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Challenges to E Learning in medical Education during Coronavirus disease 2019 (COVID-19): A literature review

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Abstract

Background: In the current situation of uncertainty, current study was aimed to review the literature on the known challengesto E-Learning in medical education faced by educators when developing and executing online learning programs for medical students.

Methods: An integrated review was conducted by an inter institutional research team. The search included PubMed, Medline, Google Scholar, Science Direct and Bio Medical sources. Serach terms included challenges, online learning, Medical educators, development, barriers, solutions and digital literacy. The search was carried out by two reviewrs. Screening of titles and abstracts was done autonomously and inclusion and exclusion criteria was defined. Articles to be included were selected consensus was drwn on which articles to be included. Data extraction was completed using the Cochrane Data Extraction Form and a modified extraction tool.

Results: Among the 38,875 abstracts identified from the search, ten full-text papers met the inclusion criteria. Data extraction was completed on seven papers of high methodological quality and on three lower quality papers. Findings suggest that the key barriers which affect the development and implementation of online learning in medical education include time constraints, poor technical skills, inadequate infrastructure, absence of institutional strategies and support and negative attitudes of all involved. Solutions to these include improved educator skilld, incentives and reward for the time involved with development and delivery of online content, improved institutional strategies and support and positive attitude amongst all those involved in the development and delivery of online content.

Conclusion: This review has identified barriers amongst medical educators to the implementation of online learning in medical education throughout world.

Keywords: E-learning, Online learning, Medical education, Medical faculty, Challenges, Pandemic

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Introduction

In early December 2019, there was an outbreak of coronavirus disease 2019 (COVID-19), in Wuhan City, China. It was declared a Public Health Emergency of International by World Health Organization (WHO) in January 2020. Perceived risk of acquiring disease led many governments to impose a variety of control measures from curfews to lock downs. This led to closure of all of classrooms all over the world and forced 1.5 billion students and 63 million educators[1,2] to suddenly modify their face-to-face academic practices, wherever possible. The digital transformation of education systems in all levels has allowed incorporating a new teaching–learning ecosystem called e-learning. This led to cancellation of almost all clinical placements of medical students stopped as health-care settings focused on the care of patients with COVID-19 and teaching in classrooms and laboratories was stopped, leaving students to continue their studies remotely. We all know that Practice-based learning is the mainstay of the medical education. Hospitals, clinics, and community services are where future doctors learn, polish professional characteristics, and develop an alignment to patient-focused care that shape their practice. The COVID-19 pandemic has had devastating effects on

medical education resulting in worldwide disruptions not only to the healthcare system but also to medical education. [3]

As a result of lock down not only students, but the public as a whole has had travelling restrictions. Educational institutes and universities including all medical colleges were forced to stop operations physically with commencement of online learning activities. This became a challenge as clinical teachings required students to be in the healthcare setting which is considered as very high risk. Worldwide, many schools of medicine had to halt their clinical teachings and assessments. [4]

In the United Kingdom, some teaching hospitals that have had reports of COVID-19 cases adjourned teaching and clinical attachments.[5] In the US, discontinuation of clinical teaching activities for minimum two-week was indorsed by the American Association of Medical Colleges (AAMC).[6] In Australia and New Zealand, most medical schools converted to online teaching in the last 2 weeks of March of 2020.[7] Simultaneously in Singapore, full lockdown was endorsed and complete termination of activities were imposed in April 2020.[8]

Medical education in India also experienced a major troublesome change as a consequence of the COVID-19 Pandemic and nation-wide lockdown since March 2020. Measures to prevent spread and to guarantee social distancing led to the closure of medical schools and have forced the situation of working from home for both medical teachers and students. [9] The government of Pakistan suspended all activities in its institutes and universities. This helped in preventing spread of the pandemic; by keeping all those exposed safe, the critical issue to be addressed was continuing medical education.[10] Medical education is about highlighting and displaying good practices to trainees, which is the basis of good professionalism in medicine.[11] this helps to enhance students' responsibility, regular observation of their work, opportunities to practice problem solving skills, and attending to patients.[12]

Educational activities include LGIS, SGDs, Tutorials, Practicals, Skill lab performances, seminars bedside teaching, outpatient clinics teaching, and inter and intradepartmental clinicopathological (CPC's) meetings. There has been no review of evidence of challenges faced during online medical education at the discretion of the medical educator but there has been completed work on student barriers and solutions to improve online learning till date [13,14,15] Therefore this review aims to fill this gap in literature. We have done a literature review of online evidence to summarise information on the challenges faced due to COVID-19 pandemic on all such online medical education activites and challenges that were faced to chalk out solutions.

Material and Methods

A review of the available literature was done to scrutinize it for inclusion of studies with varied methodologies such as those with both experimental and experimental designs. The Whittemore & Knafl framework was used to strengthen the rigour of the review.[16] The process involved the following five steps: identification of the research problem; execution of a well-defined literature search; data quality appraisal of the literature; analysis of the data; and declaration of conclusions. Studies using different research designs were included with the aim of presenting diverse perspectives and expanding knowledge.

Search strategies

A team of researchers consisting of six members developed a search strategy. Database included in the study were: PubMed, Medline, Google Scholar Science Direct, Bio Medical, JSTOR and Scopus. After a robust search on these databases Boolean operators (AND, OR) by means of the search terms "online learning", "distance learning", "challenges for medical educators" in online teaching and "digital literacy" have been used. The search was completed by researchers independently to certify that all relevant data was counted in. This is done by exploring the titles and abstracts independently. This was followed by analysing input from all authors to ensure that the results are the same. All included abstracts were explored for full text articles to be finally included or excluded from the study .

Inclusion and exclusion criteria

Consensus was made to include all the data, available in English language being published between March to August 2020 concentrating on the difficulties being a challenge for medical educators were involved. Scientific publications that considered distance learning / learning through electronic mode in undergraduate and postgraduate non-medical were omitted as well as the studies without experimental research and in languages other than English were not considered.

Data appraisal

Total ten articles were included in review after accomplishment of evaluation of the data by two reviewers through Critical Appraisal Skills Programme

(CASP) Qualitative Research Checklist for qualitative studies.[17]

Data extraction

Researchers performed data abstraction by using Supplementary Guidance Notes for Inclusion of Qualitative Research in Cochrane Systematic Reviews of Interventions from the included papers.[18]

Data analysis

For the mixed method studies thematic analysis was incorporated. Consensus was developed on analysis and coding under two headings i.e. 1. Implementing online teaching 2. Challenges to the implementation of online teaching. Concluding themes were approved by all authors.

Results

Search results

The initial search yielded 38,875 abstracts across all sources. A total of 38,765 articles were excluded following first evaluation of the literature rendering only 110 full text articles suitable for review (see Fig. 1 Algorithm of study selection). One hundred of these particular studies didn't not meet the contributor criteria were omitted. Rest of the 10 studies fitted into the inclusion criteria, were scrutinized for concluding analysis. Research team finally agreed upon four themes. These clusters are inclusive of barriers to the formulation and employment of online learning (see Fig. 2 Key themes recognised by coding process).

Core themes

Technical barriers

Expertise Lack: There is a large number of available technologies for online education but sometimes they create a lot of difficulties both for educators and learners. Insufficiencies in the skill area comprise poor fidelity of existing arrangements, connection / access instability; inadequate hardware / software; setup problems; insufficient organizational set-up; and scarce technical support. Not only this but there is also a lack of exposure to the clinical work as all treatment sessions are suspended. In addition to these medical students were not exposed to patients to mastery in taking history and treatment procedures such as catheterization and placement of intravenous cannula (IV). [19]

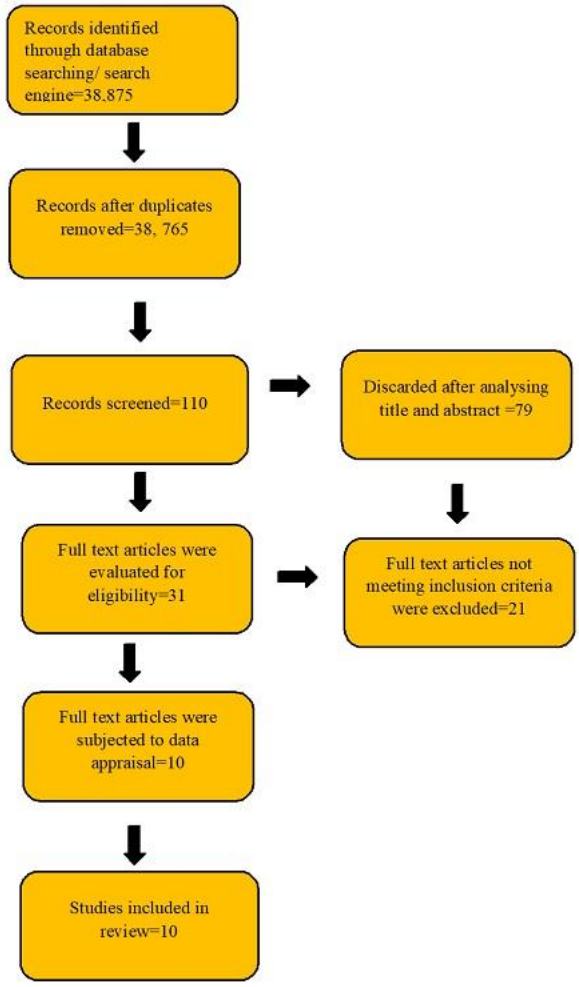

Fig.1 alogrithem of study selection

Time Deficit: Medical instructors find it difficult in fact, to devote plenty of time to complete online teaching, and uphold a work life balance in personal life chores. Therefore, inadequate time to offer to the be master in execution of online learning methods can be seen as a substantial barricade.

Gadget Deficit: In most of the families there is inadequate number of existing digital devices like mobile phones computers and tablets to be provided for online education.

Attitude Deficit: There is pronounced lack of awareness and interest of medical teachers to accept a new teaching approach. Instructors feel overburdened with the whole method of acquaintance with new approaches and having very less tolerance for rectification of negligeable technical problems.

Learner related Barriers

Communication Deficit: There is no face-to-face interaction of students with their teachers in distant learning predisposing to lack of students' interest. This poses a major challenge of one-sided interaction.

Motivation Deficit: Some online learning approaches may not be interesting, while others may be difficult to get acquainted with. The hardest thing is that there are no colleagues or teachers who can encourage you to continue. The risk of being alone is another destructive feature. While online learning effects each student in its own way, it essentially sets him apart from other students.

Burn out: It is difficult for faculty and students to familiarise with emerging teaching and learning environment. There is lack of concentration during online instruction due to lack of eye contact, role modelling, and teaching place environment. Facing many demands as learners combine learning, work and family. Students can become overly stressed, or "burned out.

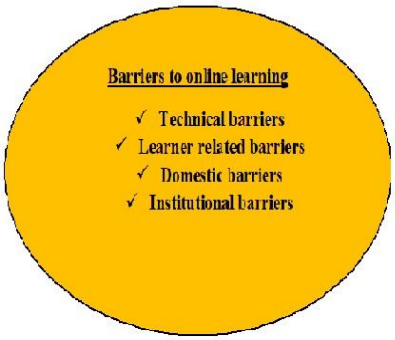

Fig.2 key themes recognized by coding process

Domestic barriers

The home environment is not conducive to the teaching and learning process. Students living in far-flung areas face difficulties in accessing online forums. Socioeconomic status affects computer ownership and ability and to pay for internet software and hardware. Impact of poverty also effects motivation for online classes

Institutional barriers

Administrative barriers comprise of a diversity of types such as backing facilities, pedagogy, and reachable course proposal.

Discussion

This review has thematically produced data comprehending substantial problems during implementation of online teaching. These comprised of various technical resources, learner related, domestic and institutional barriers with similar themes across many studies. This emphasises the ubiquity of barriers to online learning across diverse medical education systems all over the world during pandemic when it became inevitability to continue medical education. Literature on online medical education from different countries of the world suggest that various strategies have been in use for delivery of content online. Multiple podiums can be used to impart knowledge of the major bulk of pre-clinical subjects including anatomy, biochemistry, physiology, pharmacology. According to Miller's pyramid in medical education, most of the skills students must be trained in, for these subjects, are up to understanding of the concept.[20]

Although there is no face-to-face communication in online learning strategies being used therefore hands-on skills cannot be practiced in clinical years. In most of institutes, to overcome this, numerous videos attractively narrating and describing communication as well as clinical skills have been used. Other methods include simulated patients modelled by the lecturers or to clarify history taking on someone else simulated after practice. Even after all these adoptions students are prompted that this only theory, they would still be encouraged to perform the clinical examinations and hands-on sessions later after reopening of medical colleges. Few of them have described the same on the transformed method in education of the students of clinical years.[21,22,23]

Literature suggests that the best way to combat this by guaranteeing basic digital mastery (including fundamental knowledge of computer hardware), familiarity with the frequently mostly used programs, and know what support to look for when technical issues arise. Literature also stresses on the necessity of robust organizational backup support to cater such developments. Implementation of such programmes proved to be unsuccessful with lack of official backing and inadequate support elaborating the utilization of proper tools or programs.[24] It is strongly recommended that every institute must have clear and documented institutional strategy when implementing

online learning.[25] Data reveals a requirement of harmony among the faculty members of different disciplines in clinical and preclinical departments to assurance of provision of congruous education for future doctors.[26]

Most of recognised themes in the current review are in agreement with former studies being published in context of health profession education. Childs et al in his study clearly identified problems and their remedies for purposeful e-learning of health professionals and medical students. In the study they recognised unacquaintance with applied skills as major hinderance in smooth delivery of e learning and proposed the solutions to the above mentioned.[27] Pettersson & Olofsson highlighted on poor educator skills as a barrier which is consistent with current review.[28] The solution to this problem is introduction, implementation and proper follow up of basic computer mastery strategy was proposed by Childs et al. Time supposed to be one of the substantial barriers in the implementation of e-learning mechanics highlighted in present study is in accordance with the findings of Pettersson & Olofsson. They found out that there is inadequate time available for mastery in the newly emerged instruction strategies for the faculty consequence of which are toxic for self-confidence. Time constrains increased anxiety of faculty who is anxious about the teaching and administrative aspects of online teaching.[28] To permit teachers, the important chance to learn new advancements, organizations ought to consider ensured time for instructors to build up these abilities, learn ideas and duplicate on rehearses.[29]

Conclusions

The Coronavirus pandemic carried a stop to preclinical and clinical involved instructing because of security reasons. The issues are more to clinical versus the non-clinical years. Schedules made should be in order to make the students ready for the clinical sessions later Covid free period This pandemic has skilled the medical instructors to acclimatize to variations and heighten the use of technology, henceforth not hindering entirely the progression of teaching and learning. In this esteem however, more backing needs to be prearranged by medical organisations to provide support guarantying technical and mental health for the teachers and students both.

Competing interests

The authors declare that they have no competing interests.

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