SCOPING REVIEW

Enablers & barriers to online and e-learning for health professionals in Pakistan: a formative research

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Abstract

Objective: To design a continuous professional development programme pertaining to integrated nutrition, health, and Water, Sanitation and Hygiene interventions for health professionals (HP).

Method: The scoping review was conducted under the aegis of a capacity-building project led by the Centre for Global Child Health, Canada, and comprised systematic search for scholarly publications and grey literature published between January 2013 and September 2023, using Best Evidence Medical Education guide on Google Scholar and PubMed data bases as well as manual search in journals focussing on health professionals education. Data on enablers and barriers to e-learning in the specific context of health professions was compiled and synthesised. This was followed by in-depth interviews of policy-makers, educators and health professionals working in the field of nutrition.

Results: Of the 1,768 publications identified, 41(2.3%) were analysed in detail. Of the 15 key informants interviewed, 7(46.6%) were HPs, while 4(26.7%) each were police-makers and facilitators or designers of online modules. Under the two broad categories of "enablers" and "barriers", five subthemes emerged for each. The subthemes related to enablers included personal, content and design, quality of facilitators, peer connectivity, and social networking. The subthemes related to barriers were structural, cultural, curricular and content, human resources, and financial.

Conclusion: In Pakistan, the corona virus disease-2019 pandemic brought about a forced digital transformation for health professions students. Blended learning emerged as an effective e-learning model. To inform the development, implementation and sustainability of online continuous professional development of health professionals, a guiding framework comprising various elements, like financing mechanism, appropriate materials and activities, communication strategy, and an evaluation process, incorporating regulatory perspective, contextual factors and clear objectives is essential.

Key Words: Online education, E-learning, Barriers, Enablers, Health professionals, Continuous professional development.

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Introduction

Increase Gains in Nutrition through Integration, Education, Evaluation and Empowerment (IGNIT3) is a capacity building project funded by the Government of Canada. The project is led by the Centre for Global Child Health, Canada in collaboration with Nutrition International, Water Aid and health system partners. It aims to help improve the nutrition of children, adolescent girls and women in marginalized communities of Ghana, Malawi and Pakistan. IGNIT3 intends to build sustainable institutional capacity across the continuum of care and improve nutrition within vulnerable communities.[1]

Nutrition plays a critical role in promoting and maintaining optimal health throughout the life cycle. Pakistan has one of the highest burdens of malnutrition as well as high levels of maternal and child mortality and morbidity directly related to malnutrition.[2] Despite the grave nutrition-related situation in developing countries, it is observed that most health professionals (HPs) receive little or no nutrition training and are ill-equipped to support nutrition interventions at all levels.[3] A position paper by members of the World Public Health Nutrition Association (WPHNA) Capacity Building Task Force highlights developing the capacity of nutrition workforce as a vital intervention for scaling up nutrition programmes.[4,5] The World Health Assembly (WHA) also called for the establishment of a comprehensive approach to capacity-building of HPs.[6,7] To prepare the HPs who are competent in providing required support for the nutrition programmes at such a scale will obviously require new and/or unconventional methods. Keeping

this in view, one of the innovative interventions of IGNIT3 is to enhance the capacity of HPs through e-learning training on integrated nutrition, health, and Water, Sanitation and Hygiene (WASH) interventions.

The term e-learning was first termed in 1998 by Jay Cross .[8] One of the recent definitions of e-learning is: "Learning in which some content or activity is delivered via computers in any way, sometimes to the learning of content from the internet and sometimes to using a Virtual Learning Environment (VLE)".[9] Thus, e-learning in simple terms is computer-assisted learning (CAL) that can be either entirely internet-based or it can be blended or mixed with certain components of face-to-face (F2F) sessions.

Traditional F2F education has limitations in terms of reaching individuals who have time and financial constraints or reside in remote geographical locations. In contrast, e-learning offers enhanced accessibility, cost-effectiveness and time flexibility. In addition, it has the potential to facilitate synchronised forms of communication between instructors and learners or between groups of different learners.[10,11] Given the accessibility and convenience, distance education has become popular in Pakistan also. As early as in 1974, Pakistan started its first distance education through the Allama Iqbal Open University (AIOU), which is considered Asia's first open university for the masses, especially accessing the students of all grades and subjects in remote and rural areas.[12] In 2002, the Virtual University became Pakistan's first university to promote e-learning in various disciplines, recognised by the Higher Education Commission (HEC). COMSATS is another public-sector university that has a virtual campus for all levels of programmes in a range of disciplines. Besides, "elearn. Punjab" is the first government initiative in Pakistan that was launched back in 2014 and is categorised as an official repository of free digitized textbooks, augmented with access to videos for primary and secondary grades. Despite these pioneering initiatives, e-learning could not become part of formal education in Pakistan[13] until the rise of the corona virus disease-2019 (COVID-19) pandemic which forced almost every educational institution to shift towards e-learning. While e-learning was becoming a necessity, issues such as technological (installation, stable supply of electricity and internet connectivity, maintenance, privacy, security, and absence of technical support), access (to personal computers/ digital devises, spaces) and competencies (English language, computer skills)[14] hampered the possibility of post-pandemic sustainability and its widespread adaptability.

HP education also saw a considerable rise in the use of e-learning which resulted in major institutional re-arrangements, curriculum and pedagogical innovations, and adoption of CAL. Approaches such as blended learning, including synchronous online tutorials, simulation sessions, asynchronous activity in moderated discussion forums, formative quizzes and other teacher-directed learning or self-directed learning (SDL) activities, were among the examples.[15] There was also a significant increase in the number of publications and collaborative projects locally, nationally and internationally in the field of HP education. However, these mostly pertain to undergraduate and graduate education, with limited availability for the continuous professional development (CPD) of HPs.[16] The current scoping review was planned cover all relevant articles concerning e-learning, regardless of the level of HP education. The aim was to understand the long-term compliance of e-learning for HPs, with focus on two questions: What are the enablers and barriers to online and/or e-learning of HPs in Pakistan? What could be the best possible platforms, devices and mechanisms for online and/or e-learning of HPs in Pakistan?

Materials and Methods

To better understand the enablers and barriers to e-learning for practicing HPs in Pakistan and to inform the development of context-specific capacity building, we undertook a: i) scoping review; and ii) Key Informant Interviews (KIIs)

Scoping Review

Using Best Evidence Medical Education (BEME # 3) guide [17] and methods for scoping review in medical education [18] we carried out a systematic search for scholarly publications and grey literature published between Jan 2013- Sept 2023. This included sources such as Google Scholar, Pub-med database and manual searches in the HP education journals. We compiled and synthesized data on enablers and barriers to e-learning specifically within the health professions (not focussing on any specific topic), including physicians, dieticians, nutritionists, nurses and midwivesin Pakistan.

Primary search terms were e-learning (all synonyms) and health professions education (all synonyms) using 'text-word searching', which involves search for a word or phrase appearing anywhere in the document, where the document is the citation (article title, journal name, author), not the full text of an article, and searching abstracts, key words and /or the full text, employing Boolean Operators and truncations, such as "e-learning" OR "online learning" OR "distance learning" OR

"computer-assisted instruction" OR "web-based learning" OR "internet-based learning" OR "technology-enhanced learning" OR "virtual environment" OR "virtual learning" AND "continuing medical education" OR "medical education" OR "public health nutrition" OR "nursing education" OR "public health nursing" OR "allied health education" AND ("challenges" OR "barriers" OR "enablers" OR "facilitator" AND Pakistan.

Manual search was conducted in two ways; first all the issues of Academic Medicine, Medical Education and Medical Teacher published between Jan 2013- Sept 2023 were searched by browsing the tables of contents and reviewing abstracts in cases of doubt regarding inclusion. Second, reference list of all the shortlisted articles i.e. the records selected for the second stage of screening. All original research articles, short communication, letter to editors, case studies, narrations and grey literature published in English language and geared towards HPs in Pakistan only. Articles about other countries in the region were only included if there were participants /or an implementation arm in Pakistan. Study selection was guided by our inclusion criteria for articles in which online and/ or e-learning of HPs and/or HP students of all levels (undergrad, graduate, (PG) and CPD were considered. Additional inclusivity was the presence of learning performance, outcomes or description of any innovation within HPs education. Articles and studies pertaining to general education and falling outside online/ e-learning were not considered. Study selection was guided by the inclusion criteria for articles which entailed online and/ or e-learning of HPs and/or HP students of all levels. Additional inclusivity was the presence of learning performance, outcomes or description of any innovation within HPs education. Articles and studies pertaining to general education and falling outside online/ e-learning domains were excluded.

The articles selected for detailed analysis were reviewed as per the 12 dimensions of BEME guidelines[17] and scoping review methodology for HPs education[18] (Table 1).

Data was analysed under two broad descriptive categories: enablers or drivers of, and barriers or challenges to e-learning of HPs. Recurrent themes were identified through six steps: familiarising with the data; developing initial codes; searching for themes; reviewing the themes and subthemes; mapping ideas or issues; and producing final data. At the final stage, each article was reviewed to note points for preparing interview questions for the Key Informants (KIs) and for generating recommendations for designing an effective e-learning programme.

KI interviews (KIIs) were conducted to identify and characterise current e-learning trends, training modalities and factors that enabled or limited e-learning for CPD of HPs in Pakistan as well as to get further insights on the findings of the scoping review. The KIs were strategically selected through an iterative process within the study

Table-1: Best Evidence Medical Education (BEME)dimensions and specifications.

Dimensions	Specifications
Citation	Author, Year of publication and Journal
Context	Pandemic COVID-19, Requirement for accreditation, Any other
Location	City and Health Professionals (HP) institution where the study took place
Participants	Medical, Nursing, Dental, Dieticians, practicing Health Professionals (HPs), Any other
Design	Quantitative, Randomized Control Trial (RCT), Quasi, Qualitative, Mixed method, Systematic review, Any other
Level/ stage of education	Undergrad, Grad, Post Grad, Doctorate, Continuous Professional Development (CPD), Any other
Participants' Assessment	Asynchronous , Synchronous, Any other
Online Platforms	Coursera, Skillshare, Udemy, Khan Academy, Any other
Course designing institution	Sick kids, Nutrition International (NI), United States Aid (USAID), United Nations Funds for Population (UNFPA), World Health Organization (WHO), Any other
Learning Management System (LMS)	Moodle, BlackBoard, Canvas, 360learning, Any other
Model of teaching/learning	Face to face (F2F) , Fully online, Flipped, Blended, Hybrid
Mode of delivery/ Communication Platform	Zoom, Microsoft teams, WhatsApp, FaceBook Chat rooms, Any other
Additional remarks	Other noting point pertaining to the research questions

team while considering their credentials, experiences and affiliations with regards to the study objective. These included policymakers (PMs), facilitators and / or designers (F/Ds) and Health Professionals (HPs) who had been recipients of e-learning.

The scoping review provided material for preparing the questionnaires for each category of KIs, and a separate code was assigned to each of them. Most KIIs were conducted online through Zoom meeting platform, and all the interviews were audio-recorded. Immediately after the interview, the recording was transcribed, and typed notes were summarised under each question of the interview guide. Both the transcriptions and notes were reviewed for consistency. Once all the interviews were subjected to the process, the entire data set was read back to map categories and sub-categories that had emerged from the scoping review. At this stage, quotes were also identified for each theme to illustrate the important points.

Results

Of the 1,768 publications identified, 41(2.3%) were analysed in detail (Figure). Of the 15 KIs interviewed,

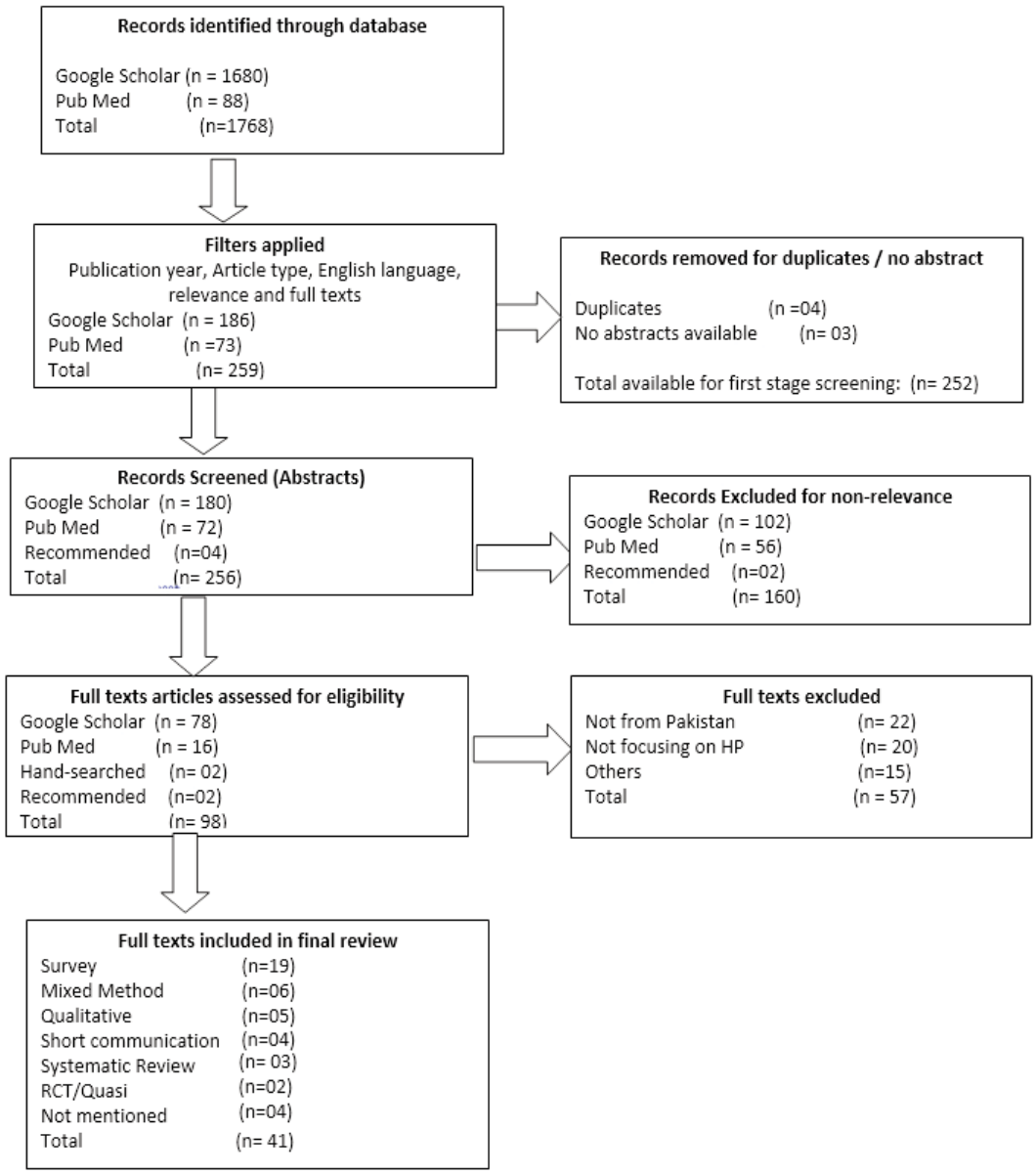

Figure: Flow Chart.

Table-2: Details of key informants.

Category	Acronyms	Numbers	Affiliation
Policy Makers	PM	4	One representative each from Higher Education Commission (HEC), Pakistan Nursing &Midwifery Council (PN&MC), Midwifery Association for Pakistan (MAP) and Ministry of National Health Services and Coordination (MoNHSRC)
Facilitators and /or Designers of online modules	F/ D	4	One representative each from Aga Khan University, Karachi; Al Nafees Medical College, Islamabad; Health Service Academy, Islamabad; Khyber Medical University, Peshawar
Health Professionals who were recipients of e-learning	HP	7	Two midwives, two nurses, one public health nutritionists, one dietician and one physician across Pakistan.

7(46.6%) were HPs, while 4(26.7%) each were PMs and F/Ds (Table 2). Most of the articles reviewed 26(63.4%) were published between 2020 and 2022 and reflected the experiences, lessons and perception of students and / or faculty members about e-learning during COVID-19 (Table 3).

At the Services Hospital in Lahore, a training module on COVID-19 was offered to staff nurses with the aim of measuring their intention and readiness for online learning using a "Unified Theory of Acceptance and Use of Technology model (UTAUT)[19]. The Aga Khan University (AKU) in Karachi offered an online training on e-health to practicing HPs, health coordinators and information technology (IT) professionals from Pakistan, Afghanistan and Tajikistan.[20] In another study, the AKU trained Family Medicine postgraduates (PGs) and nursing interns on palliative care through online mechanisms using "Moodle" as their learning management system, and simultaneously used Microsoft Teams for online lectures, student-led seminars, and virtual simulation, which was followed by synchronous and timed online assessment.[21-22]

Likewise in Lahore, training for family physicians (FPs) was designed for enhancing their capacity on rheumatology care.[23] Another study reported on training a large number of HPs of multiple cadres, including physicians, nurses, paramedics and allied health staff, from all over the country during the COVID-19 epidemic on the use of personal protective equipment (PPE).[24] Another study reported training of laboratory staff from various cities; their programme included a purpose-built web-based platform, The American College of Rheumatology (ACR) offered a course called "ACR Rheum2learn modules", where course content and international guidelines were uploaded, and these were supplemented with F2F sessions.[25] Another study reported, reported a 5-year multi-institution project on Nutrition Research methods, also known as "The Bangalore Boston Nutrition Collaborative (BBNC)". The course was taught through two-week-long F2F sessions in India by faculty from Indian and American universities, using web-based courses through a platform called the "Tufts University Sciences Knowledgebase (TUSK)" in which HPs were engaged from various countries in the region, including Pakistan.[26]

With the stabilisation of education and training approaches post-pandemic, a surge was noticed in the use of blended and hybrid approaches of learning. Blended approach includes traditional component of F2F sessions, alternating with distance or e-learning phase of 2-3 months. In contrast, in the hybrid model, instructors teach remote and in-person learners at the same time, using technology like video conferencing. For the blended approach we found several studies in Pakistan, all about graduate programmes such as Masters in Health Profession Education (MHPE).[27–29] Whereas hybrid approach was reported by only one study; in Karachi a public sector university developed a six-week module on basic topics of research which was concurrently offered to first year undergraduate medical students spread across three campuses of the university. One group was taught F2F, while the remaining groups joined the session through videoconferencing from their campuses. They also created software called, "Articulate Studio 09", to make interactive flash-based lectures combined either with F2F sessions or synchronous modalities, like audio and/ or video recordings.[30] In both the approaches (blended and hybrid), proper support, timely feedback and easy availability of the facilitators is vital, as they facilitate students in adopting the transition from traditional to the blended/ hybrid method of learning.

Another approach that we found becoming popular especially among undergraduate programmes is known as "Flipped Classroom" (FC). It is an active learning pedagogical method in which the students prepare prior

Table-3: Summary of studies analysed.

S #	Citation	Location	Participants	Research Design	Learning Management System	Mode of teaching/learning	Communication Platform
1	Zahra, etal (2016)[19]	Lahore	Staff nurses	Mixed method	Moodle	Online	WhatsApp
2	Sajwani, etal (2019)[20]	Programme offered from Karachi Participants from Afg, Pak, &Taj	Doctors, nurses, e-Health coordinators, and IT professionals. ,	Survey	Moodle	Online	Not specified
3	Jabeen, etal (2023)[21]	Karachi (Aga Khan University)	Family Medicine Residents	Mixed method	Not specified	Blended	Not specified
4	Cassum, etal. (2020)[22]	Karachi: Aga Khan University)	141 Nurse interns	Survey	Moodle &Micorsoft Teams	Blended	Not specified
5	Khan SEA, etal. (2020) [23]	College of Physicians & Surgeons, Lahore	48 HPs (44 Family Medicine & 4 Allied health Profs	Survey	Not specified	Blended	Not specified
6	Hafeez, etal. (2022)[24]	All over Pakistan	100 000 frontline health care workers (nurses, docs, allied health)	Not specified	Not specified	Blended	Not specified
7	Saeed, etal. (2022) [25]	Karachi	227 – lab technicians from 30 laboratories all over the country	Not specified	Open Online Source	Online	Not specified
8	Kuriyan, etal. (2014) [26]	Bangalore - (Participants: India, Pak, Bangla, Nepal, Uganda & Cambodia	Multiple HPs	Mixed Method	Not specified	Blended	Not specified
9	Rizvi,N.F.etal. (2017)[27]	Aga Khan University Karachi and E. Africa campuses	33 faculty members from SONAM and IED	Survey	Not specified	Blended	Not specified
10	Naeem & Khan (2019)[28]	Across Pakistan	MHPE 18 students & 4 facilitators	Qualitative	Not specified	Blended	Not specified
11	Khan S, Jamil B. etal. (2022)[29]	Khyber Medical University, Peshawar	12 students and six faculty members (MHPE)	Qualitative Exploratory	Not specified	Blended	Not specified
12	Jawaid, etal. (2012)[30]	Karachi- Dow University	539 - MBBS 1st year students	Mixed method	Not specified	Hybrid	Not specified
13	Rehman, etal. (2021) [31]	Karachi -Aga Khan University	2nd year MBBS	Not specified	Moodle	Flipped Classroom	WhatsApp
14	Fatima, etal. (2019) [32]	Karachi – Aga Khan University	1st year MBBS	Survey	Moodle	Flipped classroom	Not specified
15	Afzal, etal. (2019)[33]	Karachi- Aga Khan University	Medical Students	Quasi Experiment	Moodle	Flipped Classroom	Google meet &Whatsapp
16	Sabqat, etal. (2022) [34]	32 medical and dental colleges of Pakistan	132 medical teachers	Qualitative	Google Classroom	live online classes & pre-recorded lectures	Zoom & Google meet
17	Eman, etal. (2021) [35]	Lahore	66 BS & MS Psychology stds.	Survey	Not specified	Online	Zoom

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18	Jafree, etal. (2022)[36]	Lahore – Services Hospital	208 nurses (102 in the control group and 106 intervention	RCT	Not specified	Online	Zoom and WhatsApp
19	Saeed, S., (2023)[37]	Karachi- Aga Khan University	102 Fourth year MBBS students	Mixed method	Blended Google Classroom	Online	Zoom
20	Iqbal, etal. (2020) [38]	Lahore-Red crescent Medical college	MBBS all years	Survey	Google Classroom	live online classes & pre-recorded lectures	Zoom & Google meet
21	Mansoor J (2022)[39]	Karachi	Not specified	Review	Edmodo	live online classes & pre-recorded lectures	Edmodo's built-in communication tools, such as discussion boards, messaging, and announcements
22	Latif, etal. (2019) [40]	Lahore	MBBS students	Systematic Review	Edmodo	Online	Face Book, WhatsApp, Instagram, YouTube
23	Shahid, etal. (2020)[41]	Rawalpindi	1041 – All years MBBS	Survey	Microsoft teams	Not specified	Not specified
24	Afzal, etal. (2020)[42]	Lahore	50 faculty members of MBBS program	Survey	Google Classroom	live online classes & pre-recorded lectures	Zoom
25	Zafar, etal. (2014) [43]	City Not specified	MBBS students	Systematic Review	Video imaging & patients	Not specified	video conferencing & Mobile Apps
26	Mukhtar K (2020)[44]	University College of Medicine & Dentistry, Lahore	12 faculty members and 12 students	Qualitative	Google Classroom	live online classes & pre-recorded lectures	Zoom & Google meet
27	Khan, T. M. (2021)[45]	Lahore	Pharmacy Students	Not specified	Not specified	Online	Zoom, Google Meet, FB Live & WhatsApp
28	Nazeer S. (2022)[46]	Kasur- Red Crescent Med. College	MBBS students	Survey	Not specified	Online	Social Media& WHO website
29	Sarwar, etal. (2020)[47]	All over the country	1207 BDS students of all years	Survey	Google Classroom	live online classes & pre-recorded lectures	Zoom & Google meet
30	Abbasi, etal. (2020)[44]	Australia, Canada, Egypt, Iraq, Saudi Arab, Malaysia, Nigeria, Pakistan, United Arab Emirates, United States and United Kingdom.	1255 students – BDS, MBBS, FCPS, DPT, MSc, MBA	Survey	Moodle and Microsoft Team	Online	Google Hangouts , Zoom
31	Mushtaque, I. etal. (2022) [49]	City not specified	369 first year medical students	Cross sectional	Not specified	Online	Zoom & Microsoft teams
32	Baig A (2019)[50]	Karachi	21 undergrad & postgrad dental students & faculty	Qualitative	Moodle	live online classes & pre-recorded lectures	Zoom & Google meet
33	Ansar, etal. (2020)[51]	10 Health Professionals Education institutes from the country	600 Medical, Engineering and Arts undergrad students	Survey	Internal portal Microsoft teams	Online	Zoom, WhatsApp, and Google meet

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34	Kamal Z, et.al. (2021) [52]	Sahiwaal	4rth & final year MBBS students	Survey	Not specified	Not specified	WhatsApp
35	Fahim A.et.al. (2022) [53]	Across Pakistan	1200 undergraduate students –medical, dental & Allied Health	Survey	Google Classroom	live online classes and pre-recorded lectures	Zoom & Google meet
36	Sethi, A.,(2019)[54]	Peshawar	789+ 167 + 103 Dental-undergrad & postgrad. students & faculty	Survey	Google Classroom	live online classes & pre-recorded lectures	Zoom & Google meet
37	Qamar, etal. (2021)[55]	Army Med. College Rawalpindi	318 MBBS students and 6 faculty members	Mixed method	Google Classroom	live online classes & pre-recorded lectures	Google meet
38	Naeem, etal. (2023)[56]	Faisalabad - Aziz Fatimah Medical & Dental College,	68 – Medical & Allied health faculty	Survey	Google Classroom	live online classes & pre-recorded lectures	Zoom & Google meet
39	Memon, etal. (2018) [57]	N/A		Short Comm	Moodle	Online	Not specified
40	Masud, etal.(2016)[58]	Not specified	Practicing physicians	Short Communication	Web based CME	Online	Not specified
41	Anwar D,M. (2022)[59]	N/A	N/A	Letter to editor	Not Specified	Not Specified	Not Specified

to the class, using different modalities, like reading materials, watching videos and spending time in the class discussing the content and reinforcing the concepts. The goal of FC teaching is to engage students in interactive exercises to facilitate learning and in-depth understanding of concepts and enhance retention of knowledge. Studies have showed that FC offers successful integration of both F2F and online components in HPs education, as well as enhances students' interest and engagement with the new content.[31-33]

Assessment has also emerged as an essential part of e-learning. Fourteen studies (34%) have discussed online assessment methods including "Asynchronous" and "Synchronous" methods. The former includes "Assessment Portfolios", or online submission of recorded videos of the tasks performed. The later methods involve online, real-time assessments or the ones given online on a pre-determined date for fixed duration, and these mainly reproduce the traditional methods of assessment, such as multiple-choice questions (MCQs).[33,34] The other example of synchronous assessment includes Open Book Exams[35], Objective Structured Practical Exam (PSPE) and Objective Structured Clinical Exam (OSCE) and Online Viva .[36] KIs echoed these points and mentioned that the assessments were always built-in within their online modules. HP1 discussed the use of case studies and journal articles with open-ended questions that were part of timed assessments in a course on "Application Statistics". Saeed et al.[37] and HP3 identified using "Kahoot!", an online game-based learning platform, as one of the formative assessment methods in their programmes. Iqbal et al.[38] concluded that the design and execution of online assessments had more impact on student performance, summative or formative, than the method of assessment delivery (online vs. F2F).

During the COVID-19 pandemic, many health professions' educational institutes adopted e-learning. Most studies reported use of Google Classroom and Moodle, 10 (24%) and nine (21.9%) respectively as the primary LMS. The preferred mode of teaching identified by 12 studies (29.2%) was pre-recorded lectures and materials. For live, interactive sessions, communication platforms varied: multiple platforms such as Zoom, Google Meet, and social media were suggested by 16 (39%) studies, while 8 (19.5%) studies identified WhatsApp, only Zoom by 4(9.7%) studies, and only Google Meet or Hangout by 2 (4.8%).studies. Two studies explored open-source courses [25,26] and another two have reported use of Edmodo.[39,40]

Regarding choice of gadgets, mobile/ smart phone, including the use of mobile applications (Apps) for educational purposes have become popular devices among students for e-learning compared to laptops and tablets.[41] While most students preferred using mobile devices, the use of desktop computers and tablets was common among facilitators.[4]

On the basis of the scoping review and the KIIs, several

themes and subthemes were formed that were arranged under two broad descriptive categories.

Enablers or Drivers

Personal Drivers: Flexibility and comfort in remote learning was considered important enabler, as the sessions can be arranged in the comfort of their homes at any day, place and time, and can reach by a large audience irrespective of their location[43,44], Flexibility means that learning often takes place at the learners' own pace, regardless of their geographical locations, and materials can be accessed any time, and these are reported as perceived benefits.[21,35,45,46] Key Informant HP1, HP2 and HP4 considered "flexibility of time as most important benefit of online education"

Internal motivation of learners and teachers are also crucial for making the online discussion interactive and enjoyable.[19,46&47] With asynchronous modes, students found learning as "self-directed" as it is easy and convenient to return to the recorded content (videos and audio) as many times as needed and/ or is also a great resource for revising the content.[34, 46-48]

There were three (7%) studies that identified prior knowledge and comfort with technology as enablers, Cassum et al[22], suggested that teachers and students with "previous exposure to a virtual learning environment acted as a strong indicator for the 'presage' phase to initiate this (online education) endeavour".

Age and gender are also important drivers; the younger HPs, for example undergraduate students having account on social networking sites were more comfortable with e-learning and had better computer skills[38,46,47] as compared to postgraduate students[35,48] or their facilitators/ teachers[48–50] Moreover, computer skills were found to be higher in male participants (of online training) as compared to females.[33, 34, 38, 49] KIs F/D4, HP3 and HP7 - also had similar experiences in relation to age and gender.

Content and Design Drivers: The acceptability and effectiveness of e-learning was found to be high for the properly planned online courses in general and especially in which activities for student engagement is considered.[31,32,50-53] For example, studies with FC reported that the study population was highly satisfied when online sessions were well-planned with adequate time allocation, sharing of schedule beforehand, and expected outcomes outlined, and had application exercises, like clinical case scenarios, applied concepts, simulations etc.[30-32] One study also stressed on the importance of planning the activities to engage students and assigning small group activities during F2F as well as online component which plays an important role in not only enhancing students' learning of the content, but also encourages and stimulates collaborative teamwork.[30] In addition, Rehman et al.[31] reported that active interaction through case studies in an online discussion forum not only enhanced learning, but also harnessed self-directed as well as team-based learning.

Khan et al[23], brought to surface another dimension with regards to "content", i.e. "cognition presence". They reported that heavy content load and too much information with lack of hands-on practice affected learning as well as frustrated both students and teachers; they suggested that instead of giving "too much" information, the content could be explained through "role plays" or "case scenarios" Similar points were elaborated by KIs F/D1 and F/D4, who both highlighted the importance of content identification, organisation and presentation in preparing for and designing any online session.

F/D2's institution engaged an international agency with expertise to design synchronous e-learning modules. The KI further described that the activities and exercises were specifically designed. For example, the facilitator would start every virtual conferencing session with a question from the previous day's lesson or by showing colourful, animated slides which kept the participants engaged throughout. The facilitators also asked many open-ended questions to generate discussion among the participants. This increased interactivity among peers as well as with the facilitators. In the end, the participants adopted these techniques and used it themselves for trickle-down trainings.

Another design driver is the duration and language of the online course. The frontline and grassroots workers appreciate and learn better when online courses are delivered in easy and local languages[24,25] especially since many of them have little or no training in the English language. Hence, when the content was delivered in Urdu, the participants' learning and satisfaction were high, as mentioned by PM4, HP3 and HP5. Courses of shorter duration were preferred by busy professionals.[24–26, 28] as well as when there was no specific time duration for course completion, and the participants could complete it at their own pace.[25, 26]

Quality of Facilitators: The courses with live online content, such as sessions conducted via Zoom or Microsoft Team or the blended / hybrid courses, rely heavily on the content as well as technological expertise of the course facilitators. Kuriyan et al.[26] described their

collaborative online education programme on nutrition research, where international faculty and research champions were engaged, highlighting the "quality of faculty" as the main strength of their programme. They had global faculty members who were experts in their field of interest as well as had strong teaching skills for delivering F2F and virtual sessions.[29] There were seven (17.07%) studies that identified easy access to faculty members and their timely feedback, such as responding to a student's query, as another element of "quality".

The KIs echoed similar points, with PM4, F/D3 and HP4 highlighting that there was high demand for the modules that were facilitated by well-prepared and experienced teachers. On the contrary, when teachers themselves are not confident in their technical area or with the use of computers, the student engagement is negatively impacted. Furthermore, F/D1 and F/D4 recommended that to make online courses successful, institutions must invest in training their faculty. F/D1 further elaborated that those courses "are very popular which are taught by teachers who are "confident" in managing the technology part.

Peer Connectivity and Social Networking: Online peer-to-peer teaching has a number of benefits beyond leveraging technologies. Social media facilitates participative learning, and acts as a set of constructivist tools for teaching and learning. It has been shown to provide the participants a more diverse medical education and shared clinical learning experiences that can be widely disseminated, especially through social media platforms. Furthermore, participants benefit from the aspects of peer connectivity and social networking[47-49]. A couple of studies recorded social media as the most used mode by the students in general, particularly at the undergraduate level.[34,37,41,43,46,47] KI-HP7 stated that WhatsApp "has been a blessing in general, but especially while taking online classes", as it helped the peers remain "connected despite connectivity issues". Latif etal.[40] also suggested the benefits of FaceBook, WhatsApp and Edmodo in student learning during online training, such as collaboration, feedback and engagement.

The other dimension of "peer connectivity" is long-term professional association with the facilitators and colleagues[26]. Almost all HPs related their experience with this point and stressed that they remained in touch with their facilitators of online training. HP3 stated that it was "because of the strong network of the facilitator that I got to know and connect with other experts in the field". Similarly, F/D2 mentioned that it was "very hard" to find practicing midwifery tutors in Pakistan, "but the international faculty who taught our teachers connected us with the "global community of practice".

Barriers or Challenges

Structural Barriers: Some of the barriers of online classes (especially synchronous and during the COVID-19 epidemic) identified through the literature include: un-availability of licensed software applications[25], not having proper bandwidth[29,30] or network facilities[29,36] or frequent technical problems.[30,43,51-56] Moreover, many institutions did not have good number of online resources or / literature repositories[25,26,44] or, as HP1 pointed out, the quality of asynchronous content and material not being good. All these factors acted as barriers to e-learning. Furthermore, practicing HPs in urban areas were more inclined towards e-learning as they often had access to faster internet and digital gadgets[25,45] compared to those in rural areas. This fact amplifies technical challenges and limited resources, including poor infrastructure, language barriers, and limited access to personal computers, power outages, and limited internet users, in rural and remote locations.[34-36,38,55,56]

Almost all KIs, especially the HPs and F/D3&4 mentioned poor connectivity, electricity shortages and power cuts, particularly during the summer months, as the most common issues pertaining to synchronous sessions, and that was one of the reasons for preferring asynchronous online education over live, interactive e-learning. F/D3 mentioned that the students "who come from armed forces institutes suffer the most because when they do not have internet facility at their homes, they cannot access their institutions because, being in armed forces, their connectivity is severely restricted. Therefore, at the time of admission to blended learning programmes, we make this clear that they need to arrange a stable and reliable internet connection".

Cultural Barriers: Cultural, institutional and individual differences play a vital role in the adoption of e-learning. Differences in cultural norms can impact how learners participate in online training programmes, including how they respond to questions, and their perceived role in the learner-teacher relationship. Some learners may be more reserved, less likely to participate vocally, and view the roles of an instructor differently. This can make them hesitant to ask questions or gain more specific direction. A study[35] reported that in Asian cultures, including Pakistan, "power distance" makes students dependent on the authorities and they are not used to asking direct questions, and such students benefit more from virtual mode of learning, like FaceBook private classrooms or chat rooms, where they are able to ask questions

comfortably and freely. Similarly, another study found that students' engagement was quite high during online sessions compared to F2F "because here (video conferencing), the students were called out by name to partake in discussions and then followed with surprise quizzes".[36]

On the other hand, there is little evidence regarding membership of online continuous medical education (CME) courses that have assessments and credit hours attached to it. They are not common in Pakistan[57] and only a few HPs subscribe to technology-assisted courses, like Really Simple Syndication (RSS) feeds, blogs and podcasts.[58] Furthermore, e-learning for professional growth is not common, nor any HPs are self-motivated to invest their time and material resources for CPD[57,58] While PM3 and PM4 echoed this point, PM1 further elaborated that the issue with online CPD is that the "HPs, mostly mid-level physicians and private general physicians (GPs), are interested in running their clinics. They neither value nor have interest in learning (new skills), unless they are recognised in some tangible way, something which they can showcase to their patients".

HP8 expressed a similar point. "The HPs working in government facilities are not interested in their professional development or in any training because there is no reward for that; there is not even a system of CME or credit requirements for the renewal of licence, so no one cares (for CPD)."

Another issue highlighted by Rizvi, et al.[27] is related to organisational culture. They found that the efforts invested by faculty members in innovating online courses are not considered part of scholarly activity by the university administration. They further elaborated that not considering teaching innovation worthy of promotion, or not counting it as scholarly activity, is basically related to an academic culture in which research has preference over teaching innovation.

Curricular / Content Barriers: The transition from F2F to virtual during COVID-19 was felt by many as hasty, haphazard and difficult. Studies reported that the disciplines/ subjects that require clinical training or interactive environment were not effectively taught through online modalities.[41,46,49] Further, these studies reported that students did not consider e-learning useful for developing clinical skills as there was no opportunity for clinical rotation, especially during the pandemic. At the same time, two studies have identified that the lack of proper course designing, and content not being appropriately converted into online modalities led to lack of motivation among students and teachers alike.[34, 42,44] Several KIs identified similar issues. HP1 stated: "I dropped from training because the content shared in reading material was not properly aligned with the power points, which caused confusion and at times was even frustrating."

On the other hand, having material video-taped, especially for clinical skills, facilitated learning and acted as an enabler.[30-34, 43] F/D1 highlighted that during COVID-19, "we created videos for teaching nursing skills to first- and second-year students like patient assessment, care and hygiene, which were highly appreciated by the students". PM4 stated: "Having videos available on various procedures (midwifery, delivery and newborn care) helped students understand the content better."

Human Resource (HR) Barriers: Another barrier in e-learning was found to be inexperience of facilitators. Many students identified teachers' preparation for designing online activities and managing online discussions/ interaction vital in making it effective.[38, 42-44] Likewise, Afzal etal.[33] identified that usage capabilities of faculty members had a statistically significant positive correlation with the overall perception of faculty members towards e-learning. In addition, lack of IT professionals in many HP educational institutions, to provide design and technical support to the content developers, added to the negative perception about e-learning.

In blended learning and FC, the facilitators/ teachers played a myriad of roles, such as mentoring and providing timely feedback and being approachable[26-30,32,33] and their lack of preparation emerged as one of the important factors in the success of online education/ e-learning. Most KIs identified blended learning as the most successful method, especially with adult students in graduate-level programmes.

HP3 and PM4 also stressed on the necessity of IT-related training of faculty members for planning and/ or delivering online sessions. F/D4 also highlighted this need: "Since most of our faculty members are not trained as educationists, let alone being expert in IT or facilitating online training, we face a lot of challenges in maintaining the interest level of students. Despite these challenges, the institution is not investing in training, and we face continuous burnout of teachers."

Financial Barriers: Any student seeking to enrol in a programme needs to invest in a range of equipment, including a personal computer or a laptop, webcam, and a stable internet connection.[19,20,23-25] F/D3 resonated with this point. "It is easy for students from upper or middle

(socio-economic) class to purchase smart phones, laptops or other gadgets, and that is why they did not have difficulty in adjusting to the e-learning environment during COVID-19. But the students who cannot afford to purchase laptops or other gadgets had difficulties."

To address the financial constraints, especially concerning digital gadgets, a report suggested that the government must play a major role by providing free laptops and connectivity devices to all those who cannot afford it.[59] Another suggestion came from F/D4 whose institution has partnered with medical colleges or HP institutions in numerous cities. They encourage their students from remote locations to work in pairs or groups, ensuring that at least one student have access to laptop and internet connectivity. Otherwise, they may attend online sessions in their partner institutions close to their towns.

Furthermore, e-learning courses offered free of cost to the participants are well received, such as those financed through a grant[26] or offered as in-service training.[23,27] HP3, and HP7 also recognised it, and suggested that such programmes must be increased for the capacity-building of staff members.

Discussion

To the best of our knowledge, the current scoping review is the first to examine the factors of enablers or barriers regarding e-learning for HPs' CPD in Pakistan. Evidence indicates that e-learning has the potential to increase accessibility to improve quality of, and reduce cost for capacity-building. Simultaneously, the e-learning programmes that are interactive, easy to access, affordable, and in which the participants were facilitated, were found to be successful.

The current review also found that undergraduate students showed positive response towards e-learning except the concern about lack of opportunities for practicing clinical skills.[60-62] On the other hand, given the independent, interactive and collaborative nature of the blended approach, graduate-level students and practicing HPs showed their preference for e-learning in general, and blended approach, in particular. The learning needs of both groups can be addressed through technology, with virtual patients, simulations, video triggers, and voice-covers being easily used to implement real-world scenarios.[60,63,64] Other strategies to enhance technology-assisted blended learning include online discussion forums, e-symposium in the presence of a teacher, personalised learning portfolios, interactive online clinical scenarios with model answers, simulated patients on Zoom, and mind-maps of examination, differential diagnosis and management plans with relevant links, podcasts and other resources.[65-67]

The current review also found that many facilitators/ faculty members were not well-prepared in delivering e-learning, and most HP education institutions lacked IT expertise and mentorship in the field of e-learning. Hence, faculty development programmes and specialised technical trainings, such as software management, designing online/ web-based course and its delivery as well as hands-on learning to use technological devices and tools to teach are of paramount significance for the successful implementation of e-learning. Furthermore, to ensure high-quality e-learning, the academic administration, faculty members and IT personnel must come together as a team in developing long-term strategies and planning the process for implementation of e-learning.[67,68]

Simultaneously addressing the issue of IT structural deficiencies, such as unstable internet connectivity and electricity, is critical which can be addressed through establishing IT infrastructure and standards, support facilities (operation, installation, security, network, administration and maintenance) and familiarising learners and teachers with development and use of e-learning material.[65,68]

With reference to CPD of health professionals, there are also a few examples of medical institutions that offer blended postgraduate courses, such as: i) The Medical Writers- Online Research Course (http://www.themedicalwriters.com/orc.html)[69]; ii) Centre of Biomedical Ethics and Culture (http://www.siut.org/bioethics/)[70] ; iii) International Network for the Availability of Scientific Publications (INASP), where Pakistan is also a member, offers several online courses for free to participants from Lower Middle Income Group Countries (http://moodle.inasp.info/)[71] (iv). Riphah International University Islamabad (https: //www.riphah.edu.pk/ faculties /).[72] In addition, there are partnership-based capacity-building models, such as the Bangalore-Boston Nutrition Collaboration.[26] The affiliation between national and international platforms can bolster the capacity of HPs, especially in the subjects for which local expertise is at a nascent stage, such as nutrition research and training through interdisciplinary web-based courses. Similar experiences were shared by HP1, HP5 and PM4, who developed online in-service modules in conjunction with international universities and development partners. However, all these had limited scope, and were offered to internal participants only.

To begin with, the existing online resources and web-based courses can offer an attractive option of e-learning

to the HPs, but, in the longer run, it is clear that leadership and buy-in from stakeholders, including the Higher Education Commission (HEC), government ministries, academic institutions, healthcare regulatory bodies, professional associations and development partners are fundamental to the task of establishing a sustainable capacity-building programme for HPs in Pakistan.

To sustain e-learning and to reap optimum benefits from the available online resources, there is an immense need for the training of facilitators as well as administrators and IT personnel. Furthermore, in order to increase learners' engagement, factors such as learners' motivation, personalisation of learning material, pedagogical methods that increase interactivity and suitability of the particular study area to be delivered must be ensured. Another aspect which must be considered for planning e-learning is the cost. There is insufficient evidence on the costs and cost-effectiveness of designing and implementing online programmes for HPs.

Further studies are recommended to systematically explore evidence on efficient e-learning models. Finally, a guiding framework (financing mechanism, appropriate materials and activities, communication strategy, and an evaluation process) that incorporates regulatory perspective, contextual factors and clear objectives is essential develop, implement and sustain the e-learning platform with regard to CPD for HPs in Pakistan.

Conclusion

While e-learning emerged as an alternative means of education during exceptional times, such as the recent COVID-19 pandemic, and for HPs pursuing higher education, it could not be mainstreamed for HPs' CPD in Pakistan.

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ZSL: Lead author, principal reviewer and qualitative work.
AMK: Supporting the review and concept.
ZAB: Concept, review and feedback.