Journal of Applied Pharmaceutical Science Vol. 12(10), pp 161-171, October, 2022
Available online at http://www.japsonline.com
DOI: 10.7324/JAPS.2022.121018
ISSN 2231-3354

The shock of the SARS-CoV-2 pandemic on health professionals' education: A pilot qualitative study in Malaysia

Ambigga Krishnapillai[1], Halyna Lugova[2], Mainul Haque[3*], Suthahar Ariaratnam[4], Aznida Firzah Binti Abdul Aziz[5], Mohammad Nazmul Hasan Maziz[6], Sapna Shridhar Patil[7], Aqil M. Daher[8], Suhaila Muhammad Ali[9], Nor Azlina A. Rahman[10], Nor Iza A. Rahman[11], Kona Chowdhury[12], Paras Sharma[13], Ayukafangha Etando[14], Santosh Kumar[15], Adnan Abdullah[16] Moyad Shahwan[17, 18], Brian Godman[18, 19, 20*]

[1]Primary Care Medicine Unit, Faculty of Medicine and Defence Health, National Defence University of Malaysia, Kuala Lumpur, Malaysia.
[2]Humanitarian Assistance and Disaster Relief Research Centre, Unit of Community Medicine, Faculty of Medicine and Defence Health, Universiti Pertahanan Nasional Malaysia (National Defence University of Malaysia), Kuala Lumpur, Malaysia.
[3]Unit of Pharmacology, Faculty of Medicine and Defence Health, Universiti Pertahanan Nasional Malaysia (National Defence University of Malaysia), Kuala Lumpur, Malaysia.
[4]Department of Psychiatry, Faculty of Medicine, University Teknologi MARA, Shah Alam, Malaysia.
[5]Department of Family Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia.
[6]Department of Microbiology, Faculty of Medicine, Bioscience and Nursing, MAHSA University, Jenjarom, Malaysia.
[7]School of Medicine, Faculty of Health and Medical Sciences, Taylor's University, Subang Jaya, Malaysia.
[8]Department of Community Medicine, School of Medicine, International Medical University, Kuala Lumpur, Malaysia.
[9]Unit of Periodontics, Faculty of Dentistry, International Islamic University Malaysia, Kuantan, Malaysia.
[10]Department of Physical Rehabilitation Sciences, Faculty of Allied Health Sciences, International Islamic University Malaysia, Kuantan, Malaysia.
[11]Unit of Microbiology, Faculty of Medicine, Universiti Sultan Zainal Abidin, Kuala Terengganu, Malaysia.
[12]Department of Paediatrics, Gonoshasthaya Samaj Vittik Medical College and Hospital, Dhaka, Bangladesh.
[13]Department of Pharmacognosy, BVM College of Pharmacy, Gwalior, India.
[14]Department of Medical Laboratory Sciences, Faculty of Health Sciences, Eswatini Medical Christian University, Mbabane, Kingdom of Eswatini.
[15]Department of Periodontology and Implantology, Karnavati School of Dentistry, Karnavati University, Gandhinagar, India.
[16]Unit of Occupational Medicine, Faculty of Medicine and Defence Health, Universiti Pertahanan Nasional Malaysia, (National Defence University of Malaysia), Kuala Lumpur 57000, Malaysia.
[17]College of Pharmacy and Health Science, Ajman University, Ajman, United Arab Emirates.
[18]Centre of Medical and Bio-allied Health Sciences Research, Ajman University, Ajman, United Arab Emirates.
[19]Department of Pharmacoepidemiology, Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow, UK.
[20]Division of Public Health Pharmacy and Management, School of Pharmacy, Sefako Makgatho Health Sciences University, Ga-Rankuwa, South Africa.

ARTICLE INFO

Received on: 03/04/2022
Accepted on: 23/07/2022
Available Online: 04/10/2022

Key words:
Consequence, feasibility study, experimental trial, healthcare provider, pedagogy, 2019 novel coronavirus, pandemic, Malaysia.

ABSTRACT

Various measures were introduced globally to prevent the spread of COVID-19, including travel restrictions, social distancing, and closure of educational establishments. Implementing these measures resulted in appreciable changes to health professions' education (HPE) with concerns regarding the level of preparedness among faculty members and students towards e-learning, including laboratory, clinical, and other forms of hands-on training. In addition, the affordability of devices and Internet bundles arose, especially among students in low- and middle-income countries. A pilot qualitative study was conducted in Malaysia to ascertain critical challenges and how higher learning establishments addressed them. The study was undertaken among 10 purposely selected educators in both public and private universities in Malaysia using an established questionnaire to ascertain critical challenges and responses. The main issues included unfamiliarity with e-learning approaches and inadequate availability of devices and Internet

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**Corresponding Authors*
Brian Godman, Department of Pharmacoepidemiology, Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow, UK. E-mail: brian.godman @ strath.ac.uk
Mainul Haque, Unit of Pharmacology, Faculty of Medicine and Defence Health, Universiti Pertahanan Nasional Malaysia (National Defence University of Malaysia), Kuala Lumpur, Malaysia. E-mail: runurono @ gmail.com, mainul @ upnm.edu.my

bundles among students. Furthermore, the study revealed a lack of interaction between faculty members and students, concerns with conducting practicals and clinical examinations, and mental distress among faculty members. Measures introduced to address concerns included supporting digital needs through the provision of software, devices, and Internet bundles, enhanced training of educators in e-learning approaches, providing clinical case banks and curated patient data, and establishing clear policies and procedures for classroom and clinical teaching. Psychological support, including stress management, was also provided. The challenges and lessons learned in Malaysia regarding HPE during the pandemic were similar to other countries with hybrid learning here to stay.

INTRODUCTION

The COVID-19 pandemic caused a considerable and wide-ranging impact on morbidity and mortality and led to devastating economic and social disruption across various countries (Bonotti and Zech, 2021; Talic *et al*., 2021; Xiang *et al*., 2021). At first, governments' responses aimed to limit COVID-19 spread and its associated impact in the absence of effective treatment and vaccines. Initial activities included enhanced disease surveillance, quarantine arrangements, the introduction of social distancing regulations, and lockdown measures, such as border closure, home confinement, prohibition of gatherings, and closure of establishments and premises (Girum *et al*., 2021; Haider *et al*., 2020; Nussbaumer-Streit *et al*., 2020). Malaysia was no exception with the early introduction of extensive lockdown measures in conjunction with complex disease prevention and control arrangements (Godman *et al*., 2020; Shah *et al*., 2020; Umair *et al*., 2021).

In particular, the higher education sector had temporarily closed and transitioned to online teaching and learning (Shah *et al*., 2020). A recent paper showed that challenges in the transition of Malaysian higher education to online teaching and learning included insufficient availability of the necessary devices and equipment, unaffordability of Internet bundles, and issues with the speed and quality of the Internet connection among students, especially those from low-income families or living in rural areas (Azman and Abdullah, 2021). Faculty members often lacked the necessary skills to conduct tutorials and practical skills training remotely, as well as the required equipment, such as microphones and webcams, and appropriate lighting and audio modulation facilities while working from home or in the office (Azman and Abdullah, 2021). Besides, there was a need to introduce innovative approaches when delivering classes to keep students engaged without face-to-face interaction (Mustafa, 2020).

The pandemic has affected health professions' education (HPE) especially severely. HPE is a separate domain of higher education that emerged in the 1960s with the responsibility to society to produce competent practitioners trained to work in a health or health-related fields (Blouin, 2022). HPE's domain draws from a wide range of disciplinary knowledge to consider the practitioners' different professional backgrounds and cultures. It includes medicine, nursing, dentistry, pharmacy, and biomedical sciences. More than ever before, HPE in Malaysia had to be seen in the context of health systems to meet the challenges caused by the pandemic, including the rising need for skilled health professionals (HP) (Azman and Abdullah, 2021).

For instance, before the pandemic, several studies revealed insufficient knowledge about antimicrobial resistance (AMR) among medical and dental students in Malaysia (Haque et al., 2019; Tiong and Chua, 2020; Wong *et al*., 2016). Since the pandemic's beginning, the importance of HPs' awareness about AMR has grown with high rates of inappropriate prescribing of antibiotics for patients with COVID-19 despite limited bacterial or fungal coinfections (Chowdhury *et al*., 2022a; Kumar *et al*., 2022; Langford *et al*., 2021). The issue could be efficiently addressed by enhanced training of a wide range of HPs in the appropriate use of antibiotics, such as introducing AMR stewardship programs among physicians and pharmacists (Godman *et al*., 2021; Mohamad *et al*., 2022).

Another concern is the growing prevalence of noncommunicable diseases (NCDs) in Malaysia which has had profound implications during the COVID-19 pandemic. Higher NCD burden, especially concerning cardiovascular diseases, obesity, and diabetes mellitus, corresponded to higher COVID-19 death rates (Ariaratnam *et al*., 2020; Rahim *et al*., 2020; Sazlina *et al*., 2020; You *et al*., 2019). Training of HPs, involving community pharmacists and nurses in careful handling of the patients based on evidence-based approaches, can help in improving the continuity of healthcare and addressing the double burden of COVID-19 and NCDs (Ayadurai *et al*., 2019; Hassali, 2017; Mustapha *et al*., 2020). Therefore, the COVID-19 pandemic has highlighted HPE's crucial role in ensuring preparedness and quality of healthcare services.

Little evidence covering the impact of the COVID-19 pandemic on higher education in Malaysia exists. Previous studies explored students' perception (Sababathy *et al*., 2021), the efficiency of e-learning (Nordin and Nordin, 2020), and university employees' well-being (Daud *et al*., 2020) during the pandemic. However, we could not find papers focusing explicitly on the challenges faced by HPE establishments in Malaysia. Similar studies were undertaken in other settings, including higher income countries where resources and familiarity with e-learning approaches can be less of an issue (Alrasheedy *et al*., 2021; Alsoufi *et al*., 2020; Azlan *et al*., 2020; Azman and Abdullah, 2021; Chowdhury et al., 2022b, 2022c; Dhawan, 2020; Etando *et al*., 2021; Sharma *et al*., 2022).

OBJECTIVES OF THE STUDY

This study aims to explore educators' perceptions of the impact of COVID-19 on HPE in Malaysia. The research generated from professionals' views may increase our understanding of the challenges faced by HPE establishments during pandemics and their response in addressing these. Consequently, it offers a more comprehensive approach to current COVID-19 and HPE research data. The present study is a pilot project. Ultimately, we aimed to answer the research question "How do educators in Malaysia perceive the impact of the COVID-19 pandemic on health professionals' education?" to develop a preliminary research framework. The findings of this study, combined with those from

subsequent analyses, can potentially be used to improve HPE in Malaysia during the current and future pandemics.

METHODS

Approach

This descriptive pilot study is an extension of cross-cultural exploratory research conducted by the coauthors in different countries around the globe (Chowdhury et al., 2022b, 2022c; Etando *et al*., 2021; Sharma *et al*., 2022). A pragmatism strategy was applied to practically address the issues in question (Allemang *et al*., 2022; Kelly and Cordeiro, 2020). The inherent focus of pragmatism is based on experience and action rather than on understanding reality as a value on its own (Hothersall, 2019). As a flexible and highly reflexive approach to research, pragmatism supports deductive and inductive reasoning, allowing the choice of a methodology that is the most relevant to address the research question (Kaushik and Walsh, 2019).

Sampling

A purposive sampling approach was used for this study, which was based on the expert knowledge of the coauthors, who are themselves HP educators. This enhanced the ability to obtain a rich source of data from a limited sample to achieve the study's objectives (Bhardwaj, 2019; Campbell *et al*., 2020). To enhance the study's credibility, transferability, and dependability, a data source triangulation method was used with participants from various medical and other health profession disciplines (Carter *et al*., 2014; Heale and Forbes, 2013). The initial sample of 10 participants included 5 educators from public and 5 from private universities in Malaysia to ensure complete coverage. The participants also covered a wide range of subjects, including physiology, microbiology, early clinical skills, internal medicine, surgery, otorhinolaryngology, dentistry, and biosciences.

Study instrument and data collection

A qualitative semistructured questionnaire approach was adopted. The questionnaire was based on recent research conducted among African and Asian countries (Chowdhury *et al*., 2022b; Etando *et al*., 2021; Sharma *et al*., 2022). The qualitative exploratory survey method allows participants to answer questions at a place of their convenience and formulate and modify their answers over time before being sent back (Hanna and Gough, 2020; Safdar *et al*., 2016; Tuckett and Stewart, 2003, 2004), which is essential during pandemics. Data collection was conducted from October 2021 to January 2022. The questionnaires were emailed to the selected educators upon receiving their verbal consent to participate. The participants were encouraged to constantly communicate with the researchers to clarify any details as the need arose.

The questionnaire consisted of four main open-ended questions and some prompt questions. The main questions focused on the challenges presented by the COVID-19 pandemic, the response and support provided by the universities to address them, and the lessons learned for future pandemics. The four questions are as follows:

1) What challenges has COVID-19 presented to HPE in Malaysia?
2) How did your university respond immediately to the challenges presented by the COVID-19 pandemic?
3) What support was harnessed to help mitigate the challenges faced by your university?
4) What lessons can be learned to prepare HPE establishments in Malaysia for future pandemics?

The questions were deliberately developed to avoid closed and leading questions to maintain flexibility, considering that the content should generate ideas and valuable information. The respondents were expected to provide four to five answers to each main question. Five follow-on questions were added to achieve a more specific understanding of the respondent's experience.

Analysis

A framework method of data analysis was applied (Goldsmith, 2021). This approach allows researchers to identify themes systematically according to predetermined procedures and make necessary changes throughout the research process. The framework created through setting codes and subsequently organizing them into categories transforms the data into a new structure that helps summarize the findings (Gale *et al*., 2013). Besides, this approach provides a detailed outline of individual observations and enables themes to develop deductively and emerge inductively from participants' experiences and views (Cavallieri *et al*., 2021).

This study reports on the initial framework shaped by recurring and salient themes and subthemes identified through the analysis of the answers provided by the respondents in the pilot study. The main themes were predetermined deductively by the research questions and stored using different sheets of Microsoft Excel. The further analysis relied on inductive reasoning in which subthemes emerged through repeated evaluation of the questionnaire data. Initially, two research team members independently coded the responses from the same 10 questionnaires and subsequently agreed on a set of codes to form the initial analytical framework. Some of the codes were subsequently grouped into categories. Using diagrams, several codes were then mapped to explore the relationship between the subthemes. In addition, patterns among the different types of participants were identified.

Ethical considerations

Verbal informed consent was taken from the participants before starting the pilot project to ensure they fully comprehended all aspects of the study and voluntarily agreed to participate. They were informed that their identities would be kept confidential, guaranteeing respect for autonomy and trust.

RESULTS

Participants in this pilot study represented a number of disciplines including preclinical disciplines (n = 4), clinical disciplines (n = 4), dentistry (n = 1), and biosciences (n = 1). Table 1 summarizes the distribution of the research participants.

The qualitative analysis yielded three main themes predetermined by the research questions: 1) challenges in HPE

Table 1. Distribution of research participants.

Discipline	University (*n* = 10)									
	Public (p)					Private (pr)				
	p1	p2	p3	p4	p5	pr1	pr2	pr3	pr4	pr5
Preclinical (PC)	PCp1	PCp2				PCpr1	PCpr2			
Clinical (C)			Cp3	Cp4				Cpr3	Cpr4	
Dentistry (D)					Dp5					
Biosciences (BS)										BSpr5

Table 2. Challenges in HPE presented by COVID-19.

Codes	Description
Challenges	
Digital needs	Internet coverage, stability, and affordability of the Internet bundles, access to equipment, and availability of devices
Learning environment	An unconducive learning environment for students at home, lack of privacy and facilities
Training	Insufficient training for technology-based teaching and learning
Practical and clinical skills	Restricted access to labs and health facilities, limited contact with patients and patient data, lab equipment, and manikins
Assessment	Issues with validity and security of exams, case-based clinical and practical skills assessment
Interaction	Lack of face-to-face student-teacher and student-student interaction
Planning and decision-making	Changes to the timetable, delays in clinical exams, academic year, final year graduation
Mental distress	Mental fatigue due to ongoing pandemic and transition to online work mode
Risk of COVID-19	Higher risk of contracting COVID-19 for students and lecturers in clinical settings
Research	Hampered research activities

presented by the COVID-19 pandemic, 2) response of HPE establishments to the COVID-19 pandemic, and 3) lessons learned to prepare HPE establishments for future pandemics.

Challenges in HPE presented by the COVID-19 pandemic

Challenges brought about by the COVID-19 pandemic caused unprecedented disruption regarding the education of HPs in Malaysia, predominantly their clinical and practical skills teaching.

The initial coding for the theme "challenges" identified several key issues that needed to be addressed by the universities at the beginning of the COVID-19 pandemic. These are summarized in Table 2.

The participants mentioned closely related themes, including digital needs and the learning environment at home, as key opposing factors with e-learning approaches. While some educators said that most of the students had access to the necessary equipment, others reported that there were students experiencing problems with the Internet connectivity and affordability and availability of Internet bundles and devices.

> [One of the main challenges is] **instability** of the Internet coverage and unavailability of **two** [electronic] **devices** (mobile phone and computer) [the second device with a camera is used for online exams] … some of [the students] have only one device. Not all students can afford the Internet. (PCp1)

> Few students have no access to the necessary equipment; some have to **share** [the equipment] **with other family members** due to financial constraints at the start of the pandemic. (Cp4)

> Issues with the environment for online learning for the students at home [included] …. **no private place, noisy environment** [due to loud] siblings. (Cp4)

The relationship between the subthemes "digital needs" and "learning environment at home" is shown in Figure 1.

Several educators highlighted insufficient technology-based teaching and learning training at the start of the pandemic. A few also stated that there were delays with the initiation of appropriate training.

> Much of the problems arose at the beginning since [online teaching] is a new method of teaching that had not been explore or used before. At the beginning of the pandemic, **no formal courses** were conducted [for] the teachers on how to use the online platform. (Cp4)

Almost all the respondents reported difficulties in teaching practical and clinical skills due to restricted access to laboratories and healthcare facilities. Overall, this was one of the biggest challenges faced by the HP educators during the pandemic.

> [One of the main challenges is] difficulty in preparing immediate **simulation-based education** and online modules to facilitate **clinical competencies**. (PCp2)

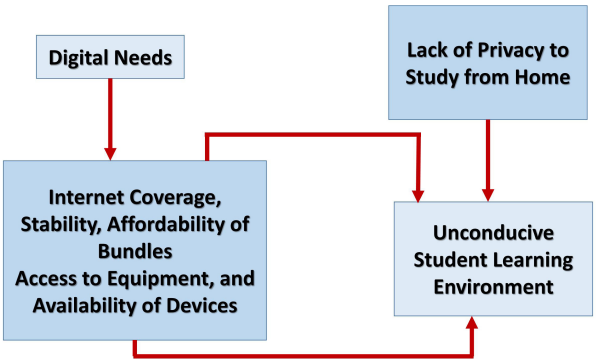

Figure 1. Relationship between "digital needs" and "learning environment at home."

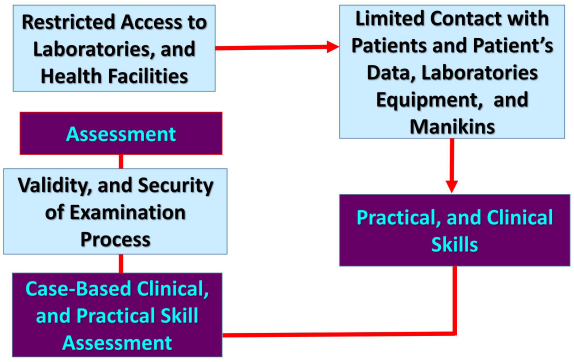

Figure 2. Relationship between "practical and clinical skills" and "assessment."

> Practical sessions had to be delivered virtually; **access to laboratories was totally stopped** (BSpr5)

The participants reported issues associated with the change from paper-based to fully online assessments during the pandemic. They highlighted the problems with maintaining the security and integrity of assessment systems, especially the inability to conduct clinical case-based and practical skills assessments online. Some educators did not believe online assessment could be a viable alternative to face-to-face examinations.

> [One of the main challenges is lack of] fair and thorough assessment: **complete assessment is only possible via face-to-face.** (Cpr3)

> [One of the main challenges is] inability to validate students' **performance of a practical session**, to assess a student's ability **to perform a skill**. (PCpr2)

The codes "practical and clinical skills" and "assessment" were mapped, and several new subthemes emerged in exploring the relationship between the initial themes (Fig. 2).

Most educators reported difficulties regarding a lack of interaction between students and teachers during the session and with each other. Participants mentioned the inability to meet with students in person and a lack of interaction with them as one of the main challenges with HPE brought about by the pandemic.

> [One of the main challenges is] complete shift from face-to-face lectures to online teaching, ... **unable to meet the students in person**. (BSpr5)

> [One of the main challenges is] lack of interaction [of students] with each other: continuous **interaction [among students] contributes extensively to learning.** (Cpr3)

Among the other challenges mentioned by the participants were difficulties in educational planning and decision-making due to the uncertainty caused by the pandemic, increased mental distress among educators, a higher risk of contracting COVID-19 in clinical settings, and hampered research activities.

Response of HPE establishments to the COVID-19 pandemic

The immediate response of the universities to the pandemic and the support harnessed to help mitigate the challenges they faced were subsequently analyzed. Table 3 outlines the codes for the "responses" identified from the initial analytical framework.

To address the digital needs, the university's quick response included the provision of digital equipment as well as ensuring IT connectivity for both educators and students. A particular focus was placed on supporting students with limited access to necessary equipment, including devices and Internet bundles.

> **Screening** [was conducted to identify] the students who need help [with equipment and bundles]. (Cp3)

> The university has **identified those poor students** and provided them with a laptop [for] loan for them to use for online learning. (Cp4)

> All lecturers (mentors) [had] to check and **identify** if any of their students (mentees) had ... related problems... The lecturers were reminded **to avoid unnecessary online streaming sessions** so that students may use the internet quota prudently. (PCp2)

At the beginning of the pandemic, training was provided for both the educators and students to enhance online teaching and learning preparedness.

> **Survey on** [lecturers' and students'] readiness to use [online] systems [was conducted]. (PCp1)

> There were many [...] trainings conducted by the university. All trainings **were made mandatory for [...] staff**, quickly transform to online teaching and learning methods. (PCpr2)

The universities also provided various teaching resources to support lecturers in the transition to an online mode of knowledge transfer, especially to assist with online teaching clinical and practical skills (subtheme 1) and assessments (subtheme 2).

Table 3. Response of HPE establishments to COVID-19.

Codes	Description
Response	
Supporting digital needs	Provision of digital equipment, Internet bundles, IT support, ensuring IT connectivity
Enhancing training	Training on the use of online platforms, experience sharing sessions, training on financial management, personal and professional development
Provision of resources for online teaching	Provision of online platforms and software, access to virtual labs, innovative methods in the delivery of teaching
S*ubthemes*:	
For teaching practical and clinical skills	Clinical case banks, curated patient data, recorded clinical teaching videos
For assessment	Online question banks, recorded examinations, and lab tests
Administrative decisions	Work from home directives, flexibility in teaching methods, adjusted criteria for student assessment, aligning faculty evaluation methods to online teaching, modified curriculum, and academic calendars
Subtheme:	
Protection from the risk of COVID-19	Postponing or cancelation of face-to-face classes, students sent back home, strict SOPs during classes, daily health screening, risk assessment, COVID-19 vaccination
Social and psychological support	Provision of financial support to purchase Internet data and equipment, training on financial management, stress management support, and training

> Access to **virtual labs** was made available to us. [The university management tried] to **innovate the delivery of teaching** with the help of available resources. (BSpr5)

> [The university organized] **online clerking of patients** and case scenarios, [provided with] **recorded** lung (and heart) sounds and physical examination videos. Online assessment of clinical skills [was arranged] with **recorded examination and laboratory tests**. Clinical case banks were created. **Curated clinical material** like X-rays, ECGs, etc. [was collected] from hospitals and online sources. (Cpr4)

The COVID-19 pandemic also forced many higher learning establishments to adopt alternative procedures to work, modify curricula, and make changes to academic calendars. One of the critical administrative responses to the pandemic was to protect staff and students from contracting COVID-19. This was achieved through postponing or cancelling face-to-face classes and sending students home. In addition, whenever face-to-face classes (especially clinical sessions) resumed, the university administration organized risk assessments, daily screening, monitoring of standard operating procedure (SOP) compliance, and, as soon as it became possible, COVID-19 vaccinations for both students and educators.

> We have to **rearrange the academic calendar** to adapt to the dynamic changes of the COVID-19 pandemic. Our university has instructed us to start online teaching and learning activities during the Movement Control Order. The **clinical teaching** has to be withheld until a certain period. (Cp4)

> Our institution [came out] with a special application **to assess daily risk** of COVID-19 infection among staff and students. This software was created by a team of university researchers during the pandemic's beginning. It has been used since then, where every working day, staff and students have to log in to the system and answer the question to assess their risk of COVID -19 infection. (Cp4)

> Several participants mentioned that social and psychological support was provided to students and staff. Educators were also encouraged to take courses on identifying students in mental distress.

> For online teaching activities, our institution has **provided financial support** to the students to purchase the Internet data [and] to buy a computer for those in need. (Cp4)

> University's psychology department conducts numerous **mindfulness sessions** for the well-being of students and staff to overcome the difficulties or issues faced during this 'new normal.' (PCpr2)

Lessons learned to prepare HPE establishments for future pandemics

The codes identified from the initial analytical framework for the theme "lesson learned" corresponded to the ones determined to the "response" (Table 4).

University educators highlighted the importance of maintaining an adequate level of digital readiness to ensure educational preparedness for future pandemics and the ability to preserve the continuity of teaching and learning.

> Internet connectivity and Wi-Fi access should be improved at the national level, especially in rural areas. [Universities should] **improve the Internet access** in the **students' accommodations**. (Dp4)

According to several participants, the ability of universities to educate and train their staff on the use of online teaching and learning methods was highly valued. Besides, one of the educators stated that it is also important to educate university administrators on adapting to the online work mode and the basics of disease transmission.

> Administrators and teachers should learn to adapt to as many activities as possible online and **to make online**

Table 4. Lessons learned to prepare HPE establishments for future pandemics.

Codes	Description
Lessons learned	
Digital readiness	Investing in educational software, sufficient digital equipment, ensuring stable Internet connectivity, adequate data, and coverage
Training	Training of academic staff and students on technology-based education, training of admin staff on disease transmission
Teaching and learning approach and resources	Creating learning environments adaptable to changes, preparing online modules and resources for simulation-based education
Policies and administration	Applying the flexible approach to academic planning, creating contingency plans, and adequate budgeting
Subtheme: Protection from the risk of infection	Clear Standards of Performance and working guidelines, budgeting to cover the cost of infection control measures
Social and psychological support	Provision of social and emotional support to students and staff, financial aid to students from low-income families

> **activity the norm**. **Administrators** should read and understand about **disease transmission**. (Cpr3)

Several HP educators highlighted that the teaching-learning process and resources approach has to change with blended learning here to stay.

> [There should be] transformation from the traditional teacher-centered to student-centered model to create learning environments that are **responsive to continuously changing situations**. (Cpr4)

> The previous supply of hard copy books, articles, manuals, and other education resources [should be digitalized] into **e-books and downloadable versions**. (Dp4)

> [Universities should prepare resources for] **simulation-based education** and online modules to develop **clinical competencies**. (PCp2)

Participants in this study also suggested a flexible approach is now needed for academic planning, contingency planning, and ensuring adequate budgets to help mitigate the impact of future pandemics on HPE. A subtheme "protection from the risk of infection" emerged within the theme "policies and administration."

> [It is important to have] adequate budgeting, especially to cover **costs of quarantine, swabbing, and transportation** and also to help the poor students and staff during these trying times, […] need to [make sure] that the flow of work is in order while maintaining the SOP to prevent infection among staff. (Cp4)

Finally, several participants mentioned the importance of providing students and staff with social, financial, and emotional support.

DISCUSSION

This pilot study aims to divulge a substantial number of challenges faced by HP educators in Malaysia at the start of the pandemic, as well as their responses to these challenges and the lessons learned. The main challenges faced by HP lecturers in Malaysia at the beginning of the pandemic included rapid adaptation to the e-learning environment, preparing necessary changes to the academic timetable, including delays in clinical exams, digital needs, and how to undertake practical and clinical examinations in an e-learning environment. These challenges were similar to several low- and middle-income countries (LMICs). The educators and students from these countries also had to adapt to online learning, lack of equipment, cost of Internet bundles (especially among disadvantaged students), and modifications in the pedagogy of teaching and learning, especially those involving practical and clinical teaching (Al-Balas *et al*., 2020; Alsoufi *et al*., 2020; Chowdhury et al., 2022b, 2022c; Etando *et al*., 2021; Sharma *et al*., 2022; Shawaqfeh *et al*., 2020; Shehata *et al*., 2020). Conversely, higher-income countries appeared better prepared for the closure of universities as they had been undertaking blended learning for several years before the onset of the pandemic (Alrasheedy *et al*., 2021; Chowdhury *et al*., 2022b).

Upon assessing the digital needs and the learning environment at home, we found that poor Internet coverage, affordability of devices and access to equipment, and a lack of privacy will affect the students' learning. This finding is similar to a study conducted among university students in the Faculty of Business Management in a public university in Malaysia (Ismail *et al*., 2020). Additionally, we found that COVID-19 badly affected teaching practical and clinical skills due to restricted access to laboratories and healthcare facilities. There was limited contact between patients and students. Moreover, the academic burden for the lecturers has increased because they had to create additional online cases for the clinical sessions. Concerns over assessment validity and security of exams were strongly linked to skill-based teaching and learning. Assessment remains vital as it is the parameter of attainment of curriculum learning outcomes. Therefore, alternative assessment modes must be considered as reported in other settings (Rao *et al*., 2021).

The response of governments and universities in Malaysia to the challenges faced by HP educators and students to the closure of educational establishments and the instigation of online learning was similar to other LMICs (Al-Balas *et al*., 2020; Alsoufi *et al*., 2020; Chowdhury et al., 2022b, 2022c; Etando *et al*., 2021; Sharma *et al*., 2022; Shawaqfeh *et al*., 2020).

The measures included supporting digital needs where there were concerns, such as the provision of devices and Internet bundles and online platforms, including virtual labs. Besides, training needs for both educators and students were addressed. Moreover, all lecturers were fully equipped with the necessary devices and software (Azman and Abdullan, 2021). Additional arrangements were in place for resuming face-to-face classes, such as strict compliance with COVID-19 SOPs. We have seen flexibility of academic calendars across countries, which is likely to remain post-pandemic with hybrid learning here to stay in Malaysia and across countries (Azlan *et al*., 2020). Additionally, more significant investments in simulation-based learning (SBL) have been made by many institutions to improve clinical competencies, although countries are still learning from each other on how to address these issues (Etando *et al*., 2021).

The lessons learned among the educators following the necessary instigation of e-learning approaches in Malaysia were similar to several other countries (Chowdhury *et al*., 2022b; Etando *et al*., 2021; Sharma *et al*., 2022). The need to invest in digital readiness was highlighted, including Internet and software availability and affordability. The participants stated the importance of maintaining academic staff adequately trained in e-learning approaches. Finally, this study emphasized the importance of a flexible approach toward e-learning and psychological support for students and staff (Chowdhury *et al*., 2022b; Etando *et al*., 2021; Sharma *et al*., 2022). Social and psychological support during the pandemic is necessary, given the impact of COVID-19 on mental health among HP students and educators during the pandemic which is consistent with the findings from previous studies (Chinna *et al*., 2021; Saddik *et al*., 2020; Saraswathi *et al*., 2020; Sundarasen *et al*., 2020).

CONCLUSION

The COVID-19 pandemic has conveyed several challenges faced by HPE in Malaysia due to the transition to online teaching and learning. This pilot study showed that the main challenges included unavailability of necessary equipment and regular access to the Internet, as well as unfamiliarity of educators and students with remote learning. These challenges have been addressed accordingly, and the gaps in response of HP establishments to the pandemic have been identified. The suggestions for future pandemic planning for HP establishments have been proposed considering hybrid learning is here to stay in Malaysia. Hence, the measures to support digital and training needs, including the expansion of online platforms and virtual labs, are being implemented by many HPE establishments of higher learning. Ultimately, social and psychological support to address mental health issues for students and educators during any pandemic remains crucial. We will be exploring these results further in the full study to provide additional directions to all key stakeholder groups in Malaysia during future pandemics.

ACKNOWLEDGMENTS

The authors show gratitude to Naufela Nafisa Ahmad, Master of Arts in English Language (Linguistics), Jalan Wangsa Delima 7, Wangsa Maju, 53300 Kuala Lumpur, Malaysia, for revising and providing her expert opinion about the quality of the English language of this article. The authors also express gratitude to Faiza Binte Mozammel, Photographer and Editor, 7/16/1 South Mugdapara Dhaka, Bangladesh, for her kind effort and time regarding image development and editing.

CONSENT FOR PUBLICATION

All authors reviewed and approved the final version and have agreed to be accountable for all aspects of the work, including any accuracy or integrity issues.

DISCLOSURE

The authors declare that they have no financial involvement or affiliations with any organization, association, or entity directly or indirectly with the subject matter or materials presented in this paper. This includes honoraria, expert testimony, employment, ownership of stocks or options, patents or grants received or pending, or royalties.

AUTHORS' CONTRIBUTION

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation or in all these areas; they took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted, and have decided to be accountable for all aspects of the work.

DATA AVAILABILITY

The data is available to the principal author only for research purposes.

ETHICAL CONSIDERATIONS

Details include in Materials and Method section.

PUBLISHER'S NOTE

This journal remains neutral with regard to jurisdictional claims in published institutional affiliation.

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How to cite this article:
Krishnapillai A, Lugova H, Haque M, Ariaratnam S, Aziz AFBA, Maziz MNH, Patil SS, Daher AM, Ali SM, Rahman NAA, Rahman NIA, Chowdhury K, Sharma P, Etando A, Kumar S, Shahwan M, Godman B. The shock of the SARS-CoV-2 pandemic on health professionals' education: A pilot qualitative study in Malaysia. J Appl Pharm Sci, 2022; 12(10):161–170.