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MEDICAL EDUCATION REVIEW

ONLINE MEDICAL EDUCATION PERSPECTIVES IN KAZAKHSTAN AND CENTRAL ASIA

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Abstract

Introduction. Medical education should review online teaching methods so that doctors can use digital information effectively. Virtual education was well received during the pandemic, and teachers and students expressed satisfaction. However, male teachers and students adapted better than female teachers and students. Although online education has advantages, traditional offline education should only be replaced partially. Universities should focus on the development of virtual education and teacher training.

Methods. We thoroughly analysed research works published on Web of Science, PubMed, and Scopus from the creation of these databases until May 2023. Our search terms included "Distance learning", "Online education", "Medical education", and "Central Asia", and we limited our search to English language articles. We also reviewed the literature lists of all the studies we found to identify potentially relevant articles. We carefully read all the studies and articles we identified, paying attention to the authors' names and publication dates to avoid data duplication.

Inclusion and exclusion criteria. To conduct a thorough search, we searched for research articles published in journals that undergo peer review and are written in English. We only included studies that involved medical students and excluded articles that did not relate to distance learning, were published in non-peer-reviewed journals, or needed to be written in English.

Conclusion. Higher education faces similar challenges and opportunities in the post-pandemic era, despite variations in cultural backgrounds and educational systems across countries. Improvements are also needed in online medical education, which can be achieved through the development of online training courses, individual tracking, technical control, professional support, and specialised evaluation. Such improvements will make medical training more accessible and sustainable for doctors in all areas. Innovative technologies will be necessary to ensure high-quality medical education in the future.

Keywords: Online learning, Distance education, Medical education, e-learning, Medical student

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INTRODUCTION

Innovations related to technology and digital communications have given rise to social changes and have become the main impetus for educational changes in recent decades [1]. Online learning is widely recognised as essential for higher education because it saves time and money. It has become a popular strategy for universities worldwide, and its significance in the educational process is increasing daily [2,3]. Online learning involves introducing advanced technologies, including computers and the Internet, to provide course content, engage students and facilitate two-way interaction among students and teachers [3].

Online learning can give students relatively easy and efficient access to a wider variety and more information [4]. However, transitioning from traditional education to online can be challenging. Increasing time constraints and demands are constantly being played on students and teachers, encouraging faculties to find new ways to provide more personalised, independent learning [5].

At the same time, there are several factors in developing countries, such as the need for financial, network and technical infrastructure, which makes it challenging to implement distance learning [6]. In addition, in developed countries, online learning is more feasible owing to Internet services, the competencies of teachers, and the experience of online learning [7, 69].

The massive use of digital communications has made it possible to create countless online learning opportunities for medical students around the world, who now benefit and learn through interactive faculty education through a worldwide network [8, 9].

Virtual classes are considered more effective than traditional offline learning [10]. Students register and study online courses to achieve their personal and professional goals. The main advantage of online education is a high degree of flexibility and unlimited digital access to large amounts of information, which explains the vast popularity of online courses [11, 12]. Round-the-clock access to online courses allows students to structure their classes along with other personal and work responsibilities, which is most difficult and sometimes impossible with the traditional method of education [13].

Even though elements of online education have been taking place for a long time, the COVID-19 pandemic has accelerated the complete transition of medical education from classroom to online. In turn, this created unique problems for both sides, both for teachers and students. Such issues include insufficient computer skills, communication skills, poor time management and much more [14]. The COVID-19 pandemic has become an excellent examination for education systems worldwide, forcing many countries to temporarily close educational institutions and perform courses thoroughly online [17].

During urgent situations such as COVID-19, it is vital for clinical education to quickly and effectively cope with the growing number of patient cases while protecting medical personnel and continuing educational activities. Technology-based clinical education makes it possible to transform the continuity of visits to clinical patients into virtual alternatives, turning teaching into internet platforms [68]. The outbreak of COVID-19 has caused a significant shift in the education system towards digital methods such as online lectures, lessons, digital books, video conferences, and virtual classrooms [15,16].

During the COVID-19 pandemic, medical professionals, educators, administrators and policymakers in developing countries tried to turn it into an opportunity to develop e-learning programs. Students of medical higher educational institutions reported discontent and a negative approach to online learning, and they explained this by saying that their opportunities to acquire essential and basic practical skills were lost due to the consequences of the COVID-19 pandemic [18, 19, 20].

Witkowski et al. l (2008) and Palmer and Holt (2009) conducted a study where the main goal was to assess the impact of access and use of online learning resources on student satisfaction. The results show that the level of access and use is associated with student satisfaction in Pakistan and Brunei. Student satisfaction is also related to the place of residence, previous online learning experience, and use of online learning resources by a friend or family. The results showed that students living in cities are more satisfied with online learning than students from rural areas in both countries. Urban settlements have better access to reliable Internet resources (Kim and Lee, 2011; Irons et al., 2002) [21, 22, 23,24].

In general, countries with good and stable economies can better respond to emergencies and give increased focus to less privileged regions, which is unavoidable during public health emergencies [25]. Good communication and counselling skills and developing them are of great and fundamental importance for enhancing health outcomes and developing productive therapeutic relationships [26]. Consultation skills are

most commonly taught during the traditional training method, that is, face-to-face. But the study by E. Warnecke and S. Pearson examined using a hybrid learning strategy, thereby improving medical students' acquisition of new skills and more efficient use of offline learning time.

Online training in medical education is a means to an end. Online learning is used and adapted in various low-income countries to cover different competencies: basic science, medical knowledge, specialisation and clinical practice. Multiple methods can be used to conduct online training, electronic libraries, distance learning networks, multimedia software, learning management systems, virtual simulations, mobile applications and many other electronic resources. Research has demonstrated, and practical experience has proven, that distance learning can be an effective mode of teaching for students residing in rural areas [27].

Online learning is well considered reliable and attractive, but medical students need help seeing it as a substitute for offline learning [28]. For students, online learning is an additional element of traditional didactic learning or one of the components of blended learning [29,30].

To produce capable doctors who can effectively access and utilise the vast wealth of online digital information, we must reassess the current teaching methods in medical education [31]. The most significant number of teachers and students supported the introduction of virtual education during the pandemic and, as a result, were satisfied with it. Although teachers were less adapted to online education, their attitude to this type of education was positive. Gender has influenced the adoption of online learning. Male teachers and students have demonstrated that they adapt better to such changes than their female colleagues. Online education has many advantages but must completely replace traditional offline education. Since virtual education is a trend for training future specialists, universities should develop it, especially to pay more attention to teachers [32].

ONLINE MEDICAL EDUCATION IN PAKISTAN

Power outages are common in Pakistan; not all families have backup power. This makes it difficult for students to attend live educational sessions. Providing socially-distanced computer labs can ensure uninterrupted access to the curriculum [33].

During a conversation with medical college teachers and students in Pakistan, it was revealed that the shift to online education has presented numerous challenges. Many individuals are experiencing this type of education for the first time and require additional time to adjust to traditional teaching methods. Another issue has been the need for more training teachers provide in preparing electronic educational content quickly. Consequently, students and teachers have faced various difficulties while participating in online medical education during the COVID-19 pandemic [5]

Despite initial reluctance, online learning has become a common practice globally. Before the pandemic, many educational institutions in Pakistan did not view it as a formal part of education [34]. Currently, 169 registered medical and dental colleges operate under the Pakistan Medical and Dental Council [35]. Before the pandemic, only a small percentage of educational institutions utilised online learning methods and training for students. This was due to the need for an information technology department and personnel to train teachers in computer technology skills. In Pakistan, many colleges rely on traditional teaching methods. However, with the pandemic, teachers were compelled to switch to online education, potentially impacting the quality and effectiveness of education [36, 37].

Since distance learning is a relatively new concept in Pakistan, faculty and learners are still getting used to the system [34]. The swift shift to a new educational format has created difficulties for students who need to become more familiar with technology. A survey conducted before the COVID-19 pandemic in Pakistan found that only 34% of students felt confident searching for clinical information on academic databases like PubMed. According to the study, there were notable differences in the ability to use online databases based on gender. Educational institutions must recognise these disparities in technological proficiency among students. One solution is incorporating technology skills training in the curriculum for remote learning and online clinical referencing [38].

It should be highlighted that obstacles to online teaching methods are common among teachers and students of medical higher educational institutions in many Central Asian countries. There is a need for Central Asian countries to adopt best practices from other regions and create effective strategies that are suitable for their local working environment.

ONLINE MEDICAL EDUCATION IN IRAN

E-learning has become increasingly common at all levels of education in Iran since the outbreak of COVID-19 in March 2020. To ensure continuity of education, universities of medical sciences have adopted the Virtual University of Medical Sciences Navid system, while the Islamic Azad University has established a virtual education network. This approach has been ongoing to date [39].

All universities in Iran strive to provide high-quality services and meet the needs of their students. The Islamic Azad University, a private organisation that receives student tuition, greatly emphasises student satisfaction as a crucial goal. The founders are committed to making continuous efforts to ensure that students are satisfied with their experience at the university. This slight difference in approach may be attributed to the university's unique position as a nongovernmental and private organisation [40].

Iranian scientists created an e-learning course on oxygen therapy for emergency department clinicians during the pandemic. After completing the course online, the researchers found a significant improvement in the knowledge of nurses and general practitioners [41]. Distance learning courses are more suitable for clinicians due to their work schedules and conditions.
Educational institutions should also consider students' psychological factors, such as their confidence in online learning. The shift to online education has been sudden, and students may need more time to adjust to this new teaching method. A study conducted in 2021 at Kerman University of Medical Sciences found that the Persian version of the Online Learning Self-efficacy Scale (OLSES) is a reliable tool for assessing students' self-efficacy in the e-learning environment. This scale is simple, valid, and has good psychometric properties [42].

When utilised correctly, new technology-based learning can enhance teaching methods in higher education institutions and shift the focus from simply transferring knowledge to building knowledge. A study conducted by Masoumeh Dousti et al. revealed that internet-mediated learning, virtual blended learning, and purely online instruction using WebQuest tasks improve the learning process, especially regarding writing and auxiliary skills. The authors suggest that advanced technological training can assist teachers in creating dynamic teaching and learning opportunities, reducing their passive role during lectures, making education more interactive, and promoting communication and teamwork among students [43].

Many medical institutions in Iran have developed a virtual training platform to help medical schools nationwide. A national learning management system has been developed by the Virtual University of Medical Sciences in Iran to facilitate teaching medical sciences through an electronic medium. This system aims to support teachers in designing effective learning processes for medical students and meeting their specific needs. Its main features include course content storage, user and equipment management, report generation, course calendar, learning trajectory, and a discussion forum for participants to contribute, set deadlines, change them, and assign grades.

The National Virtual University of Medical Sciences collaborates with top medical universities in Iran to offer massive open online courses, providing additional learning opportunities for students enrolled in medical institutions [44].

ONLINE MEDICAL EDUCATION IN KAZAKHSTAN

A study conducted by a group of authors from Kazakhstan examined the mental state of medical students in Kazakhstan after transitioning to online education during the pandemic. The study revealed significant changes in emotional burnout, depression, and anxiety among students. Surprisingly, emotional burnout and the prevalence of depression, anxiety, and somatic symptoms were lower during distance learning compared with traditional offline education. Additionally, students reported higher satisfaction with their academic performance during the online period. However, adverse changes in academic performance were associated with symptoms of depression and anxiety and dissatisfaction with academic performance. This could be due to a need for more communication during distance learning [45].

Bolatov et al. conducted a study to compare the effects of online and blended learning on the academic motivation of first-year medical students during the COVID-19 pandemic. They also considered academic life satisfaction, college affiliation, psychological factors, and emotional well-being. The authors concluded that the transition from online to blended learning during the pandemic was more beneficial for students in terms of their motivation to study, based on the results of a cross-sectional study [46].

ONLINE MEDICAL EDUCATION IN CHINA

The COVID-19 outbreak occurred in China, making it the first country affected [47]. Despite this, China was one of the countries that responded most effectively to the situation. The Ministry of Education in China has

encouraged the continuation of classes through online teaching, leading to a significant increase in this learning mode [47, 48].

One major obstacle to implementing online medical education in developing countries is the need for more necessary infrastructure, such as learning equipment and reliable internet connections. However, this concern was quickly resolved in China, where it was initially a problem for medical students studying online [14].

Based on surveys, the implementation of online medical education in China was booming and satisfying, despite the sudden shift. The investigation showed that the progress of online medical education exceeded the researchers' expectations. Additionally, most students had access to the necessary equipment and internet connections for online learning [49].

At Chongqing Medical University in China, a questionnaire survey was conducted to understand how students feel about online teaching of infectious diseases on WeChat, QQ, and the SuperStar platform. Results showed that most students were satisfied with the quality of online education. Out of 150 participants, over 90% believed it helped develop skills such as self-learning, independent thinking, case analysis, and literature searching. They also felt that it was effective in assisting them to understand theoretical knowledge and clinical skills [50].

Other online teaching studies across various disciplines, including radiology, obstetrics and gynaecology, and laboratory medicine, have also yielded similar results. Student-centred online teaching improves students' abilities and fosters teamwork and a positive attitude [51, 52, 53, 54]. Online education in China has shown that students are more engaged in learning when presented with dynamic electronic materials, such as images and videos. This has been observed in various studies [51].

The 5G telecommunications network infrastructure in China is significant in upholding the standard of distance learning. It offers speedy access to online resources and instantaneous communication, guaranteeing students a smooth learning experience. Efforts have been made to simplify and enhance online teaching by optimising the use of technology and promoting engagement between educators and learners in digital classrooms [54].

Also, a survey was conducted in China with over 99,000 medical students from 90 different schools to gather their opinions on formal online education. This was the first survey of its kind, and most students were satisfied with the online learning program offered by their school. This indicates a general acceptance of the online-learning approach for undergraduate medical education [55].

At the same time, a study conducted in China found significant correlations between online learning modes, smartphone addiction problems, and multiple mental health symptoms among a representative sample of students after the COVID-19 outbreak. The study revealed a high prevalence of problematic smartphone use (58.5%), similar to previous studies conducted during the pandemic [56].

According to a recent study, many Chinese college students experience high anxiety and depression symptoms. The meta-analysis found that 31% of students had anxiety symptoms, and 34% had depressive symptoms [57]. Focusing on the teaching structure and considering students' mental well-being is essential.

Currently, numerous websites are offering free online courses for teachers. These courses enable students to learn about online learning and create dynamic classes for their students. Over the years, several studies have been conducted to determine students' views on online learning. The findings indicate both positive and negative attitudes among students. While students appreciate online education's affordability, convenience, and cost-effectiveness, they also encounter technical and behavioural issues, difficulties in understanding course content, and teachers' proficiency in computer technology and conducting practical online lessons [58, 59, 60, 61]. Teachers have highlighted several advantages of online education, including distance learning, constant access to educational content and teachers, and reduced travel expenses. Online education also simplifies management tasks such as recording lectures and marking attendance. Students and teachers believe online education has helped students adapt to the pandemic. Online learning allows students to learn at any time convenient, giving them complete independence in their studies [60].

The way students and teachers perceive e-learning programs can be influenced by their age and technological skills, which may impact their satisfaction with its effectiveness [62].

Overall, the pandemic had a positive impact by increasing access to online educational platforms and social networks for higher education institutions, research and teaching staff, and medical students worldwide. This enables educators and trainees to attend training more conveniently without disrupting their primary work and responsibilities. Moreover, the basic versions of many online platforms and social networks are free, making it possible for national and international speakers/experts to participate at reduced rates [63].

Innovative, flexible technologies are revolutionising medical education and will continue to do so in the future [64]. Virtual medical universities and simulation-based solutions for healthcare training environments [65, 66] will guarantee high-quality medical education.

Online education in the field of medicine, while undeniably useful, needs further improvements. The development of an online training course tailored to the unique features of medicine is imperative. Additionally, individual tracking, technical control, professional support, and specialised evaluation are essential components to effectively evaluate the efficacy of online medicine training and provide guidance for future medical teachers.

The present moment presents an opportune time to disseminate skills and experiences on a broader scale. This long-term advantage would make professional development and education more accessible and sustainable for doctors in various settings, such as urban, regional, rural, and remote environments. This has the potential to reduce unnecessary travel and financial costs. As the world changes rapidly, teachers, students, and healthcare employees must adapt to stay up-to-date, benefiting all medical education levels.

Administrators and teachers must seek out innovative technologies to maintain the high quality of medical education. Scientific and pedagogical workers in medical education must embrace these new technologies, ultimately shaping the future of medical education in their institutions [67].

CONCLUSION

Despite variations in cultural background and educational systems across countries, higher education faces comparable challenges and opportunities in the post-pandemic era. These include the advancement of online or blended teaching, the enhancement of teachers' professional development and information literacy, the creation of courses and training programs, and the implementation of emergency management mechanisms.

Online medical education requires improvement through the development of online training courses, individual tracking, technical control, professional support, and specialised evaluation. Online medical education will make medical training more accessible and sustainable for doctors in all areas. Innovative technologies will be needed for high-quality medical education in the future.

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CONFLICTS OF INTEREST

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ҚАЗАҚСТАН МЕН ОРТАЛЫҚ АЗИЯДАҒЫ МЕДИЦИНАЛЫҚ ОНЛАЙН-БІЛІМ БЕРУДІҢ БОЛАШАҒЫ ҚАЗАҚСТАН ЖӘНЕ ОРТАЛЫҚ АЗИЯДА МЕДИЦИНАЛЫҚ ОНЛАЙН БІЛІМ БЕРУДІҢ БОЛАШАҒЫ

Түйіндеме

Кіріспе. Медициналық білім дәрігерлер цифрлық ақпаратты тиімді пайдалана алатындай етіп оқыту әдістерін қайта қарауы керек. Пандемия кезінде онлайн білім беру жақсы қабылдап, мұғалімдер мен оқушылар қанағаттанушылықтарын білдірді. Айта кету керек, ер мұғалімдер мен ер оқушылар әйелдерге қарағанда жақсы бейімделді. Онлайн білім берудің артықшылықтары болғанымен, дәстүрлі офлайн білім беруді ішінара ауыстыру керек. Университеттер виртуалды білім беруді дамытуға және мұғалімдерді даярлауға назар аударуы керек.

Зерттеу әдістері. Біз Web of Science, PubMed және Scopus қорлар құрылғаннан бастап 2023 жылдың мамырына дейін осы дерекқорларда жарияланған зерттеу жұмыстарын мұқият талдадық. Іздеу сұрауларымызға "Қашықтықтан оқыту", "Онлайн білім беру", "Медициналық білім беру" және "Орта Азия" кірді. Іздеуді ағылшын тіліндегі мақалалармен шектедік. Біз, сондай-ақ, ықтимал сәйкес мақалаларды анықтау үшін тапқан барлық зерттеулердің әдебиеттер тізімін қарастырдық. Деректердің қайталануын болдырмау үшін авторлардың аты-жөні мен жарияланған мерзіміне назар аударып, біз анықтаған барлық зерттеулер мен мақалаларды мұқият зерттедік.

Енгізу және алып тастау критерийлері. Мұқият іздеу үшін біз сараптаудан өткен және ағылшын тілінде жарияланған журналдардағы ғылыми мақалаларды іздедік. Біз тек қана медицина студенттері қатысқан зерттеулерді енгіздік және қашықтықтан оқытуға қатысы жоқ, рецензияланбаған журналдарда жарияланған немесе ағылшын тілінде жазылмаған мақалаларды алып тастадық.

Қорытынды. Жоғары білім пандемиядан кейінгі дәуірде әртүрлі елдердегі мәдени шығу тегі мен білім беру жүйелеріндегі айырмашылықтарға қарамастан ұқсас қиындықтар мен мүмкіндіктерге кездеседі. Медициналық онлайн білім беруде реформалар мен жақсартулар қажет, бұған онлайн оқыту курстарын әзірлеу, жеке бақылау, техникалық бақылау, кәсіби қолдау және мамандандырылған бағалау арқылы қол жеткізуге болады. Мұндай жақсартулар медициналық дайындықты барлық саладағы дәрігерлер үшін қол жетімді және тұрақты етеді. Болашақта сапалы медициналық білім беру үшін инновациялық технологиялар қажет болады.

Түйін сөздер: онлайн оқыту, қашықтықтан оқыту, медициналық білім, e-learning, медицина студенті.

Дәйексөз үшін: Ауанасова А. Қазақстан және Орталық Азияда медициналық онлайн білім берудің болашағы. Медициналық гипотеза мен этиканың Орта Азиялық журналы 2023:4(2):112-122. https://doi.org/10.47316/cajmhe.2023.4.2.06

ПЕРСПЕКТИВЫ МЕДИЦИНСКОГО ОНЛАЙН-ОБРАЗОВАНИЯ В КАЗАХСТАНЕ И ЦЕНТРАЛЬНОЙ АЗИИ

Резюме

Введение. Медицинское образование должно пересматривать методы обучения, чтобы врачи могли эффективно использовать цифровую информацию. Онлайн-образование было хорошо воспринято во время пандемии, учителя и ученики выразили удовлетворение. Стоит отметить, что учителя и ученики-мужчины адаптировались лучше, чем женщины. Хотя онлайн-образование имеет свои преимущества, традиционное офлайн-образование должно быть заменено лишь частично. Университеты должны сосредоточиться на развитии виртуального образования и подготовке учителей.

Методы исследования. Мы тщательно проанализировали исследовательские работы, опубликованные в Web of Sciences, PubMed и Scopus, с момента создания этих баз данных до мая 2023 года. Наши поисковые запросы включали «Дистанционное обучение», «Онлайн-образование», «Медицинское образование» и «Центральная Азия». Ограничили наш поиск статьями на английском языке. Мы также просмотрели списки литературы всех исследований, которые мы нашли, чтобы определить потенциально релевантные статьи. Внимательно изучили все выявленные нами исследования и статьи, обращая внимание на имена авторов и даты публикации, чтобы избежать дублирования данных.

Критерии включения и исключения. Чтобы провести тщательный поиск, мы искали исследовательские статьи, опубликованные в журналах, которые проходят рецензирование и написаны на английском языке. Мы включили только исследования, в которых участвовали студенты-медики, и исключили статьи, которые не имели отношения к дистанционному обучению, были опубликованы в не рецензируемых журналах или должны были быть написаны на английском языке.

Заключение. Высшее образование сталкивается с аналогичными проблемами и возможностями в постпандемическую эпоху, несмотря на различия в культурном происхождении и образовательных системах в разных странах. В медицинском онлайн-образовании нужны реформы и улучшения, чего можно добиться за счет разработки онлайн-курсов обучения, индивидуального отслеживания, технического контроля, профессиональной поддержки и специализированной оценки. Такие улучшения сделают медицинскую подготовку более доступной и устойчивой для врачей во всех областях. Инновационные технологии будут необходимы для обеспечения качественного медицинского образования в будущем.

Ключевые слова: онлайн-обучение, дистанционное обучение, медицинское образование, электронное обучение, студент-медик.

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