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Medical Education Challenges in the Era of Internationalization and Digitization

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ABSTRACT

Prior to the coronavirus disease 2019 (COVID-19) pandemic, Central Asia and Eastern Europe saw a significant rise in international medical student enrollment, driven by competitive tuition fees, prestigious institutions, and culturally diverse environments. The pandemic forced a rapid shift to online learning, disrupting student mobility and compromising clinical training quality. Online education for international medical students during the COVID-19 pandemic has proven beneficial, though low- and middle-income countries struggled with access to information infrastructure and resources. While 64% of students preferred online learning, challenges like limited internet access and lack of in-person interaction persisted, making a blended approach of online and traditional methods most effective. Despite a rebound in post-pandemic enrollment, persistent challenges such as linguistic obstacles, psychological stress, and cultural adaptation issues remain. Active research engagement during undergraduate studies is essential for skill development. Integrating research into education curricula and fostering motivation are crucial for enhancing academic outcomes. Critical thinking and cultural competence are vital, necessitating explicit instruction and collaborative learning strategies. Addressing language barriers through comprehensive support systems for both instructors and students is imperative. Tailored strategies and robust institutional support are essential to enhancing the educational experiences and success of international medical students.

Keywords: International Students; Medical Students; Medical Education; Language Barriers; Cultural Adaptation; Critical Thinking; Research Integration; Higher Education; Central Asia; Eastern Europe

INTRODUCTION

Prior to the onset of the coronavirus disease 2019 (COVID-19) pandemic, Central Asia and Eastern Europe witnessed a significant rise in the enrollment of international students,

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particularly within the realm of medical education.[1,2] The attractiveness of these regions stemmed from their competitive tuition fees, distinguished educational institutions, and culturally diverse environments.[3-5] Countries like Ukraine and Kazakhstan emerged as preferred destinations for those aspiring to pursue medical degrees.[4,6] Medical education in Ukraine and Kazakhstan is known to closely adhere to the European model, placing emphasis on both theoretical knowledge and hands-on clinical training. Their academic institutions strive to maintain high standards, offering programs in English.[4,6]

Over the past decade, Kyrgyzstan has undergone substantial reforms, focusing on strengthening primary healthcare and human resources. The ongoing Medical Education Reforms project, initiated in 2007 and supported by the Swiss Agency for Development and Cooperation, has successfully addressed barriers at various education levels.[7] Similarly, Tajikistan has undertaken medical education reforms, restructuring undergraduate, postgraduate, and continuing professional development programs in line with the World Medical Education Federation recommendations.[8] Medical education and research activities are improving in Kazakhstan in view of the increasing publication activity.[9] However, there are still numerous challenges mostly due to English language barrier, poor visibility of local medical journals, and inadequate scientific writing and editing skills.[10]

The COVID-19 pandemic significantly affected medical education in Eastern Europe and Central Asia. Regional academic institutions were forced to switch to online learning during lockdowns.[11] The switch from traditional classrooms to online platforms posed challenges for both educators and students, particularly affecting hands-on clinical training.[12]

Pandemic-related travel restrictions and visa challenges significantly affected the enrollment and participation of international graduates, including those pursuing medical degrees.[13-15]

The influence of the COVID-19 pandemic on medical education has been explored in numerous worldwide studies. A nationwide cross-sectional survey of UK medical students revealed a significant increase in online platforms use during the pandemic, with 24% of students allocating more than 15 hours per week compared with 7% in pre-pandemic period ($P < 0.05$).[16] Although the flexibility of online teaching was acknowledged as a benefit, family distractions (27%) and internet-related issues (22%) were reported as challenges.[16] Similarly, a study focusing on dental students revealed positive perceptions of online and blended learning during the pandemic, with associated social aspect viewed as a challenge.[17]

Notably, concerns have been voiced regarding the suitability of online learning for clinical disciplines, particularly at postgraduate level.[18]

Additionally, lower sleep quality and decreased quality of life during the lockdowns were linked to decreased academic performance and overall satisfaction with training courses.[19] Younger age was identified as a predictor of better performance of students, whereas lockdown-related stress and fatigue were associated with poorer academic outcomes.[20]

After the COVID-19 pandemic, global higher education has undergone substantial transformations, witnessing a rise in the international student enrollment.[21] This rise is accompanied by language barriers, psychological distress, and cultural obstacles, impacting student adaptation, socialization, and overall learning experience.[22]

In this context, our overview aims to comprehensively analyze challenges and perspectives of medical education for international students amid globalization and digital transformation and to provide recommendations for improving educational practices and outcomes.

SEARCH STRATEGY

We searched through Medline/PubMed, Scopus, and Directory of Open Access Journals (DOAJ) up to April 2024 in adherence with previously published recommendations.[23] The following MeSH keywords were utilized for the retrieval and analysis of pertinent articles: "foreign students" OR "international students" in combination with "medical education," "English language," "research." We conducted analysis on English-language original research articles, reviews, and case reports. Conference proceedings, book chapters, and preprints were filtered out.

CURRENT ISSUES OF MEDICAL EDUCATION AND STUDENTS' CHOICE OF UNIVERSITIES

Medical education is undergoing transformation worldwide (**Fig. 1**), resulting in new challenges and opportunities primarily for international students studying outside their home countries.

In the context of selecting a medical school, the following determinants have emerged: medical school reputation, location, personal contacts, and recommendations.[24] Medical school reputation stands out as a pivotal factor significantly influencing students' choices.[25] A detailed investigation into how academic reputation aligns with student expectations and outcomes provides valuable insights into the intricate decision-making process.[26] Identifying and better understanding all confounding factors is paramount for medical education reforms and academic institutions adjustments to meet the needs and preferences of students. Rapid increase in medical student enrollment may strain educational resources, requiring revision of instructional standards and strategies of educating proficient and flexible educators.[27]

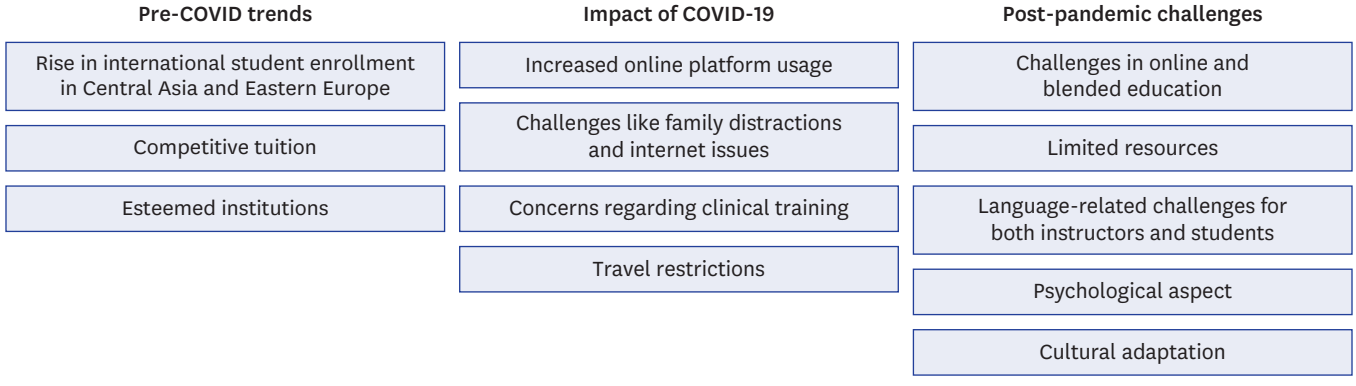

Fig. 1. Visual summary of challenges and perspectives in medical education for the international students.
COVID-19 = coronavirus disease 2019.

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Notably, a Korean nationwide study has demonstrated a high prevalence of medical faculty burnout, associating it with gender, age, and working hours.[28] Tightened control and regulation has emerged as a primary stressor.[28] To mitigate medical faculty burnout, further research is imperative.[28]

European and Central Asian education strategies vary widely in terms of access to academic institutions, equipment standards, interdisciplinary and team work approaches, availability of highly skilled educators, etc.[29] As an example, Ukraine has encountered unprecedented educational challenges over the last two years, primarily affecting international students, though their satisfaction with the quality of education remained consistent.[30] Supposedly, the educators' extra efforts, curricular adjustments, and technical assistance, and advanced online education may counteract some of the challenges.

On another extreme, post-pandemic education worldwide encounters similar challenges, necessitating adjustments in online and blended courses, advances in educators' continuing development programmes, and more focus on information literacy and digitization.[31] Current online courses require personalized approaches and support of information technology specialists.[32]

Emerging evidence stemming from post-pandemic surveys suggests that medical students positively perceive the evolving concept of blended learning, which is based on balanced online and face-to-face courses.[33]

STUDENTS' ACTIVITIES - FOCUS ON LEARNING, RESEARCH, AND PRACTICE

Undergraduate students' research activities are instrumental for acquiring basic skills and nurturing scientific thinking. Such activities may introduce them to mentors and other actors in the research infrastructure and facilitate acquiring science communication skills which are essential for postgraduate research and education.[34] Notably, mentors' support and guidance contribute to a high publication activity.[34]

Although the integration of research training into undergraduate education is mandatory in some countries, related outcomes are still unsatisfactory.[35,36] A survey of 215 students in Pakistan revealed that 60% acquired research experience by engaging in mandatory undergraduate activities and only 62% were aware that research is an inseparable part of their curriculum.[36] Seventy-one percent of respondents identified lack of resources and lack of interest as main barriers to their research activities.[36] Another survey of 704 Australian medical students revealed that only 45% contributed to a research project and only 20.5% cited an interest in academia as a motivation to engage in research.[37] Finally, a longitudinal survey of 108 US-based medical students demonstrated that respondents' attitude to research became more positive after viewing a didactic video regarding experimental medicine and its implications for safety of clinical medicine.[38]

Another important aspect of improving interest toward research and academia is publishing with medical student journals.[39] Preliminary evidence suggests that those who publish their articles in medical student journals are more likely to publish in PubMed-indexed journals, attain PhD degree, and secure academic positions post-graduation.[39]

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Gaining writing and publishing experience by targeting student journals and other reputable sources is particularly important in view of the proliferation of substandard, or so-called predatory, journals. The absolute majority of medical students are still unaware of predatory journals and their negative consequences for authors.[40] Institutional initiatives are warranted to increase awareness in this regard.[40]

Interestingly, time constraints are increasingly reported as barriers to medical students' engagement in research.[41-44] Time constrain is even more stressful factor among residency students who are concerned with relevance and quantity of published articles to successfully compete with peers and engage in impactful research projects.[42]

CRITICAL THINKING (CT)

CT holds crucial importance for health professionals. The availability of various courses for improving CT is not always translated into students' relevant skills.[45,46] Student-centered strategies with hands-on teaching methods are supposed to improve the learning environment oriented toward CT.[47] Case-based learning is a prime example of gaining clinical problem-solving skills.[48] Overall, continuously improving conventional teaching modalities and moving toward student-centered education may foster CT and self-sufficiency among medical students.[49]

LANGUAGE BARRIERS

English is currently the main language of communication, facilitated by extensive knowledge dissemination and proliferation of international medical journals.[50] English language barriers are still challenging medical education and performance of both students and educators.[51] Linguistic clarity, comprehension, and cultural nuances are increasingly reported confounders.[52]

Students from diverse linguistic backgrounds encounter difficulties with comprehending medical terminology, instructions, expressing ideas, and engaging in communication with peers and educators.[53]

Most students encounter challenges with adapting to internationalized educational systems due to time constraints, psychological stress, and language barriers.[54] A survey of 82 Ukrainian undergraduate medical students demonstrated that educators' English proficiency is one of the main factors associated with the overall quality of education and motivation of international students.[55] Overall, tailored support for both educators and students, with advanced language courses, is gaining more and more importance in the context of the quality of internationalized education.[56,57]

CULTURAL ISSUES

Cultural competence (CC) plays a vital role in medical education, though its teaching is still not unified and not systematic.[58] Recognizing the significance of CC across all educational levels and developing individualized approaches require affective, cognitive, and behavioral

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measures.[59] Unbiased healthcare provision is based on CC, particularly for subjects with culturally and linguistically diverse backgrounds.[60]

Culture shock and related factors influence international students' adaptation to the academic environment. Successful adaptation to host country culture depends on language learning and socialization.[61] In fact, international students who encounter daily life challenges rapidly adapt to the new realities, confounded by gender, language proficiency, and regional specifics.[62] The host academic institutions enable their students' adaptation by identifying and curbing challenges.[62] Complex and uninterrupted support of host institutions translates into the progress in learning throughout all years in education, reduces psychological stress, and improves behavioral aspects.[63]

ADAPTATION AND PSYCHOLOGICAL ASPECTS

International students initially encounter moderate psychological distress that becomes less intensive over time, with visa arrangements and accommodation, engagement in academic courses, successful accomplishment of preparatory modules, and advancing language skills.[64,65] Departments of international students at academic institutions are capable of lessening the intensity of psychological distress by proper instructing and arranging language and medical terminology courses.[66] Additional support to cope with international students' distress may come from their families, helping emotionally to prevent burnout and maintain their motivation to continue education.[67] Finally, depression, anxiety, and other manifestations of student distress can be treated by a specifically designed scheme of mindfulness meditation, body awareness, yoga, and behavioral analysis which is termed mindfulness-based stress reduction.[68] In fact, accumulating evidence confirms that engaging in frequent and intensive physical activities decreases medical students' burnout and enhances their quality of life.[69]

Overall, a balanced/rational approach to education and performance may well translate into less stressful and enjoyable years of students' learning.[70]

ONLINE EDUCATION

The advantages of online education for international medical students have been acknowledged in the peri-pandemic period.[71,72] Low- and middle-income countries have encountered numerous challenges due to limited access to global information resources and online channels, shortage of educators with digital skills, and inadequate governmental support.[73-76]

A survey of 358 undergraduate medical students in the beginning of the COVID-19 pandemic demonstrated that switching to online education was perceived as the best solution by two-thirds of responders.[77] The same survey pointed to limited access to high-speed Internet, inadequate digital skills, and lack of face-to-face interaction as factors affecting the efficiency of online learning.[77] Another survey of 517 medical students and 88 educators reaffirmed benefits of students' positive perceptions of online learning and educators' online teaching readiness.[78] The largest survey of medical students (n = 99,559) during the pandemic concluded that positive perceptions of online education are dependent on previous experience of the same and that students learning clinical disciplines are much

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less satisfied with online courses than those exposed to theoretical and fundamental disciplines.[79] A systematic overview of 31 studies revealed that for fundamental disciplines such as anatomy online teaching cannot replace traditional teaching and that a blended approach is the most advantageous.[80]

CONCLUSION

The increasing internationalization of medical education has resulted in a rich tapestry of cultures and backgrounds among students. However, this diversity brings with it a set of challenges that may impact the academic and personal experiences of international students. Recognizing and addressing these challenges are essential for creating a conducive learning environment. Introducing comprehensive cultural competency training within medical curricula may enhance understanding and communication among students and faculty. Establishing mentorship programs that pair international students with experienced mentors may offer guidance on academic expectations, career development, and navigating the challenges of a new healthcare system. By adopting a multifaceted approach that addresses cultural, linguistic, and educational challenges, medical institutions may foster a more inclusive and supportive atmosphere for international students.

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