

A Literature Review on Risk and Protection Factors of Burnout in Healthcare Students

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Abstract. The pandemic was a test of the boundaries and challenges to conventional practices in healthcare education systems. During the emergent pandemic situation, several critical decisions were promptly taken, disregarding students' consent. For instance, healthcare students were encouraged to serve as health volunteers. The surge in responsibilities led to an increase in burnout cases among students, a decline in motivation, academic achievement, and an inclination to consider dropping out or discontinuing education. This study aimed to investigate risk and protection factors contributing to burnout in healthcare students, categorizing the elements into intrinsic and extrinsic. The method employed a literature review following the PRISMA guidelines. Four databases, namely ProQuest, PubMed, Google Scholar, and DOAJ were searched in March 2022, leading to 18 articles meeting the criteria out of 3,835 initially identified. The results showed at least thirty factors contributing to burnout risk and protection, with two-thirds falling into intrinsic and the rest in the extrinsic group. The findings suggested that burnout in healthcare students primarily stems from internal factors rather than environmental influences. These results enhance the design of interventions to prevent and address student's burnout more effectively and efficiently.

Keywords: burnout, healthcare students, protection, risk

Kajian Literatur: Faktor-Faktor Risiko dan Proteksi *Burnout* pada Mahasiswa di Bidang Kesehatan

Abstrak. Pandemi telah menguji batasan sistem perawatan kesehatan dan menantang praktik konvensional dalam sistem pendidikan kedokteran yang telah lama berjalan. Beberapa keputusan penting terpaksa dibuat secepatnya, tanpa melibatkan masukan dan persetujuan dari mahasiswa karena berpacu dengan waktu dan kegawatan pandemi, seperti mendorong para mahasiswa di bidang kesehatan untuk terjun menjadi sukarelawan kesehatan. Ditemukan peningkatan kasus-kasus *burnout* pada mahasiswa di bidang kesehatan, yang berdampak menimbulkan kehilangan motivasi, penurunan prestasi, hingga keinginan putus atau tidak melanjutkan pendidikannya. Tujuan penelitian ini untuk mengungkap faktor-faktor risiko dan proteksi burnout pada mahasiswa di bidang kesehatan, serta mengidentifikasi faktor-faktor tersebut ke dalam dikotomi intrinsik dan ekstrinsik. Metode penelitian menggunakan kajian literatur mengacu panduan PRISMA. Pencarian literatur menggunakan empat pangkalan data: ProQuest, PubMed, Google Scholar dan DOAJ pada bulan Maret 2022. Terdapat 18 artikel penelitian yang memenuhi kriteria ditetapkan dari temuan awal sebanyak 3,835 artikel. Hasil penelitian menemukan terdapat 30 faktor yang berkontribusi sebagai risiko dan proteksi terhadap *burnout*, di mana sebanyak dua pertiga faktor teridentifikasi dalam kelompok intrinsik dan sisanya teridentifikasi dalam kelompok ekstrinsik. Temuan penelitian menyiratkan penyebab utama dari *burnout* pada mahasiswa di bidang kesehatan berasal dari internal individu, dibandingkan peran lingkungan. Hasil penelitian ini dapat menjadi panduan dalam merancang intervensi untuk mengatasi *burnout* khususnya bagi mahasiswa di bidang kesehatan. Intervensi yang dirancang berdasarkan identifikasi secara akurat terhadap faktor pemicu atau proteksi lebih efektif dan efisien dalam pelaksanaannya.

Kata Kunci: *burnout*, mahasiswa kesehatan, proteksi, risiko

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The COVID-19 pandemic continues to have a tremendous impact and is almost devastating to public healthcare services. Studies in various countries showed an increase in cases of burnout among students in healthcare field (Muaddi et al, 2023; Samara & Monzon, 2021; Silistraru et al, 2021; Sveinsdóttir et al, 2021; Zis et al, 2021). Burnout is a state of emotional and physical exhaustion due to excessive stress, associated with feelings of overwhelm, emotional depletion, and the inability to meet demands (Gaston-Hawkins et al, 2020). Burnout also stems from an ongoing response to chronic stressors and various interpersonal factors, leading to mental health issues such as fatigue, depersonalization, and decreased personal achievement (Pinho et al, 2021).

The pandemic is also instigating fear, uncertainty, and raising questions about the roles of medical students and other health-related pupils during the ongoing crisis that has persisted for several years (Khamees et al, 2020). The epidemic puts healthcare system to the test, challenging long-standing conventional medical education practices. Urgent decisions have to be made without seeking input and approval from students, driven by the severity of the pandemic at that time. For instance, healthcare students are being encouraged to volunteer directly in health services (Pinho et al, 2021). Healthcare professionals, workers, health residents, and multidisciplinary programs are struggling and directly engaging

in handling the disease. However, these efforts are raising concerns about their self-safety due to the potential risk of getting infected with the virus during direct contact with patients (Fessell & Cherniss, 2020).

Burnout is a highly forbidden and dangerous phenomenon for healthcare workers and students in the medical care field. According to Ishak et al. (2009), burnout significantly increases risk of errors in patient care when it occurs in healthcare workers, especially among students undergoing residency and field practices. This includes misdiagnosis, improper prescription, and mal procedures. Within the context of interpersonal relationships among the involved workers or students, burnout leads to friction, conflicts, and negative tension. Strict regulations in field practices and students residency at advanced levels cause delays and uncertainties, leading to frustration (Harries et al., 2021). The accumulation of frustration and burnout triggers the thoughts of quitting and discontinuing education, leading to a desire to switch to another career path (Karakachian & Colbert, 2019).

A previous review demonstrated that approximately 44% of medical students reported experiencing symptoms of burnout (Frajerman et al, 2019). Dyrbye et al. (2014) reasearch stated that medical students exhibited higher levels of burnout, depression, and lower quality of life compared to other academic programs. The World Health Organization

(WHO) classifies burnout as a medical condition and emphasizes that fatigue is more than general tiredness and addressed with temporary rest (Corpuz, 2022). Studies have shown burnout is not only solely treated as a consequence but also as a cause of other adverse outcomes, damages such as depression (Ernst et al., 2021; Talih et al., 2018), and suicidal thoughts (Ghosh et al., 2021; Gramaglia & Zeppegno, 2018).

Despite numerous studies on burnout, a literature search has not yet yielded a comprehensive compilation of these findings. This study aims to investigate the fatigue risk and protection factors in healthcare students, categorizing the elements into intrinsic and extrinsic groups. The categorization and deeper understanding of risk and protection factors will aid in developing more effective burnout management programs, encompassing both preventive and intervention-based methods.

Method

This study utilized a literature review method following the PRISMA (The Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, ensuring a clear and

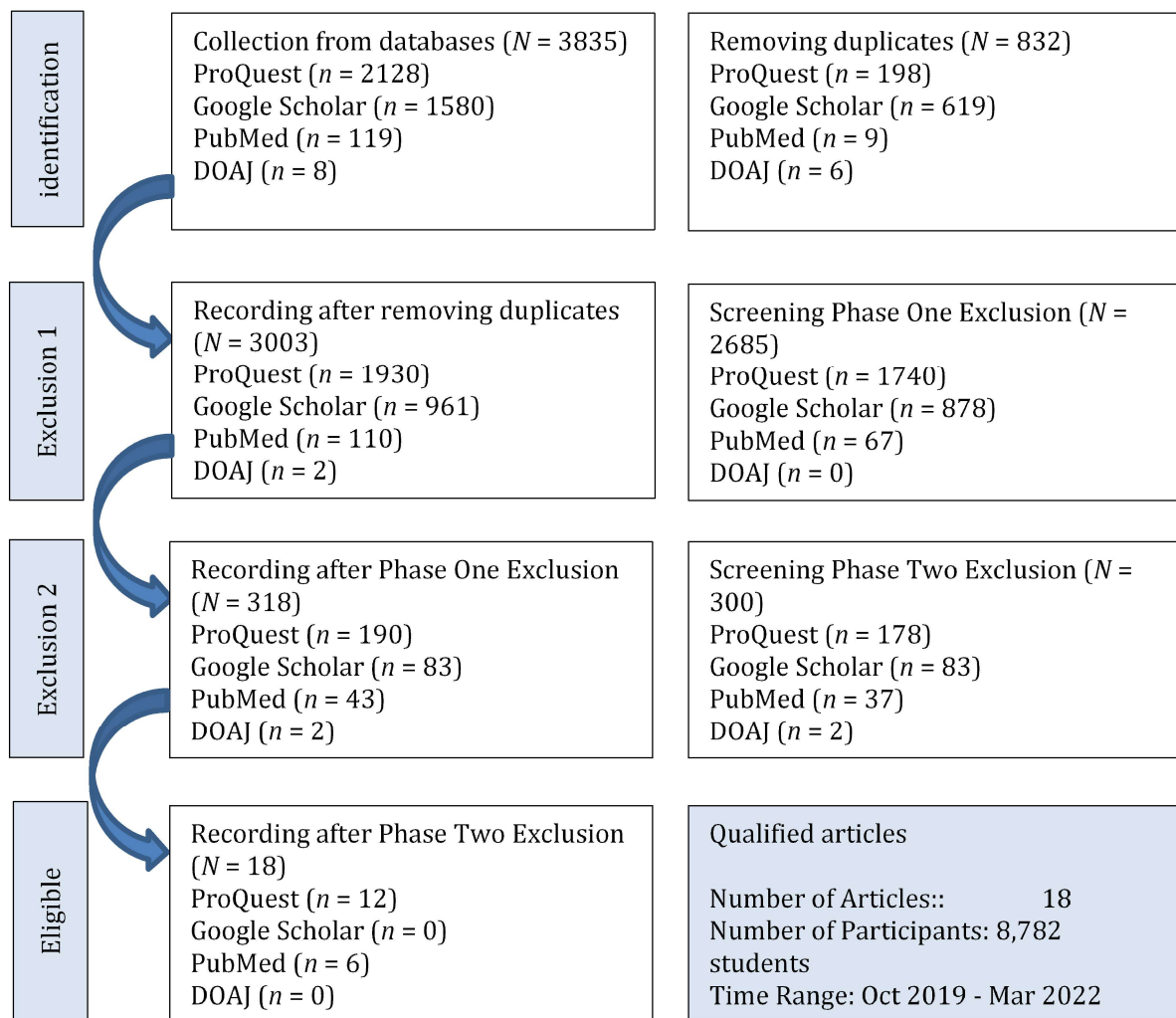
robust procedure (Page et al., 2021). Relevant articles were selected in four databases, namely ProQuest, PubMed, Google Scholar, and DOAJ, from March 15th to 21st, 2022. The article collection was carried out electronically, utilizing the keyword “students’ burnout” in a pandemic as the search engine.

Subsequently, the study applied exclusion criteria to sort the articles which were designed in two stages. In phase one, articles published before October 2019 which was the initial appearance of the pandemic in Wuhan, written in other languages except English, and those with irrelevant topics were all excluded. In phase two, articles focusing on respondents other than healthcare students and specific types of methods were excluded. The study specifically selected primary studies and avoided literature and systematic reviews, and meta-analyses to prevent review-after-review bias.

This study meticulously followed the step-by-step data collection procedure outlined in the PRISMA guidelines. Through the rigorous method, 18 relevant articles related to the study were successfully identified. The entire process of searching, identifying, sorting, and screening the data sources was visually represented in the following diagram:

Figure 1

Data Collection Procedure according to PRISMA Guidelines



After collecting 3,835 articles from the four databases, the study was left with 3,003 unique publications following the removal of 832 duplicated ones. During the Phase One Exclusion sorting process, the study excluded 2,685 articles based on publication year, language used, and topic relevance, leading to 318 pieces for further evaluation. In Phase Two Exclusion criteria, 300 articles were excluded based on respondent criteria of students in healthcare

fields and study methods. The study was left with 18 articles that met the criteria. This entire process was conducted manually and progressively.

Results

Study data

The table below presented eighteen articles that met this study's criteria. The table includes details such as the study writer's name

and year of publication, the aims, participants, locations, burnout measurement and

distribution instruments utilized, and the findings.

Table 1

Description of Study Data

Study	Aim	Participants	Burnout Instrument	Findings
<i>Abreu Alves, et al., 2022</i>	To examine the relationship model between coping strategies, satisfaction with social support, general stress on academic engagement, burnout, and dropout intentions.	532 medical students in Lisbon, Portugal	MBI – SS Sent electronically using the Lime Survey application.	Academic engagement weakens the impact of burnout on dropout intentions. Satisfaction with social support and adaptive coping enhance academic engagement, while general stress and maladaptive coping increase burnout.
<i>Chalikkandy, et al., 2022</i>	To assess burnout and its relationship with emotional regulation inability and social cognition.	108 medical students at King Khalid University, Saudi Arabia	CBI Sent by postal mail.	Emotional and social cognitive dysfunction significantly increases burnout levels.
<i>Duarte, et al., 2022</i>	To explore the mediating role of resilience and life satisfaction in the perceived stress and burnout experienced by students during the pandemic.	462 medical students in Northern Portugal.	OLBI Sent using Google Forms.	Resilience and life satisfaction play a mediating role in the relationship between stress and burnout dimensions.
<i>Forycka, et al., 2022</i>	To assess resilience, well-being, and burnout levels during the pandemic.	1,858 medical students in Poland.	MBI – GS Sent using the Study Gram method.	During the pandemic, most medical students showed low resilience and high burnout levels.
<i>Pereira, et al., 2022</i>	To analyze whether self-compassion plays a protective role in the relationship between perfectionism and burnout through mediation analysis.	528 medical students in Portugal.	MBI – SS Sent using Google Forms.	Self-compassion significantly mediates the relationship between all three forms of perfectionism and burnout, acting as a partial mediator in critical and rigid perfectionism and a full mediator in narcissistic perfectionism.
<i>Reed, et al., 2022</i>	To determine whether resilience levels and student’s health behaviours can predict burnout and GPA at the end of the semester during the pandemic.	108 pharmacy students at the University of Maryland, US	OLBI Instrument distribution not specified.	Resilience is positively associated with older students and negatively associated with students of colour. Burnout worsens over time. Resilience has inconsistent associations with burnout. The only health behaviour closely related to burnout is nutrition and sufficient sleep.

<i>Arif, et al., 2021</i>	To test the prevalence of psychological pressure, burnout and their relationship with gender, training phase, funding, cumulative GPA, and coping strategies.	748 medical students from USM, Malaysia & USM KLE, India	CBI Using paper and pen.	Male students in clinical years, self-funded (non-scholarship), with a cumulative GPA above 3.50, are predicted to be vulnerable to psychological pressure and burnout with varying outcomes. Maladaptive coping mechanisms consistently predict risk of psychological pressure and burnout more than twice.
<i>Kajjimu, et al, 2021</i>	To determine the prevalence of burnout and related influencing factors in its development.	145 medical students at Mbarara University, Uganda	MBI – SS Sent via WhatsApp group.	Intrinsic factors inhibiting burnout: (1) optimism about future careers, (2) job satisfaction and happiness, (3) willingness to pursue a degree, (4) satisfaction with the choice of medical studies, (5) motivation with the chosen studies. Key triggering factors for burnout: (1) tiring daily routines, (2) long-distance travel challenges to the university, (3) available free time, (4) being the backbone of the family.
<i>Khalafallah, et al., 2021</i>	To investigate the prevalence of burnout among US medical students interested in pursuing a neurosurgery residency during the pandemic.	254 medical students who are members of AANS, US	a-MBI Sent through an online survey.	Based on multivariate analysis, burnout is significantly related to uncertainty in continuing medical careers when given choices, having alternative career thoughts, and expecting clinical practices to worsen in the future.
<i>Naderi, et al., 2021</i>	To predict academic burnout based on an individual's sleep quality and lifestyle.	143 nursing students at Kerman University Medical School, Iran	ABQ Sent randomly.	Academic burnout can be predicted by an individual's sleep quality and lifestyle.
<i>Shresta, et al., 2021</i>	To determine the prevalence of burnout concerning age, gender, and study year.	229 medical students at NAIHS-College of Medicine, Kathmandu, Nepal	OLBI – S Sent using Google Forms.	There is diversity in the prevalence of burnout among medical students due to the use of different scales to measure burnout and different criteria to categorize burnout on the same scale. Differences in curriculum, teaching methods, available facilities, institutional factors, study duration, and the impact of the pandemic with varying effects also cause the prevalence variation.
<i>Spiller, et al., 2021</i>	To investigate the correlation between negative emotion network density and burnout severity.	47 medical students in Switzerland	MBI – GS Sent online.	Temporary negative emotion network density directly correlates with burnout as a response to work pressures when providing healthcare services. Increased emotion network density can be developed as a model for describing the pathogenesis of burnout.

<i>Sveinsdottir, et al., 2021</i>	To evaluate burnout predictors in personal, academic, and collaborative contexts.	339 nursing students from the University of Iceland and the University of Akureyri, Iceland	CBI Sent via email.	Personal and academic burnout is predicted by faced stress, mental health, and received support. Collaboration burnout with fellow students is predicted by physical health and study year/education.
<i>Rohmani, et al., 2021</i>	To investigate the relationship between academic self-efficacy and burnout in students engaged in distance learning.	69 nursing students at Ahmad Yani University, Yogyakarta, Indonesia	MBI – SS Sent via email and WhatsApp.	Students perceive online learning as burdensome and report high burnout, negatively affecting their academic performance. Interventions to increase academic self-efficacy can foster student's confidence, potentially reducing burnout levels.
<i>Wang, J., et al., 2021</i>	To explain academic burnout and clarify the relationship between academic burnout, academic engagement, and psychological capital.	733 nursing students at the University of Jian, Shandong, China	ABS Sent through an online platform.	Academic engagement and psychological capital negatively correlate with academic burnout. Academic engagement plays a partial mediating role in the relationship between psychological capital and academic burnout.
<i>Wang, J., et al., 2021</i>	To analyze the underlying relationship mechanisms between self-efficacy and nurse-patient communication tendencies experiencing study burnout.	2,272 medical students at a higher vocational medical college in Fujian, China	CS – LBS Sent through a website.	Self-efficacy directly correlates with overall nurse-patient communication levels, including caring, sharing attitudes, and health promotion. Burnout refusal partially mediates the relationship between self-efficacy - caring and self-efficacy - sharing attitudes. It fully mediates the relationship between self-efficacy - health promotion.
<i>Zis, P., et al., 2021</i>	To investigate the impact of digital learning on burnout and students' mental health.	189 medical students at the University of Cyprus	MBI – SS Sent via email.	Digital learning in medical education increases many risks for students learning.
<i>Jumat, et al., 2020</i>	To assess the relationship between specific resources and burnout symptoms in first-year students.	59 medical students at Duke – NUS, Singapore	MBI-SS Sent through the NUS mailing list.	Grit is identified as protection factors against burnout. Students with low grit are susceptible to experiencing burnout. Grit is a strong character trait in predicting burnout in medical students.

Study data description

Among the eighteen articles meeting the study criteria, six papers were published in 2022, eleven in 2021, and one in 2020. The study speculated that the chaotic and uncertain situation caused by the widespread outbreak of the virus increased the attention of several studies to uncover issues arising from the pandemic. These findings have been widely published afterwards.

The study locations comprised eight in Europe, seven in Asia, two in America, and one in Africa. However, the participants from America and Africa were healthcare workers, hence did not meet the criteria. This study focused on healthcare students, including those from medical, nursing, pharmacy, and dental programs.

Regarding burnout measurement instruments, the Maslach Burnout Inventory (MBI) was most commonly used and widely recognized as the gold standard for fatigue assessment globally (Schutte et al, 2000; West et al, 2012; Williamson et al, 2018). Different versions of the MBI, such as Students Survey (SS), General Survey (GS), and Healthcare Survey (HS) were applied based on the target participants. Additionally, other instruments, such as CBI, OLBI, ABQ, ABS, and LBS were used. Fifteen studies employed electronic means, such as Email, Google Forms, and Survey Monkey to distribute the instruments. One study used a mixed-methods method with part-electronic and part-physical instruments, and another utilized paper questionnaire without specifying the form of distribution.

Table 2*Description of Study Data*

Description	<i>n</i>
Publication Year of the study	
2022	6
2021	11
2020	1
Study Location	
Europe	8
Asia	7
America	2
Africa	1
Participants' Study Programs	
Medical	11
Nursing	5
Pharmacy	1
Dental	1
Used Instruments	
MBI-SS	6
MBI-GS	2
a-MBI	1
CBI	3
OLBI	3
ABQ	1
ABS	1
CS-LBS	1
Additional Instruments (if applicable)	
Electronic	16
Physical Document	1
Mixed	1

Note. N = 18

Risk and protection factors of burnout

This study identified a total of 30 factors categorized as risk and protection factors of burnout. Risk factors were conditions, situations, or characteristics that positively correlated with triggering or increasing the threat of individuals experiencing burnout. Conversely, protection factors were conditions, situations, or characteristics that negatively correlated and mediated to inhibit or reduce

burnout in individuals. The above factors originated from personal or external sources, including the environment. The study attempted to categorize the thirty factors into two groups. The first group referred to as intrinsic factors, originated within oneself. While the second group originated from external sources or the environment known as extrinsic factors. The following table provided a clearer representation of these findings:

Table 3*Risk and Protection Factors of Burnout*

Variables	Article Number
Intrinsic	
Risk	
Emotional dysregulation	2
Perfectionism	5
GPA (Grade Point Average), Academic performance	7
Mental health	7, 13
Career aspirations	8, 9
Thoughts about future career	9
Thoughts about future clinical performance	9
Stress	13
Protection	
Life satisfaction related to relationships	3
Resilience	3, 4, 6
Self-compassion	5
Wellness	6
Coping strategies	7
Sleep quality	10
Healthy Lifestyle	10
Physical health	13
Self-efficacy	14, 16
Psychological capital	15
Grit	18
Variation	
Age	7, 11
Gender	7, 11
Extrinsic	
Risk	
Training phase	7
Funding or scholarship	7
Socioeconomic status	8
Density of negative emotion networks	12
Digital learning	17
Protection	
Academic engagement	1, 15
Received support	13
Variation	
Social cognition	2
Year of study	7, 11, 13

According to the table, there were 13 risk and protection factors each, with 4 elements in various outcomes. The equal number of risk and protection factors suggested a balanced between experiencing fatigue and the

possibility of reducing or preventing burnout. Factors with varying outcomes, such as coping strategies, functioned as either risk or protection element depending on the circumstances. Adaptive coping acted as

protection factors against burnout, while maladaptive coping increased risk of fatigue. The variable outcomes also indicated that specific factors had been correlated with triggering or inhibiting burnout in certain populations, while in others, no correlations were observed.

The identification results showed that 21 factors were intrinsic and 9 were extrinsic. Two-thirds of burnout cases among medical students were related to internal factors rather than external or environmental influences. These findings guided stakeholders to prioritize and focus on the individual's internal aspects and consider environmental factors when designing burnout prevention and intervention programs for medical students.

Discussion

This study aimed to uncover risk and protection factors of burnout among students in healthcare industry and categories the elements as intrinsic and extrinsic. Burnout among healthcare workers and students garnered significant interest from experts, academics, and the wider community (Gaston-Hawkins et al., 2020; Vargas et al., 2014). Risk factors are causes that increase the likelihood of experiencing a disease, while protection variables reduce and inhibit the development of the ailment (Huang et al., 2020). The WHO classified burnout as a summary syndrome (a *compendium of diseases*) (Corpuz, 2022).

The study identified 13 risk factors that trigger and increase burnout symptoms.

Another 8 intrinsic factors were identified, namely emotional dysregulation, mental health, perceived stress, perfectionism, high cumulative GPA, thoughts about uncertainty in a future career and clinical practice, and ambivalence or indecision to pursue the profession further. The remaining 5 variables were considered risk factors, including negative emotional network density in the workplace, digital learning, funding or scholarship, socioeconomic status, and clinical phase.

The discussion of this study begins with the intrinsic risk factors. The pandemic has heightened multidimensional crises and problems, impacting the human population worldwide physically, mentally, psychologically, socially, economically, and educationally. This immense pressure made individuals less capable of regulating negative emotions that arise, leading to intense work-related stress (Chalikkandy et al., 2022). Studies from Iceland and Portugal showed positive correlations between mental health problems, stress, perfectionism, and burnout among students (Sveinsdóttir et al., 2021). Perfectionistic individuals enjoy psychological pressure but are prone to experiencing burnout (Pereira et al., 2022). Arif et al. (2021) stated that students with cumulative GPAs above 3.50 had a higher risk of experiencing burnout compared to those with lower GPAs. Students' efforts in achieving the best outcomes, driven by perfectionistic tendencies, lead to physical

and emotional burnout. Similarly, a study from the US by Khalafallah et al. (2020) discovered that most respondents expressed uncertainty about students' careers and clinical performance. The pandemic's impact, with increased time spent attending online lectures, facing schedule uncertainties, cancelling classes, preparing for medical licensure exams, and participating in internships, contributed to burnout and led some students to reconsider pursuing a medical career if choices are available.

The study by Spiller et al. (2021) showed a close relationship between the pandemic's crisis and chaotic situation and the density of negative emotional networks in the workplace, particularly in the healthcare sector. The density of negative emotional networks directly impacted burnout and potentially served as the underlying cause of mental exhaustion, leading to intense pressure. In some countries, healthcare students were asked to participate fully as workers or volunteers in providing care for COVID-19 patients as part of the emergency response. Additionally, the transition from traditional face-to-face learning to digital or virtual education was linked to an increased risk of burnout in students. A study from Cyprus found that discontinuing face-to-face clinical training and switching to virtual education negatively affected students' psychological health and confidence (Zis et al., 2021). Students perceived virtual training to be inadequate in providing the same quality of skills and clinical experience.

The study by Arif et al. (2021) mentioned funding as risk factors that triggers burnout. Students receiving scholarship funding tend to experience burnout compared to those with self-funded education. The responsibility of meeting educational targets under scholarship funding leads to concerns and worries. Socioeconomic status increases burnout risk, particularly for students with dual roles as breadwinners and family pillars, compared to those solely fulfilling the role of students. The region of residence and access to the campus also contribute to exhaustion, as some students in Africa travel long distances, expending financial resources, time, and energy to attend academic activities (Kajjimu et al., 2021). Another extrinsic risk factor is the clinical phase, particularly specific to medical students. The demands of preparing for medical licensing exams, participating in residencies, mandatory internship practices, and more, create pressure and concerns, especially during a pandemic (Arif et al., 2021).

The findings indicated that burnout was more susceptible to individuals experiencing psycho-emotional problems. The challenges include mental health issues, self-regulation abilities, stress pressure, and perfectionism, which demand excellence in every action taken (Spagnoli et al., 2021). Cognitive factors contributed to burnout occurrence, as negative and pessimistic thoughts related to future job conditions led to increased worries and anxieties (Garratt-Reed et al., 2018). Among the

extrinsic risk factors, the shift to digital learning during the pandemic stood out, as students perceived online training as inadequate in providing the required learning understanding (Alsoufi et al., 2020).

The discussion proceeds to protection factors of burnout. The study identified 13 protection factors that reduce or inhibit burnout symptoms, with 11 variables being intrinsic and 2 extrinsic. The intrinsic protection factors include coping strategies, Grit (perseverance), resilience, self-compassion, self-efficacy, psychological resources, physical health, healthy lifestyle, relationship satisfaction, sleep quality, and wellness behaviour.

The study showed the crucial role of coping strategies in mediating burnout among students. Increased coping strategy scores were associated with reduced risk of specific forms of fatigue, including personal, work-related, and patient-related burnout (Arif et al., 2021). Grit, defined as the spirit of sustained perseverance for long-term achievements, emerged as a strong character trait that acts as a guardian and predicts burnout (Jumat et al., 2020). Resilience, known as toughness, has been extensively studied as a protective factor against burnout. High resilience is associated with better attitudes, lower burnout and cynicism, and higher academic efficacy among students (Duarte et al., 2022; Forycka et al., 2022; Reed et al., 2022). Self-compassion has also shown relevance in fatigue prevention and

management programs, as students with high self-compassion display more positive, warm, and caring attitudes and accept the reality of being human (Reed et al., 2022).

Another significant strategy is self-efficacy, defined as an individual's belief in the ability to achieve specific goals (Bandura, 1977). Two studies from Indonesia and China demonstrated that self-efficacy played a role in combating burnout symptoms among nursing students. Online learning significantly increases risk of burnout, but interventions that enhance students' self-efficacy have been proven to cultivate self-confidence, leading to a reduction in fatigue levels (Rohmani & Andriani, 2021); Psychological capital played a role in inhibiting burnout among healthcare students. Psychological capital enhanced learning performance overcame obstacles and encouraged the pursuit of future goals. Psychological capital, an essential variable in positive psychology, encompassed positive mental states, including self-efficacy, optimism, resilience, and adaptability when necessary (Wang et al., 2021).

Continuing with the discussion on intrinsic protection factors, physical health played a crucial role in mediating burnout. Students with poor physical health report higher burnout symptoms than those with healthy strength (Naderi et al., 2021). Additionally, adopting a healthy lifestyle including regular exercise, consuming nutritious food, maintaining a balanced daily schedule, and

getting quality sleep, are associated with lower levels of burnout. According to Naderi et al. (2021), a healthy lifestyle had a negative correlation with burnout, which noted that healthcare students face unique challenges. The problems includes higher stress levels, dense academic schedules, night shifts, and caring for patients in pain and trauma, all of which disrupt normal sleep patterns and trigger fatigue. Another study showed that relationship-related life satisfaction mediates burnout, effectively alleviating stress and fatigue symptoms (Forycka et al, 2022). Life satisfaction is linked to individuals' health and quality of life, which negatively correlates with burnout (Duarte et al, 2022). Lastly, wellness behaviour, including maintaining good nutrition and getting enough sleep, has been found to reduce various burnout symptoms in students (Reed et al, 2022).

The extrinsic protection factors that played a role in preventing, inhibiting, and reducing burnout consist of academic engagement and received support. Academic engagement, demonstrated in behavioural, emotional, and cognitive dimensions, weakens the impact of burnout. This engagement is reflected in students' active participation in class, laboratory work, enthusiasm in attending training sessions, willingness to invest in understanding and mastering each subject, commitment, belief, and focus on completing their education (Abreu Alves et al, 2022; Naderi et al, 2021). Sveinsdóttir et al. (2021) noted students who receive sufficient social support

from family, friends, and educational institutions are found to positively influence the progress in education, reducing feelings of loneliness and enhancing adaptability to new habits like online learning. Students who receive sufficient support have better time management and a lower prevalence of burnout.

The findings indicated a stronger dominance of intrinsic protection factors compared to those from external sources (extrinsic). The eleven intrinsic protection factors were further categorized into two subgroups, namely, psycho-emotional aspects and healthy lifestyle behaviour (wellness behaviour). The psycho-emotional subgroup included coping strategies, grit, resilience, self-compassion, self-efficacy, and psychological resources, which are potential factors within individuals to prevent, maintain, and improve burnout conditions, similar to immunity in resisting disease. The wellness behaviour subgroup comprised healthy lifestyles, overall physical health, sufficient sleep quality, and consistently engaging in healthy behaviours. Students with good health, who are less frequently sick, and who maintain regular healthy lifestyles are better equipped to face their studies and assignments (Naderi et al, 2021).

In the final discussion of this study, four factors are identified to have varied results regarding burnout, namely gender, age, year of publication, and social cognition. Shrestha et al. (2021) stated that no significant relationship

existed between gender, age, and year of publication. However, other studies suggested that male students tend to be more vulnerable to burnout (Arif et al, 2021; Kajjimu et al, 2021). Fares et al. (2016) also reported that female students are more susceptible to fatigue. Regarding age, Dyrbye et al. (2014) found no association with burnout, but O'Connor et al. (2018) reported a significant influence on fatigue prevalence. The year of publication was not directly linked to burnout vulnerability but rather triggered by factors such as a learning schedule, academic competition, tense environments, and excessive workload. Lastly, social cognition showed different results between undergraduates and interns, with a negative correlation between university students and a positive relationship in traineeships (Chalikkandy et al. 2022).

Conclusion

This study aimed to explore risk and protection factors of burnout among healthcare students and categorize the variable into the dichotomy of intrinsic and extrinsic. The study discovered an equal number of risk and protection factors, implying that several variables increased the vulnerability of healthcare students to burnout. The findings also identified several protection factors that played a role in preventing and reducing burnout levels. The majority of factors were intrinsic, highlighting the significance of individual

characteristics in addressing and managing burnout among healthcare students.

The identification of risk factors provided several valuable implications, including a better understanding of how burnout arises, developed, and intensified. This knowledge should be utilized to design targeted intervention programs to address burnout and create a healthier and more supportive environment for students. Additionally, the identification of protection factors provided a valuable guide for designing effective and efficient intervention programs. For instance, healthcare students with unhealthy habits benefited from interventions promoting healthy lifestyle behaviours, such as regular exercise, balanced nutrition, sufficient sleep, and well-planned daily schedules, rather than solely focusing on coping mechanisms or self-efficacy.

The findings were instrumental in designing intervention programs focused on preventing and addressing burnout among healthcare students, utilizing the identified risk and protection factors. With the proper focus and strategies, burnout was effectively addressed and managed. Further study should be developed to include different populations, such as non-healthcare students, and to compare the results when the pandemic has subsided. This would provide valuable insights into the long-term impact of the pandemic on burnout and the effectiveness of the intervention programs.

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