ORIGINAL RESEARCH

The Effects of the 2019 Novel Coronavirus Disease (COVID-19) Outbreak on Academic Staff Members: A Case Study of a Pharmacy School in Saudi Arabia

Dalia Almaghaslah [1]
Abdulrhman Alsayari[2]

[1]Department of Clinical Pharmacy, College of Pharmacy, King Khalid University, Abha, Saudi Arabia; [2]Department of Pharmacognosy, College of Pharmacy, King Khalid University, Abha, Saudi Arabia

Background: The 2019 coronavirus disease (COVID-19) pandemic has required governments to implement preventive policies to control the spread of the virus. Temporarily closing schools and other educational institutions has been adopted in many countries, including Saudi Arabia. This study aimed to assess academic staff satisfaction with suspending face-to-face teaching and turning to web-based education. Additionally, this study assessed how the suspension of face-to-face classes has affected the administrative work, research, and community at the College of Pharmacy, King Khalid University.

Methods: This study used a cross-sectional, self-administered, anonymous online questionnaire. A total of 59 academic staff were included.

Results: More than half the participants (55.9%) agreed or strongly agreed that the sudden shift to online education was done smoothly, more than half (57.6%) agreed or strongly agreed that virtual lectures were more flexible than face-to-face lectures, and a majority (79.7%) agreed or strongly agreed that the technology used for online education was reliable. A minority of participants agreed or strongly agreed that research (20.4%), community service (11.4%), and participation in scientific meetings (15.2%) had not been affected by the suspension.

Conclusion: Suspending classes without stopping education has been implemented effectively, and administrative work has continued to run smoothly. However, research, community service, and attending scientific meetings have been negatively impacted by the suspension.

Keywords: COVID-19, pharmacy education, academic staff members, Saudi Arabia, King Khalid University

Introduction

In December 2019, a novel coronavirus disease (COVID-19) was first identified in Wuhan, Hubei Province, China, after several cases of pneumonia of unknown etiology had been reported.[1,2] The newly recognized virus, which causes severe acute respiratory disease, is related to the severe acute respiratory syndrome (SARS) coronavirus and the Middle East respiratory syndrome (MERS) coronavirus.[3] The current outbreak is believed to have begun from single or multiple zoonotic transmissions at a wet market in Wuhan where game animals and meat were sold, and human–human transmission was later confirmed. The outbreak spread rapidly to other national areas in China and globally.[2]

Correspondence: Dalia Almaghaslah
College of Pharmacy, King Khalid University, PO Box 1882, Abha 61441, Saudi Arabia
Email damoazle@kku.edu.sa

Attention has been directed to implementing preventive measures by countries around the world to control the pandemic. Saudi Arabia had its first case reported on tMarch 2, 2020.[4] As the outbreak continued to evolve, the Saudi government issued several emergency management policies, including social distancing, eg, lockdown of cities, suspension of operation of many government agencies, prohibition of social gatherings in parks, beaches, and resorts, establishment of local quarantine of individuals, suspension of operations of all malls and markets, and banning both domestic and international flights.[5] The causeway between Saudi Arabia and Bahrain and the land borders between Saudi Arabia and all surrounding nations are limited to commercial traffic only.[5] Other policies affected Islamic worship, eg, banning prayers in Mosques, visiting the holiest sites in Medina and Mecca, and performing pilgrimages.[5]

The Ministry of Education issued a notice to suspend face-to face teaching and learning and temporarily close all educational institutions, including public and private schools, technical and vocational training institutions, and universities. Virtual classes and distance learning were activated through the use of an online-education platform (vschool.sa) and the use of enriching digital materials through the Standard Education System website and an application available in the Apple and Android application stores. Lessons for all years of school were made available asynchronously via the Ain channel, which is aired on Arabsat through 14 TV channels and YouTube (www.youtube.com/dorosien; Ministry of Education).[6]

At the university level, all institutions have already implemented online-education platforms. King Khalid University (KKU) has adopted an online learning method along with traditional instructor-delivered dedicated lectures.[7] Both fully online learning and blended learning have been implemented. Online education at KKU is managed through the Blackboard learning-management system.[7] The college has an annual student enrollment of 140 students, and provides undergraduate Bachelor of Pharmaceutical Sciences and Doctor of Pharmacy degrees.[8]

Higher education responded to the coronavirus outbreak in a similar manner to general education in terms of shifting to virtual education.[6] Faculty members have been affected by the precautionary measures, which have led to technology-enhanced learning in response to the COVID-19 outbreak. This study aimed to assess academic staff satisfaction with suspending face-to-face teaching and turning to web-based education. Additionally, this study assessed how the suspension has affected administrative work, research, and community services at the College of Pharmacy, KKU.

Methods
Study Design
This study used a cross-sectional, self-administered online questionnaire carried out in the College of Pharmacy, KKU, Abha, Saudi Arabia.

Population and Setting
The sample consisted of the entire academic staff (62 individuals) teaching a course at the College of Pharmacy, KKU during the second semester of the 2019–2020 academic year during the COVID-19 outbreak, which required a complete shift to virtual education.

Data Collection
All online academic staff at the college were contacted through their university email addresses and invited to participate in the study. They were provided with the aim of the study and a link to the online survey, which was designed using the Google Forms online-survey platform. Participants needed to log in using their university ID to complete the questionnaire. All responses were anonymous and confidential.

Data-Collection Form
The structured questionnaire was designed based on the nature of instructors' work during the outbreak and the precautionary measures implemented by the university, ie, completely shifting to virtual classrooms and working from virtual work environments. The questionnaire consisted of four sections, with demographic information included in the Introduction section. The Methodology section consisted of 12 items to assess faculty members' satisfaction with virtual education using a five-point Likert scale ranging from "strongly disagree" to "strongly agree". This section was adapted from a previous study assessing faculty members' satisfaction with online teaching and learning in higher education.[9] The Results section consisted of eight items assessing faculty perceptions of how administrative work, research, and community service had been affected, using a five-point Likert scale ranging from strongly disagree to strongly agree. The Discussion section consisted of eleven items evaluating faculty's experience with working from home during the suspension using a five-point Likert scale ranging from strongly disagree to strongly agree.

Face validity was established by the study authors, who have experience and expertise in the pharmacy-education and pharmacy-workforce fields. The questionnaire was prepared in English. The survey was piloted using three participants who were representative of the study population. The pilot study was also conducted as a web-based questionnaire. The results of the pilot study were used to determine the clarity of the language and the structure of the questionnaire. The questionnaire was reviewed and modified based on the feedback received in the pilot test. The results of the pilot test were not included in the end results. The validated questionnaire was posted online, with data collectedMarch 20–30, 2020.

Ethical Considerations

Ethical approval for this study was granted by the Ethical Committee of Scientific Research at KKU (ECM 2020-221; HAPO-06-B-001). All participants were asked for written informed consent before starting the questionnaire.

Statistical Analysis

Data collected were cleaned, entered, and analyzed using SPSS version 24.0 for Macintosh. Results are described in terms of frequencies. Descriptive statistics were used to analyze Likert-scale responses.

Results

Of the 62 academic staff, 59 completed and submitted the online questionnaire, for a response rate of 95.2%. The data in Table 1 show that of the 59 individuals who responded, just over half (52.5%) were 34–44 years old. The majority of participants were male (59.3%), assistant professors (59.3%), and non-Saudi nationals (71.2%).

Academic staff satisfaction using virtual education was assessed using a five-point Likert scale (Table 2). More than half the participants (55.9%) agreed or strongly agreed that the sudden shift to online education was done smoothly, more than half(57.6%) agreed or strongly agreed that virtual class lectures were more flexible than face-to-face class lectures, and a majority (79.7%) agreed or strongly agreed that the technology used for online education was reliable.

Just under two-thirds of the instructors (61%) agreed or strongly agreed that the communication tools in the online environment were excellent, and that was reflected in communicating with students regarding online course matters, where 57% of the instructors agreed or strongly agreed that students actively communicated with them. However, the majority of the instructors were not satisfied with engaging with or controlling students. Only 32.1% of the instructors

Table 1 Demographics

	Number	**Percentage**
Age, years		
24–34	22	37.3
34–44	31	52.5
44–54	5	8.5
54–64	1	1.7
Sex		
Male	35	59.3
Female	24	40.7
Position		
Teaching assistant	2	3.4
Lecturer	16	27.1
Assistant professor	35	59.3
Associate professor	3	5.1
Professor	3	5.1
Nationality		
Saudi	17	28.8
Non-Saudi	42	71.2

agreed or strongly agreed that students were actively participating in their learning, and 23.8%agreed or strongly agreed that they were able to control students virtually.

Online education was less effective in certain aspects, including the delivery of virtual hands-on activities in practical sessions, where only 8.5% of the instructors agreed or strongly agreed that they managed to deliver such classes electronically. Providing feedback virtually was also a challenge, where 37.3% agreed or strongly agreed that delivering face-to-screen feedback was better than delivering face-to-face feedback. Creativity in using resources was among the aspects that instructors were less satisfied with, where only a quarter (25.4%) agreed or strongly agreed that virtual classes did not require more creativity. A vast majority of the instructors (88.1%) agreed or strongly agreed that they missed face-to-face contact with students, and only 13.6% agreed or strongly agreed that they were more satisfied with online education.

Academic staff satisfaction with administrative work, research, and community service was assessed using a five-point Likert scale (Table 3). Just over half the instructors (52.5%) agreed or strongly agreed that online meetings were as effective as face-to-face meetings, and 40.7% agreed or strongly agreed that completing administrative tasks online was as easy as being at work. In addition, the vast majority of instructors agreed or strongly agreed that the technology was reliable (81.3%) and that they received

Table 2 Academic Staff Satisfaction with Online Teaching and Learning

	Statement	Strongly Disagree, n (%)	Disagree, n (%)	Neutral, n (%)	Agree, n (%)	Strongly Agree, n (%)
1	The sudden change to full online teaching was smooth.	3 (5)	10 (16.9)	13 (22)	19 (32.2)	14 (23.7)
2	The flexibility provided by the online environment is more than that of a traditional lecture.	4 (6.8)	7 (11.9)	14 (23.7)	21 (35.6)	13 (22)
3	My online students are actively involved in their learning.	13(22)	12(20.3)	15(25.4)	16(27.1)	3(5)
4	The technology I use for online teaching is reliable.	1 (1.7)	4 (6.8)	7 (11.9)	27 (45.8)	20(33.9)
5	I miss face-to-face contact with students when teaching online.	1 (1.7)	1 (1.7)	5 (8.5)	14 (23.7)	38 (64.4)
6	I do not have any problems controlling my students in the online environment.	11 (18.6)	21 (35.6)	13 (22)	8 (13.6)	6 (10.2)
7	My students are very active in communicating with me regarding online course matters.	12 (20.3)	12 (20.3)	12 (20.3)	21 (53.6)	2 (3.4)
8	I do not have to be more creative in terms of the resources used for online courses.	11 (18.6)	18 (30.5)	15 (25.4)	10 (16.9)	5 (8.5)
9	I am satisfied with the use of the communication tools in the online environment (eg, chat rooms, threaded discussions).	2 (3.4)	4 (6.8)	17 (28.8)	28 (47.5)	8 (13.6)
10	I am able to provide better feedback to my online students regarding their performance in the online environment.	7 (11.9)	10 (16.9)	19 (32.2)	18 (30.5)	4 (6.8)
11	Teaching practicals has been manageable.	18 (30.5)	19 (32.2)	17 (28.8)	1 (1.7)	4 (6.8)
12	I am more satisfied with teaching online compared to other delivery methods.	15 (25.4)	17 (28.8)	18 (30.5)	6 (10.2)	2 (3.4)

sufficient training and IT support for using the electronic platforms (76.9%). A minority of instructors agreed or strongly agreed that research (20.4%), community service (11.4%), and participation in scientific meetings (15.2%) had not been affected by the suspension.

The effects of adopting a virtual working environment were assessed using a five-point Likert scale (Table 4). Several benefits were reported by participants, including the following percentages of participants who agreed or strongly agreed: reducing the risk of infection with COVID-19 (91.5%), spending more time with one's family (59.3%), more work flexibility (59.3%), saving money (44.1%), improved willpower and self-discipline (44.1%), and a more convenient working environment (41.7%). On the other hand, working from home failed to prevent office distractions (29.8%), did not help to maintain physical activity (10.2%), and did not always

provide a custom working environment (35.6%). A majority of participants agreed or strongly agreed that they missed social interactions at work (78%), and 64% would not rather continue working from home.

Discussion

The spread of COVID-19 around the globe has required governments to take rapid and efficient precautionary actions.[10] China set a great example for successful control of the outbreak. The preventive polices the Chinese government initiated included but not limited to social distancing and closing schools. The Chinese government implemented an emergency initiative called Suspending Classes Without Stopping Learning, which basically means switching traditional offline education to online education.[11] China, however, has previously experienced epidemic disease outbreaks that affected education, such

as SARS and Ebola, and successfully managed education.[12]

The scenario is not very different in other countries, including Saudi Arabia. Similar preventive measures were implemented by the government, including shutting down all government and private educational institutions.[6] The Ministry of Education in Saudi Arabia launched a temporary emergency policy of large-scale, long-distance online education for both general education (ie, primary, intermediate, and high school) and higher education. General education was more closely supervised by the ministry and supported through creating web-based teaching platforms. Higher education, on the other hand, was given more freedom to be controlled by the universities themselves.[6]

KKU is a government university located in the southern region of the country. KKU has 29 colleges, including a pharmacy college, and >60,000 students.[8] In response to the notice issued by the Ministry of Education, KKU suspended all classes and switched to virtual education. This study aimed to assess academic staff satisfaction with suspending face-to-face teaching and turning to web-based education. Additionally, this study assessed how the suspension has affected administrative work, research, and community work at the College of Pharmacy, KKU.

The results of this study showed that the education system was prepared for the emergency switch to web-based education. The respondents found this mode of education to be more flexible than traditional classes, the technology used reliable, and the communication tools in the online platforms efficient, and hence they did not face any difficulties reaching their students, as previously reported by Daniel.[13] KKU had already adopted an online learning strategy using the Blackboard learning-management system, along with traditional face-to-face dedicated lectures, and both fully online learning and blended learning had been implemented.[7] However, successfully switching all courses to fully online courses required the Electronic Learning Deanship to provide online training for instructors, focusing on conducting live-streaming classes, prerecording lectures, facilitating discussions on an electronic platform, and providing assessment and receiving feedback.

Despite the attentive planning and arrangements by the university and the great efforts made by the stakeholders involved, including the KKU Electronic Teaching Deanship and the College of Pharmacy instructors and students, the implementation of large-scale web-based distance learning still faced a few issues. Engaging and controlling students has been challenging. These findings have previously been reported by Almaghaslah et al as students not fully

understanding the concept of online education and preferring instructor-delivered face-to-face education.[7] Other aspects of online education that were not up to standard in the instructors' eyes included providing feedback and the delivery of practical and laboratory-based sessions.

We argue that education in this critical time needs to be differentiated from that in a normal period. As such, embracing flexibility while ensuring accountability is a priority. In other words, it should be assured that course-learning outcomes are met without necessarily covering all the content of the syllabus, such as the delivery of some practical sessions that have to canceled due to a suspension. Embracing technology-enhanced education at this time of emergency provides a critical evaluation of the preparedness and resilience of the education system, since this is the first crisis requiring the country to temporarily close schools. Overcoming the identified difficulties can be achieved through, eg a hybrid model in which a small number of students attend face-to-face sessions. Another possible solution would be simulation-based online education.

This situation is especially true, since the last time the country had to suspend classes was almost 30 years ago during the Gulf War in 1991. However, suspending classes at that time resulted in the postponement of a few months at the beginning of the academic year. Technology has transformed education over the past few decades. A majority of instructors prefer traditional in-class education and missed interacting with students, and similar findings were reported by a study conducted in China during the COVID-19 outbreak.[14] They suggested that in-person communication between instructors and students is more convenient and effective.

A majority of instructors believed that they received sufficient training and IT support regarding using technology to conduct meetings and complete their administrative work. However, they found that completing administrative tasks virtually was challenging. This finding could have been the result of the lack of dynamic human interaction in digital communication, a failure to engage participants directly, limited ability to assess and judge participants' integrity and competence, and a lack of the opportunity to have side conversations with their colleagues.[15] A large proportion of participants suggested that their research activities were affected, probably due to the limited access to university labs during the suspension. In addition, community service and scientific meetings and conferences were highly affected by the precautionary policies implemented by the government, including compulsory home

Table 3 Academic Staff Satisfaction with Administrative Work, Research, and Community Service

	Statement	Strongly disagree, n (%)	Disagree, n (%)	Neutral, n (%)	Agree, n (%)	Strongly agree, n (%)
1	I find online meetings to be as effective as face-to-face meetings.	4 (6.8)	12 (20.3)	12 (20.3)	18 (30.5)	13 (22)
2	I find communicating with my colleagues and supervisors online as easy as being on campus.	1 (1.7)	14 (23.7)	14 (23.7)	21 (35.6)	9 (9.5)
3	I find that completing my administrative tasks while working from home is as easy as being on campus.	6 (10.2)	18 (30.5)	11 (18.6)	18 (30.5)	6 (10.2)
4	The technology I use for online meetings is reliable.	1 (1.7)	1 (1.7)	9 (9.5)	29 (49.1)	19 (32.2)
5	I receive enough training and IT support related to the use of the electronic platforms.	2 (3.4)	6 (10.2)	6 (10.2)	23 (39)	22 (37.9)
6	My research activities are not affected by the suspension.	17 (28.8)	18 (30.5)	12 (20.3)	7 (11.9)	5 (8.5)
7	Participation in community service is not affected by the outbreak.	24 (45.8)	15 (25.4)	13 (22)	4 (6.8)	3 (5)
8	Attending conferences and scientific meetings are not affected by the outbreak.	27 (45.8)	12 (20.3)	11 (18.6)	6 (10.2)	3 (5)

quarantine, cancelation of all events, and cancelation of domestic and international flights.[5]

The use of information-and-communication technologies during the COVID-19 outbreak has been positive, allowing many organizations to operate digitally and employees to be available anytime and anywhere.[5] This study assessed academic staff's experience working from home. The main propose of the shift to the work-from-home model, to reduce the risk of COVID-19 infection was successful, according to the participants. Other benefits, including more flexible working times and flexible workplace arrangements, were also reported. Although participants felt positive about some aspects, such as work flexibility and spending more time with family, they did not feel the same about other aspects, such as office distractions. The literature has suggested that work-from-home employees are often contacted regarding work-related tasks at home, hence destroying the boundaries between work and nonwork domains.[16] These employees might also feel that they must be or are expected to be available anytime and must complete work-related tasks outside regular working hours. In our scenario, the academic staff worked long and variable working hours, since live-streaming sessions, meetings, and online assessments can be conducted any time of the day, including weekends. Therefore, controlling working hours is essential.[16]

A study conducted in China discussed how the sudden suspension of classes and compulsory home quarantine made home the only place where education could take place.[14] This unplanned change does not allow time for psychological preparation, and since most faculty members live with their families, interference by other family members might interrupt the completion of certain tasks at home. As such, creating a customized working environment at home was nearly impossible, as the participants suggested. The majority of participants found it difficult to stay physically active during the quarantine and missed social interactions. They would rather return to working at the college campus.

This study has several limitations. First, the sample is geographically limited, since only online instructors at a single college took part. Second, the sample is relatively small, even though the response rate (95.2%) was high. These limitations could make the results particularly dependent on contextual factors. Therefore, these findings might be generalizable only to other colleges or universities in Saudi Arabia or other countries that have adopted similar precautionary measures to tackle the virus outbreak, ie, temporarily closing schools and shifting to online education. Suggestions for future researchers is to include other colleges at KKU or to carry out a multi-institutional study. Additionally, others could evaluate the level of student satisfaction with the online environment.

Table 4 Academic Staff Satisfaction with Working from Home

	Statement	Strongly Disagree, n (%)	Disagree, n (%)	Neutral, n (%)	Agree, n (%)	Strongly Agree, n (%)
1	I find that working from home allows me to spend more time with my family.	5 (8.5)	11 (18.6)	8 (13.6)	22 (37.3)	13 (22)
2	I find that working from home helps with time management, self-discipline and willpower.	10 (16.9)	14 (23.7)	9 (15.3)	19 (32.2)	7 (11.9)
3	I find that working from home prevents office distractions.	14 (23.7)	8 (13.6)	16 (27.1)	12 (20.3)	9 (9.5)
4	I find that working from home provides a more focused work environment (fewer distractions).	14 (23.7)	11 (18.6)	12 (20.3)	14 (23.7)	7 (11.9)
5	I find working from home more convenient (eg, making calls, cozy clothes, no commuting).	11 (18.6)	5 (8.5)	15 (25.4)	19 (32.2)	9 (9.5)
6	I find working from home more flexible.	6 (10.2)	5 (8.5)	13 (22)	26 (44)	9 (15.3)
7	I find that working from home helps me save money.	8 (13.6)	6 (10.2)	18 (30.5)	17 (28.8)	9 (15.3)
8	I feel that working from home reduces the risk of catching the COVID-19 virus.	1 (1.7)	1 (1.7)	3 (5)	15 (25.4)	39 (66.1)
9	I feel that working from home increases my physical activity.	23 (39)	17 (28.8)	13 (22)	2 (3.4)	4 (6.8)
10	I miss social interactions while working from home.	2 (3.4)	5 (8.5)	6 (10.2)	21 (35.6)	25 (42.4)
11	I would rather continue to work from home after the outbreak.	20 (33.9)	18 (30.5)	7 (11.9)	6 (10.2)	8 (13.6)

Conclusion

To the best of our knowledge, this is the first study to evaluate how faculty members' teaching, learning, research, community service, and work environments have been affected by the outbreak and the preventive measures that have been implemented. This study revealed that suspending classes without stopping education has been implemented effectively and that administrative work has continued to run smoothly. However, research, community service, and attending scientific meetings have been strongly impacted by the suspension. In addition, this study provides data for decision-makers on the effects of the COVID-19 outbreak on academic staff performance. Future research should focus on evaluating levels of student satisfaction in the online environment during the outbreak and preventive measures.

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