01 |  |  | .984 |  |  |
| Age | .04 |  |  | .704 |  |  |
| Psychiatric history | 1.45 |  |  | .053 |  |  |
| *Step 2: Empathy* |  | 6.82 | 7,334 | < .001 | .125 | .05 |
| Empathic Concern | -.11 |  |  | .122 |  |  |
| Personal Distress | .08 |  |  | .143 |  |  |
| Fantasy | .11 |  |  | .029 |  |  |
| Perspective Taking | .01 |  |  | .879 |  |  |
| *Step 3: Perceived Social Support*  |  | 9.19 | 8,333 | < .001 | .181 | .06 |
| Total | -.06 |  |  | .001 |  |  |
| *Step 4: Perceived Stress*  |  | 28.9 | 9,332 | < .001 | .440 | .26 |
| Total | .37 |  |  | <.001 |  |  |
|  |  |  |  |  |  |  |
| **Academic Effectiveness** |  |  |  |  |  |  |
| *Step 1: Demographic variables* |  | 1.88 | 3,338 | .133 | .016 | - |
| Gender | -.27 |  |  | .629 |  |  |
| Age | .22 |  |  | .014 |  |  |
| Psychiatric history | -.78 |  |  | .274 |  |  |
| *Step 2: Empathy* |  | 3.02 | 7,334 | .004 | .06 | .04 |
| Empathic Concern | -.04 |  |  | .511 |  |  |
| Personal Distress | -.04 |  |  | .470 |  |  |
| Fantasy | .03 |  |  | .608 |  |  |
| Perspective Taking | .15 |  |  | .005 |  |  |
| *Step 3: Perceived Social Support*  |  | 6.11 | 8,333 | < .001 | .128 | .07 |
| Total | .07 |  |  | < .001 |  |  |
| *Step 4: Perceived Stress*  |  | 10.7 | 9,332 | < .001 | .224 | .10 |
| Total | -.18 |  |  | < .001 |  |  |

*Note.* This table displays all hierarchical regression analyses performed on academic burnout domains.

**Figure 1. Academic burnout and years of study**



Figure A

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Figure B



Figure C

This figure displays estimated marginal means of academic burnout domains (i.e., emotional exhaustion, cynicism, and academic effectiveness) over years of medical study (B1: Bachelor 1; B3: Bachelor 3; M1: Master 1; M3: Master 3). Standard errors are reported on each histogram. \*: *p* < .05; \*\*: *p* < .005.

1. Note that, to our knowledge, no study pointed out that stress has positive outcomes on academic performance or mental health (see, for instance, the Pascoe et al.’s narrative review).80 [↑](#footnote-ref-1)