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ORIGINAL ARTICLE

E-learning in the era of Covid-19 Pandemic: the Challenges and Opportunities

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ABSTRACT

Background: The current study aimed to determine the effectiveness of E-learning in Pakistan among the higher education students (both medical and non-medical) during the global pandemic.

Methodology: A cross-sectional study was conducted at a government university in Karachi, Pakistan between April 2020 to September 2021. All participants living in a region where COVID-19 is prevalent, having higher education status, who had access to the internet and were above 18 years of age were included in the study. All those who were younger than 18 years, those who were in primary and secondary education, and students who were already taking any online module before the Covid-19 pandemic were excluded. All findings were recorded in the semi – structured Proforma consisting of closed ended questions. Demographics of the study participant's such as age, gender and occupation were recorded. Furthermore, information to assess the satisfaction towards the online learning were included.

Results: Mean age of study participants was 21 years with female dominance. Overall mean scores for learning environment, face-to-face learning, and E-learning were 18.1 ± 4.6, 23.1 ± 6.5, and 15.4 ± 7.1, respectively. The scores for the learning environment were significantly higher for female students as compared to male counterparts ($p<0.008$). However, no statistical difference was observed between gender and scores on face-to face learning and E-learning. It was further indicated that face-to-face learning was significantly higher in medical students ($p=0.0001$) while non-medical students score significantly higher in E-learning with a p-value of 0.0002.

Conclusion: The present study presented a comparison between modes of teaching (face-to-face learning versus E-learning) from the perspective of the students. The study indicated that medical students preferred face-to-face learning while other non-medical students preferred E-learning. If interactive classes are an option for students in which they can easily interact with the teacher and postulate questions, then E-learning could be as effective as face-to-face learning. However, this should be further explored using a larger sample population including remote areas of Pakistan as well.

Keywords: E-LEARNING, COVID-19, PANDEMIC, LEARNING ENVIRONMENT

INTRODUCTION

In December 2019, there was a cluster of pneumonia cases in the city of Wuhan, China.Investigation found that it was caused by a previously unknown virus, now named as the 2019 Novel Coronavirus[1].Coronaviruses are a large group of viruses that cause respiratory or sometimes gastrointestinal symptoms.Respiratory symptoms can range from the common cold to pneumonia however there are some types of Coronaviruses that cause severe diseases these includes the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) first identified in china in 2003 and theMiddle East Respiratory Syndrome Coronavirus (MERS-CoV) first identified in Saudi Arabia in 2012 [2,3].On March 11, 2020 World Health Organization declared covid-19 as pandemic, up till now (April 12, 2021) 135,646,617 confirmed cases and 2,930,732deaths has been reported worldwide which makes 2.16 % mortality rate [2].

Worldwide spread of infectious diseases like Covid-19 hashad a very serious impact on students, teachers, and educational institutions around the globe [4]. In order to maintain quarantine and social distancing measures all schools, colleges, universities and educational institutes had to shut down their campuses worldwide [5]. The pandemic caused conventional education to be transformed into distance and virtual learning,but this rapid transformation came up with various challenges and obstacles [6].

In Pakistan 725,602 confirmed cases of covid-19 have been reported as per the statistics of April 12, 2021with the mortality rate of 2.14 % [7].In reaction to the global pandemic, all educational institutions across the country have been closed by Pakistani authorities on March 13th, 2020 [8].Education is the pillar of any country specially when your country is developing as it contributes to poverty, environmental condition, GDP, mortality, life, human development, Technology, trade and so on. It is very important to keep your education up to date. The Higher Education Commission (HEC) under the orders of Federal Government of Pakistan direct all higher educational institutions to transform face-to-face learning into distance learning modes and assist students online until the pandemic situation remains unchanged [8].This change of distance learning was quite challenging for both teachers and students to move from one model to a completely different mode of learning.

Adnan et al. conducted a recent study among 126 higher education students, found that 71.4% of them were

not satisfied with online learning modes while only 10.3% students were satisfied with the online learning and found it more effective [9]. This cross-sectional study will reflect the thoughts of undergraduate students about online learning as it happened for the first time in the history of a country to completely shift towards E-learning. It was a new challenge not only for students but also for instructors and educational institutions as well. Potential benefits of this study include student capacity and understanding of online education, proper usage of electronic devices for online learning through different applications like Google meet, Microsoft teams, zoom et cetera and other barriers faced by students during online learning in the Covid-19 era.

The current study aimed to determine the effectiveness of E-learning in Pakistan among the higher education students (both medical and non-medical) during the global pandemic. Secondly, to assess the obstacles and challenges faced by higher education students acquiring distance learning in Pakistan and finally to perform a comparative analysis among conventional face-to-face education and distance online education.

METHODOLOGY

A cross-sectional study was conducted at a government university in Karachi, Pakistan between April 2020 to September 2021. A non-probability convenience sampling technique was used to select participants. The study was initiated after approval from the Institutional Review Board (IRB) of Jinnah Sindh Medical University, Karachi, Sindh; Pakistan.

As snow – balling sampling technique was considered for incorporating participants the sample size is therefore not calculated. The sample will include all participants satisfying the inclusion and exclusion criteria during the study period. Data was collected using a semi – structured questionnaire developed through the google website.

All participants living in a region where COVID-19 is prevalent, having higher education status, who had access to the internet and were above 18 years of age were included in the study. All those who were younger than 18 years, those who were in primary and secondary education, and students who were already taking any online module before the Covid-19 pandemic were excluded.

Data was collected from participants fulfilling the inclusion and exclusion criteria within the next 4 weeks after receiving approval from the IRB. The links for the questionnaire were shared using emails and social media apps such as whatsApp, Instagram, and facebook. Each participant was encouraged to forward the link among their social circle to enrol more and more participants.

All findings were recorded in the semi – structured Proforma consisting of closed ended questions. Demographics of the study participant's such as age, gender and occupation were recorded. Furthermore, information to assess the satisfaction towards the online learning were included. Data were entered and analyzed by using SPSS version 22.

RESULTS

Mean age of study participants was 21 years with female dominance. The majority of the respondents were enrolled in second year of study. Overall mean scores for learning environment, face-to-face learning, and E-learning were 18.1 ± 4.6, 23.1 ± 6.5, and 15.4 ± 7.1, respectively (Table 1).

Table 1. Demographics of the participants

Age	21.01 ± 1.79
Gender	
Female	265 (65.9%)
Male	137 (34.1%)
Year of study	
1st	80 (19.9%)
2nd	117 (29.1%)
3rd	97 (24.1%)
4th	94 (23.4%)
5th	14 (3.5%)
Full name of institute	
NED University	69 (17.2%)
Institute of Pharmaceutical Sciences (JSMU)	48 (11.9%)
Sindh Institute of Oral Health Sciences (JSMU)	40 (10%)
Institute of Physical Therapy & Rehabilitation (JSMU)	26 (6.5%)
Jinnah Sindh Medical University	16 (4%)
Hamdard University of Medicine & Dentistry	15 (3.7%)
Khyber College of Dentistry	13 (3.2%)
de'Montmorency College of Dentistry	13 (3.2%)
Liaquat College of Medicine & Dentistry	11 (2.7%)
Others Medical College	130 (32.3%)
Others Non-Med	21 (5.2%)
City of Institute	
Karachi	277 (68.9%)
Lahore	37 (9.2%)
Rawalpindi	22 (5.5%)
Peshawar	20 (5%)
Others	46 (11.4%)
Degree Program	

BDS (Dentistry)	217 (54%)
D-Pharm	48 (11.9%)
Mechanical Engineering	44 (10.9%)
DPT (Physical therapy)	26 (6.5%)
Electrical Engineering	18 (4.5%)
MBBS	17 (4.2%)
Others Medical Field	4 (1%)
Other Non-Medical fields	28 (7%)
Overall Mean Scores	
Learning Environment	18.1 ± 4.6
Face-to-face Learning	23.1 ± 6.5
E-Learning	15.4 ± 7.1

Table 2 illustrates that the scores for the learning environment were significantly higher for female students as compared to male counterparts (p<0.008). However, no statistical difference was observed between gender and scores on face-to face learning and E-learning (table 2).

Table 2. Association between Gender and learning environment, attitude towards face to face learning and E-learning.

Variable	Female	Male	p-Value
Learning Environment	17.7 ± 4.4	18.9 ± 4.7	0.008
Face-to-Face Learning	23.4 ± 6.4	22.5 ± 6.7	0.187
E-Learning	14.5 ± 6.7	17.1 ± 7.4	0.001
Variable	Medical	Non-medical	
Learning Environment	17.9 ± 4.5	18.8 ± 4.6	0.113
Face-to-Face Learning	23.7 ± 6.1	21.1 ± 7.4	0.001
E-Learning	14.8 ± 6.9	17.4 ± 7.3	0.002

It was further indicated that face-to-face learning was significantly higher in medical students (p=0.0001) while non-medical students score significantly higher in E-learning with a p-value of 0.0002 (table 2). When year of study was stratified, it was found that there were no significant differences between the year of study and learning environment and attitude toward face-to-face or E-learning (Table 3).

Table 3. Association between year of study and learning environment, attitude towards face to face learning and E-learning.

	Year of Study					
	1st (80)	2nd (117)	3rd (97)	4th (94)	5th (14)	
Learning Environment	18.1 ± 4.5	17.4 ± 4.2	18.2 ± 4.4	18.9 ± 5.2	18.6 ± 3.8	0.232
Face-to-Face Learning	23.4 ± 6	22.9 ± 6.3	22.7 ±7.4	23.3 ± 6.3	24.5 ± 5.9	0.861
E-Learning	16.2 ± 6.7	15.2 ± 6.7	14.7 ± 7.2	15.9 ± 7.5	13.1 ± 8.2	0.378

Mechanical Engineering students scored significantly higher i.e. 20.39 ± 4.87 in the learning environment (p<0.012) as compared to other fields of study as well as scored higher in E-learning (p<0.006). Physical therapy students scored highest in attitude towards face-to-face learning (p<0.01) (table 4).

Table 4. Association between Field of study and learning environment, attitude towards face to face learning and E-learning.

	Dentistry (217)	Pharmacy (48)	Mechanical Eng. (44)	Physical Therapy (26)	Electrical Eng (18)	MBBS (17)	Other Med (4)	Other Non Med (28)	
Learning Environment	18.18 ± 4.49	17.9 ± 4.91	20.39 ± 4.87	16.77 ± 4.27	16.44 ± 3.6	16.59 ± 4.57	17.75 ± 5.06	17.79 ± 3.71	0.012
Face-to-Face Learning	23.97 ± 6.13	22.81 ± 6.16	20.73 ± 7.78	24.31 ± 5.84	21.94 ± 7.83	20.76 ± 5.95	28 ± 0	21.14 ± 6.85	0.01
E-Learning	14.43 ± 6.9	16.21 ± 7.3	19.41 ± 7.78	15.54 ± 6.8	14.78 ± 6.67	14.88 ± 6.28	13.5 ± 7.59	16.07 ± 6.06	0.006

Learning environment and attitude towards face-to-face and E-learning were not significantly associated with geographical location of the students (Table 5).

Table 5. Association between City of study and learning environment, attitude towards face to face learning and E-learning.

	Karachi	Lahore	Rawalpindi	Peshawar	Others	

Learning Environment	18.2 ± 4.6	18.2 ± 4.1	17.9 ± 4.3	16.2 ± 4.2	18.2 ± 4.6	0.458
Face-to-Face Learning	22.8 ± 6.7	23 ± 6.7	24.5 ± 7.3	24.3 ± 5.7	23.7 ± 4.8	0.633
E-Learning	15.8 ± 7.2	15 ± 7.4	12.4 ± 7.2	12.6 ± 5.7	16.1 ± 6.4	0.081

DISCUSSION

The emergence of the covid-19 global pandemic came with restrictions in social gatherings, resulting in the cessation of physical classroom teaching methods and the continuation of higher education provision via an online or virtual approach. Our study focuses on the learning outcomes and experiences of undergraduate students with the online learning systems, and the difficulties faced by students, which hindered the learning process.

Our study revealed that students, particularly those belonging to the field of medicine were unsatisfied with online learning methods. The results showed that students, especially males, were greatly impacted by the learning environment.

The face-to-face learning approach was largely preferred by students receiving higher education, and adjusting to the new norm of e-learning created new challenges for students. [10]

Studies have been conducted to evaluate whether e-learning outcomes were better than face-to-face learning, and it was reinforced that the physical learning experience was largely preferred owing to the difficulties and obstacles associated with online learning programs. [11-13]

A study by Dawadi et al. revealed that low-income countries faced several issues while adapting to the online learning programs, which increased the pre-existing inequalities in terms of socio-economic and literacy backgrounds. [14] Covid-19 and the switch to online learning created a mass digital divide between the population in terms of access to electronic resources

A study by Wahid et al. concluded that an online system of education was not of benefit for higher education students, especially those who studied sciences and were involved in the field of medicine. [15] Our results supported these findings and found that students of the medical specialties found it much harder and less beneficial to adapt to the online system of education.

Our findings were supported by a study conducted by Radha et al., which elaborated that though online learning was popular among few, a wide majority of students still preferred classroom education. [16] This implies that students prefer the opportunity to actively interact, discuss and debate with their peers and professors. Thus, though remote learning was a viable solution due to the ongoing pandemic, it did create significant challenges for the students.

A positive association between the learning environment and its influence on the students, particularly on the males. A study by Baticulon et al. found that many students did not have access to private rooms where they could focus without disturbance. [17] The transition to an online mode of teaching did not take into consideration the learning environment of each student, which may adversely impact learning outcomes.

CONCLUSION

The present study presented a comparison between modes of teaching (face-to-face learning versus E-learning) from the perspective of the students. The study indicated that medical students preferred face-to-face learning while other non-medical students preferred E-learning. It should also be noted that the learning environment was a significant factor determining the preference of students. In many areas of Pakistan, E-learning is not a viable option however, in many other cities of Pakistan, students would rather study from the comfort of their homes than to come to university each day and fatigue themselves. If interactive classes are an option for students in which they can easily interact with the teacher and postulate questions, then E-learning could be as effective as face-to-face learning. However, this should be further explored using a larger sample population including remote areas of Pakistan as well.

Conflict of Interest: None
Acknowledgement: None

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