
| RESEARCH ARTICLE

A Comprehensive Evidence-Based Review and Analysis of Factors Contributing to Low Performance in Undergraduate Health Programs

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| ABSTRACT

Academic performance in undergraduate health programs is a critical determinant of professional success and healthcare quality, yet many students face systemic barriers that hinder their achievement. This literature review explores the evidence-based factors contributing to poor academic outcomes, categorizing them into Cognitive and Non-Cognitive: Psychological and Emotional, Socioeconomic and Environmental, Cultural and Gender Role, and Institutional and Systemic Factors. Cognitive challenges, such as information overload, ineffective study strategies, and mismatched learning styles, interact with psychological stressors like anxiety, burnout, and mental health disorders to undermine performance. Socioeconomic disparities, including financial strain and limited access to resources, exacerbate these challenges, while institutional factors like rigid curricula, passive teaching methods, and high-stakes assessments further disadvantage students. Cultural and gender-related barriers, such as language proficiency, discrimination, and conflicting role expectations, also contribute to inequities in academic success. Through a comprehensive review of empirical evidence, this study highlights the need for targeted interventions, including active learning pedagogies, mental health support, financial aid programs, and inclusive curriculum design. By addressing these interconnected factors, institutions can foster equitable academic achievement and better prepare future healthcare professionals.

| KEYWORDS

Undergraduate health programs; Healthcare quality; Cognitive challenges

| ARTICLE INFORMATION

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1. Introduction

Academic performance in undergraduate health programs is a critical determinant of both professional success and the overall quality of healthcare services. These programs are inherently rigorous, requiring students to integrate vast amounts of complex information while simultaneously developing essential cognitive, clinical, and interpersonal skills. Despite selective admission processes, many students encounter challenges that hinder their academic success. The factors influencing academic performance are multifaceted, encompassing cognitive abilities, psychological resilience, socio-economic conditions, institutional structures, and systemic issues within healthcare education. Cognitive factors, such as intellectual capacity, learning styles, and academic preparedness, significantly affect students' ability to grasp complex health concepts, with critical thinking skills and instructional quality playing pivotal roles (An et al., 2007; Klieme & Nilsen, 2022; Agha et al., 2023; Brambila-Tapia et al., 2024). Additionally, non-cognitive attributes, including academic resilience, grit, locus of control, and personality traits, shape students' engagement and perseverance in the face of challenges (Findley & Cooper, 1983; Hazrati-Viari, et al., 2012; Christopoulou et al., 2018; Fernández-Martín et al., 2020; Terry et al., 2023). However, psychological barriers such as perceived stress can negatively impact academic performance, particularly in high-pressure environments (Kumar et al., 2014; Reynolds et al., 2021). Institutional factors, such as the availability of teaching resources and alignment between instructional methods and students' learning

preferences, further influence academic outcomes (Al-Hazmi, 2016; Klieme & Nilsen, 2022). Given the complex interplay of these elements, this literature review seeks to provide a comprehensive analysis of the evidence-based determinants of academic performance in undergraduate health programs. By categorizing these factors into cognitive, psychological, socio-economic, institutional, and systemic dimensions, this review aims to offer a nuanced understanding of the challenges students face and propose practical strategies to enhance academic success.

2. Literature Review

2.1 Cognitive Factors

Cognitive factors play a critical role in determining academic success in health sciences education, such as intellectual capacity, instructional quality, and resource utilization significantly impact student performance. Intellectual ability is essential for understanding complex health concepts, and limitations in cognitive capacity can lead to poor academic outcomes (Agha et al., 2023; Brambila-Tapia et al., 2024). Additionally, the quality of instruction is a crucial determinant of student success; inadequate teaching resources and insufficient teacher training can negatively affect learning experiences (Klieme & Nilsen, 2022). Teaching styles also influence academic performance, as a mismatch between students' learning preferences and instructional approaches may cause frustration and hinder comprehension (An et al., 2007). Efficient utilization of educational resources is another key factor, as proper management can reduce costs and improve academic outcomes (Al-Hazmi, 2016). Moreover, the learning environment, including curriculum design and faculty support, significantly affects student performance. Poor clinical learning environments (CLE), characterized by inadequate supervision and excessive workload, often result in suboptimal learning experiences (Sellberg et al., 2021). Furthermore, faculty development plays a vital role in student success, with ineffective evaluator training hindering academic progress in health programs (Yepes-Rios et al., 2016). Given the profound influence of cognitive and instructional factors, comprehensive planning and faculty training are essential to enhance teaching effectiveness and improve educational outcomes in health sciences programs (Sellberg et al., 2021; Klieme & Nilsen, 2022).

2.1.1 Cognitive Load and Information Overload

Health-related fields, particularly medical education, require students to retain and apply vast amounts of complex information, often leading to cognitive overload (Sweller, 1988; Young et al., 2014). Cognitive load theory suggests that excessive demands on working memory hinder learning and problem-solving, particularly in disciplines requiring high levels of knowledge integration. Research has shown that students who struggle with synthesizing and applying complex information tend to perform worse academically, as their cognitive resources become overwhelmed (Kirschner et al., 2006). Van Merriënboer and Sweller (2010) further emphasized that cognitive overload impedes learning efficiency in complex domains such as medical education, making it essential to manage cognitive load effectively. Instructional strategies such as scaffolding techniques and problem-based learning can help mitigate cognitive overload by structuring information more effectively and enhancing comprehension. By implementing these strategies, educators can support students' cognitive processing, thereby improving academic performance and reducing the detrimental effects of information overload.

2.1.2 Learning Styles and Study Strategies and Habits

Students' learning styles, study strategies, and time management skills play a crucial role in academic success, particularly in demanding health-related programs. Research consistently demonstrates that students who adopt deep learning strategies—characterized by a focus on understanding and application—outperform those who rely on rote memorization or surface learning techniques (Biggs, 2003; Samarakoon et al., 2013). Conversely, ineffective study strategies, such as passive reading, last-minute cramming, and reliance on superficial learning, have been linked to lower academic performance (Sternberg, 2001; Nonis & Hudson, 2010). Poor time management is also a significant predictor of academic underachievement, as students who fail to effectively allocate their study time often struggle to keep up with coursework and meet deadlines (Britton & Tesser, 1991). Furthermore, cognitive preparedness, including critical thinking and problem-solving skills, is essential for success in health programs. Students lacking these cognitive skills often find it difficult to manage the rigorous coursework, which can further hinder their academic progress (Dochy et al., 2003; Chan et al., 2018). Additionally, deficits in foundational knowledge in key subjects such as biology, chemistry, and physics contribute to difficulties in grasping advanced concepts, ultimately impacting students' academic performance (Kranz et al., 2022). Given the complexity and intensity of health-related education, fostering effective learning strategies, strengthening cognitive skills, and improving time management practices are critical for ensuring students' academic success.

2.2 Non-Cognitive Factors

Non-cognitive factors play a crucial role in shaping academic performance, influencing students' ability to navigate challenges, maintain motivation, and adapt to stress. Academic resilience, defined as the ability to overcome adversity while pursuing educational goals, is a key determinant of student success (Findley & Cooper, 1983; Hazrati-Viari, et al., 2012). Similarly, grit, which encompasses perseverance and passion for long-term goals, has been associated with both academic and professional

achievement (Christopoulou et al., 2018; Fernández-Martín et al., 2020; Terry et al., 2023). Another important factor is locus of control, which refers to an individual's belief in their ability to influence outcomes. Students with a strong internal locus of control tend to demonstrate higher levels of academic achievement, as they attribute success to personal effort rather than external circumstances (Findley & Cooper, 1983; Hazrati-Viari, et al., 2012). However, non-cognitive factors can also present challenges; perceived stress, which encompasses mental, physical, and emotional responses to pressure, can negatively impact academic performance, particularly in high stakes learning environments (Kumar et al., 2014; Reynolds et al., 2021). Additionally, personality traits from the Big Five models such as agreeableness, conscientiousness, and neuroticism—can influence academic outcomes, with conscientiousness generally promoting success, while neuroticism may hinder performance due to heightened anxiety and stress sensitivity (Findley & Cooper, 1983; Hazrati-Viari, et al., 2012). Although resilience and grit are consistently linked to academic achievement, the relationships between other non-cognitive factors and performance remain complex, with some variables, like neuroticism and stress, exerting indirect or context-dependent effects (Findley & Cooper, 1983; Hazrati-Viari, et al., 2012). A deeper understanding of these factors can inform educational strategies that foster resilience, motivation, and adaptive coping mechanisms, ultimately improving student success.

2.2.1 Psychological and Emotional Factors

2.2.1.1 Stress, Anxiety, and Burnout

Psychological and emotional challenges, including stress, anxiety, and burnout, are prevalent among students in health programs and have been linked to lower academic performance. High levels of anxiety, particularly test anxiety, can impair students' ability to focus and perform well in assessments (Zeidner, 1998). Similarly, burnout—characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment—diminishes students' ability to learn and retain information, ultimately leading to disengagement and academic underperformance (Ishak et al., 2013). A systematic review by Frajerma et al. (2024) highlighted the high prevalence of burnout among medical students, emphasizing its detrimental effects on both academic performance and mental health. Moreover, mental health disorders such as depression and chronic stress negatively impact concentration, motivation, and persistence, further hindering academic achievement (Andrews & Wilding, 2004; Rotenstein et al., 2016). Given the rigorous demands of health education, prolonged exposure to psychological stressors can exacerbate these issues, making it essential for institutions to implement targeted interventions. Research indicates that access to mental health support services, including counseling and stress management programs, can significantly improve students' well-being and academic performance (Givens & Tjia, 2002). Additionally, adopting a balanced lifestyle that includes adequate sleep, physical activity, and effective coping strategies is crucial for maintaining cognitive performance. Universities must prioritize mental health initiatives to foster resilience, enhance learning outcomes, and mitigate the risks associated with stress and burnout in health education.

2.2.1.2 Motivation and Self-Efficacy

Motivation and self-efficacy are critical determinants of academic success, particularly in rigorous fields such as health education. Research indicates that students with low intrinsic motivation and self-efficacy are more likely to struggle academically, as they tend to engage less in effective learning strategies and demonstrate lower persistence when faced with challenges (Ryan & Deci, 2000; Artino, 2012). Artino et al. (2012) found that medical students with higher self-efficacy and intrinsic motivation were more likely to adopt productive learning approaches and achieve superior academic outcomes. Furthermore, both intrinsic and extrinsic motivation play a pivotal role in sustaining student engagement, with low levels of motivation correlating with poor performance (Hazrati-Viari, et al., 2012). Students who lack enthusiasm or a clear sense of purpose in their studies often fail to engage deeply with the curriculum, leading to suboptimal learning experiences. Therefore, fostering motivation and self-confidence through targeted educational strategies, such as goal setting, feedback-driven learning, and mentorship, is essential for enhancing academic performance in health programs. Providing students with supportive learning environments, positive reinforcement, and opportunities for autonomy can significantly contribute to improved self-efficacy and motivation, ultimately leading to better academic achievement.

2.2.1.3 Mental Health Disorders

Mental health disorders, particularly depression, have a profound impact on students' concentration, motivation, and academic persistence, making them a significant concern in medical education (Hunt & Eisenberg, 2010; Rotenstein et al., 2016). The demanding nature of medical training, combined with high expectations and prolonged stress, increases the risk of mental health issues, which in turn negatively affect academic performance. Research suggests that access to mental health support services can improve academic outcomes by providing students with coping mechanisms and necessary interventions (Givens & Tjia, 2002). Recent findings further emphasize the severity of this issue; Rotenstein et al. (2016) conducted a systematic review and meta-analysis revealing that a substantial proportion of medical students experience depressive symptoms, which significantly hinder their academic success. These findings highlight the urgent need for educational institutions to prioritize

mental health initiatives, such as counseling services and stress management programs, to support student well-being and enhance academic performance. By integrating proactive mental health policies and promoting awareness about mental well-being, institutions can foster a more supportive academic environment that enables students to navigate challenges effectively and achieve their full potential.

2.3 Socioeconomic and Environmental Factors

2.3.1 Financial Stress

Financial stress is a significant barrier to academic success, particularly for students in health programs from lower-income backgrounds. Financial constraints contribute to heightened stress levels, which negatively affect students' ability to focus on their studies and overall academic performance (Britt et al., 2016; Porcelli & Delgado, 2017). Moreover, students experiencing financial strain often lack access to essential resources such as study materials and preparatory courses, exacerbating performance disparities (Lam, Hanson, & Martimianakis, 2020). Research indicates that medical students with substantial educational debt reports increased stress levels, which correlate with lower academic performance, underscoring the detrimental effects of financial burdens on student success (Pisaniello et al., 2019). However, strong social support networks have been shown to play a protective role in academic resilience. Students who receive emotional and academic support from peers and faculty are better equipped to cope with financial stress, leading to improved academic outcomes (Skahill, 2002; Wilcox et al., 2005). In contrast, negative peer influences or a lack of mentoring can contribute to disengagement and decreased motivation (Zimmerman et al., 2000). Heinen et al. (2017) found that strong social support significantly enhances academic resilience, emphasizing the need to cultivate supportive environments for students. Given the adverse effects of financial stress, it is essential for institutions to implement financial support initiatives such as scholarships and financial aid programs, which can help alleviate economic pressures and foster a more equitable learning environment. Additionally, establishing robust peer and faculty support systems can further promote student well-being and academic success.

2.3.2 Social Support and Peer Influence

Social support networks play a crucial role in student resilience and academic success, particularly in health education programs. Strong support systems from family, friends, and academic mentors help students develop effective coping strategies, reduce stress, and enhance academic performance (Skahill, 2002; Wilcox et al., 2005). Conversely, a lack of social or family support can lead to heightened stress levels, negatively impacting students' ability to focus and perform academically (Roksa & Kinsley, 2019). Cultural factors also play a role, as students from diverse backgrounds may struggle with social integration, communication, and adapting to academic expectations (Lam & Zhou, 2022). Peer influence significantly shapes academic resilience, with positive peer interactions and mentoring fostering motivation and engagement, whereas negative peer pressure or an absence of mentorship can contribute to disengagement and decreased motivation (Zimmerman et al., 2000). Additionally, an unwelcoming or non-collaborative classroom environment can hinder student performance, while a supportive and inclusive academic setting enhances engagement and success (Astin, 1993). Research by Heinen et al. (2017) further highlights that students with strong social support networks exhibit greater academic resilience, underscoring the importance of fostering supportive environments in health education programs. Peer influence can also be a source of stress, particularly in highly competitive settings, where students may feel overwhelmed by pressure to succeed (Reich, 2012). Therefore, institutions must prioritize initiatives that promote positive peer interactions, mentorship programs, and inclusive learning environments to support student well-being and academic achievement.

2.4 Cultural and Gender Role Factors

Cultural and gender role factors significantly contribute to low performance in undergraduate health programs. Language barriers can hinder academic success, as students may struggle with instruction or exams due to limited proficiency (Andrade, 2006; Maringe, 2010). Additionally, cultural expectations may impose excessive pressure to succeed, creating stress that negatively impacts performance (Sue & Okazaki, 1990; Lam & Zhou, 2022). Discrimination or bias based on cultural background further exacerbates these challenges, leading to feelings of marginalization (Mitchell et al., 2015; Hood et al., 2017), while social integration difficulties impede academic and interpersonal adaptation (Ward & Kennedy, 1993; Berry, 1997). Gender-related barriers also play a critical role, as traditional gender expectations may conflict with academic aspirations (Eccles, 1994; Charles & Bradley, 2009). Balancing domestic responsibilities with studies can overwhelm students, particularly women (Duxbury & Higgins, 1991; Pisaniello et al., 2019), and gender discrimination in academic settings reinforces inequities (Fnais et al., 2014; Casad et al., 2020). The absence of relatable role models further discourages students, limiting their motivation and sense of belonging (Lockwood, 2006; Koh et al., 2023). Addressing these cultural and gender-based obstacles is essential to fostering equitable academic success in health programs.

2.5 Institutional and Systemic Factors

2.5.1 Curriculum Design and Teaching Methods

The design and delivery of curricula play a crucial role in shaping student performance, particularly in health education programs. Rigid, overloaded curricula can contribute to passive learning, disengagement, and increased student burnout, negatively affecting comprehension and retention (Prince, 2003; Cook et al., 2010; Finnell et al., 2018; D'Eon, 2023). Curriculum overload, where students must absorb vast amounts of information in a short period, has been linked to poor academic performance and higher stress levels (Finnell et al., 2018; D'Eon, 2023). Additionally, inadequate access to essential learning resources, such as textbooks, clinical experiences, and technology, further impedes student learning and success (Kapur, 2022). In contrast, active learning strategies, such as problem-based learning (PBL) and team-based learning, have been shown to enhance knowledge retention and application by promoting critical thinking and student participation (Graffam, 2007; Schmidt et al., 2011). A meta-analysis by Graffam (2007) demonstrated that active learning significantly improves academic outcomes for medical students, underscoring the need for curriculum reform to integrate more interactive and student-centered teaching methods. By adopting such reforms, institutions can create a more engaging educational environment that enhances student comprehension and long-term academic success.

2.5.2 Assessment Methods and Exam Formats

Assessment methods significantly influence student performance, particularly in high-stakes academic environments such as health programs. Standardized exams, while commonly used, often induce substantial performance anxiety, which can negatively affect student outcomes and fail to provide a holistic measure of competencies (Sood & Singh, 2012). Traditional written exams may not fully capture the diverse skill sets required in health professions, underscoring the need for alternative assessment strategies (Schuwirth & Van der Vleuten, 2011). A diversified assessment approach, incorporating evaluation methods beyond conventional exams, offers a more comprehensive view of student abilities. Techniques such as objective structured clinical examinations (OSCEs), competency-based assessments, and formative evaluations have been shown to better assess critical thinking, problem-solving, and practical skills. Sood and Singh (2012) highlight the importance of integrating varied assessment formats to ensure a more accurate and holistic representation of student capabilities. By implementing broader evaluation techniques, educational institutions can not only mitigate exam-related stress but also better prepare students for real-world professional challenges in healthcare settings. A well-balanced assessment strategy is therefore essential to enhance student performance, engagement, and readiness for professional practice.

2.5.3 Faculty Support and Mentorship

Faculty support and mentorship play a crucial role in student success, particularly in health programs, where academic and professional challenges can be complex. Effective mentorship fosters confidence, engagement, and academic resilience, while inadequate mentorship can lead to isolation, confusion, and disengagement (Burgess et al., 2018; Nimmons et al., 2019). Faculty members who provide guidance, feedback, and emotional support contribute significantly to student development, enhancing both academic performance and career satisfaction (Sambunjak et al., 2006). Conversely, poor teaching quality, lack of feedback, and insufficient academic guidance hinder learning experiences, preventing students from fully engaging with their studies (Norcini et al., 2018). Institutional differences further contribute to disparities in mentorship quality, as public universities often have greater resources and research opportunities compared to private institutions, where health sciences may not be a primary focus (Rabossi, 2011; Liew et al., 2017). Moreover, clinical learning environments (CLEs) are integral to student experiences, and inadequate supervision or overwhelming clinical duties can diminish learning opportunities (Sellberg et al., 2021). Faculty development and training are essential to ensure high-quality mentorship and evaluation, as ineffective faculty guidance can hinder student progress (Yepes-Rios et al., 2016). Ultimately, fostering strong faculty-student interactions through supportive and adaptive teaching approaches enhances student engagement, promotes academic success, and prepares students for the professional demands of healthcare fields. Given these factors, it is imperative for health education programs to adopt innovative, student-centered teaching strategies, ensure access to adequate learning resources, and provide strong faculty support to optimize student engagement and learning outcomes.

2.6 Conclusion

The academic performance of undergraduate students in health programs is influenced by a complex interplay of cognitive, non-cognitive, institutional, systemic, psychological, emotional, socio-economic, and environmental factors. Cognitive challenges, such as information overload and ineffective study strategies, significantly impact students' ability to process and retain complex medical concepts. Non-cognitive elements, including resilience, grit, motivation, and personality traits, further shape students' ability to navigate academic pressures. Psychological and emotional factors, such as stress, anxiety, burnout, and mental health disorders, present additional barriers to success, often exacerbated by the demanding nature of health education.

Socioeconomic and environmental challenges, including financial stress, social support, and peer influences, contribute to disparities in academic performance. Students facing financial constraints may struggle with resource accessibility, while those lacking strong support systems may experience higher stress levels and reduced motivation. Institutional and systemic factors, such as curriculum design, teaching methods, assessment formats, faculty support, and mentorship, also play a pivotal role in shaping educational outcomes. Rigid and overloaded curricula, traditional assessment methods, and inadequate faculty guidance can hinder students' ability to perform optimally. Addressing these multifaceted challenges requires a holistic approach that integrates targeted interventions at the student, faculty, and institutional levels. Effective strategies include implementing evidence-based teaching methodologies, fostering supportive learning environments, promoting mental health initiatives, and offering financial aid programs. Additionally, enhancing mentorship opportunities and adopting diversified assessment strategies can further support student success. By addressing these factors comprehensively, institutions can improve academic outcomes, better prepare students for professional healthcare roles, and ultimately enhance the overall quality of healthcare delivery.

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