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Message From Chairman Organizing Committee, Icme 2021

The process of reforms in medical education was initiated in North America soon after the publication of Flexner's report a little more than a century ago. The reform process had started much earlier in Europe. It was Netherland that led the reform process by introducing competency-based medical education and other regulatory measures in 1865. Reforms spread throughout Europe and were incorporated in Bologna Process for the unification of higher education across Europe in 1999.

While a great treasure of experience and knowledge in reforming Medical, or more correctly Health Profession, education collected in Europe and North America but the developing countries were left alone. This resulted in a dichotomy of education in developed and developing worlds making it difficult for the graduates of later to compete with those of first. It was soon realized that developing countries must also enter the process of reforms to end this disparity. For this, most essential was to benefit from the experience and experimentations by the developed countries.

Riphah International University established the Riphah Academy of Research and Education in 2006 to achieve this objective. The Academy initiated a series of workshops and lectures conducted in Pakistan by world-renowned experts in medical education. International Conference of Medical Education was the brain-child of its Chancellor Mr. Hassan Muhammad Khan: The mission of ICME is "to provide a credible platform for bringing together World-leading Experts on Medical Education and Educators from all over the world to prepare them to adopt recent innovations and standards in medical education so that the product from Institutions in their countries matches and competes with the product from

similar Institutions in the developed world". This mission is well conveyed in the theme of ICME 2021, "Excellence in health profession education through globalization and collaboration". The first ICME was organized in 2009 in Islamabad-Pakistan. It was a great success and its recommendations were implemented by the Government of Pakistan, Pakistan Medical and Dental Council, and Higher Education Commission of Pakistan.

It was then decided that ICME shall also be organized in other developing countries so that they can also benefit. Until now ICME has been organized in UAE, Mauritius, and Turkey. This is the 7th conference of the series being organized in Indonesia. It is unfortunate, that the conference has been converted to a virtual conference because of the Covid-19 outbreak. But we expect that we shall be able to organize a physical conference in the same place once conditions normalize.

Prof. Dr. Masood Anwar
Riphah International University

Message From The Chairman Of Local Organizing Committee Icme 2021

Alhamdulillahirabbill 'alamin, we could hold this International Conference on Medical Education (ICME) 2021 in the current pandemic situation. This conference is organized by Universitas Islam Indonesia, Riphah International University, and Forum Kedokteran Islam Indonesia (FOKI). Even though we meet virtually, we can still share our experience to strengthen medical education quality, such as the theme of the conference "Excellence in the health profession; through globalization and collaboration."

Approximately four hundred abstracts were submitted. Two hundred and ninety abstracts are selected to be presented at this conference. These abstracts derive from Health Education, Psychology, Science and other relevant fields. We encourage your very active and enthusiastic participation in this conference to learn much from each other.

We want to express our gratitude to all of the speakers for sharing their knowledge at this conference. We also would like to thank the participants for joining this conference. Our special thanks also go to the committee for the hard work to support this conference.

dr. Umatul Khoiriyah, MMedEd., PhD

Faculty of Medicine, Universitas Islam Indonesia

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Awareness among Physicians and Medical Students of Pakistan Regarding COVID-19: A Questionnaire Based Online Survey

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ABSTRACT

Objective: The purpose of our study is to assess the awareness among healthcare professionals and medical students of Pakistan regarding COVID-19. Our data will be useful for the authorities to check if the medical students are ready to serve as a frontline force. Materials and Methods: In this cross-sectional study, physicians and medical students of government and private sector hospitals and universities across Pakistan were included. The questionnaire was distributed through an online forum. Convenience sampling was done. The Confidence level (CI) of 95% was set with 5% margin of error. Demographic data was noted. Data was evaluated using SPSS version 21. Chi-square statistics was utilized to evaluate the relations. A p-value of less than 0.05 was deemed statistically significant. Results: There was a total of 400 responses of our questionnaire. The number the physicians participating in our research was 200 (50%) and 200 (50%) students contributed in our study. The total response of 10 questions in our research is 4000 out of which 2730 (68.25%) are the correct responses. By evaluating the responses on the bases of profession, 1281 (46.9%) responses of the physicians while 1512 (55.3%) responses of medical students were correct. Conclusion: To face this pandemic, adequate amount of knowledge is needed specially of the frontline workers. Our study showed 68.25% awareness of the participants and more responsiveness is needed in this regard to tackle this pandemic efficiently.

Keywords: *COVID-19, awareness, physicians, medical students.*

A. INTRODUCTION

COVID-19 is the biggest Public health problem faced by the entire world nowadays. In Pakistan, the first case of COVID-19 was reported on 26 February 2020. The number of confirmed cases is increasing with the increase in the number of days [1]. On 12 January 2020, the World Health Organization (WHO) affirmed that a novel COVID-19 was the reason for a respiratory disease in group of individuals in Wuhan City, Hubei Province, China, which was informed to the WHO on 31 December 2019. WHO on March 11 2020 declared COVID-19 a pandemic [2].

Coronaviruses are an important cause of common cold. In 2002, a new disease emerged as an atypical pneumonia called severe acute respiratory syndrome (SARS). This genome sequence of coronavirus was called CoV-SARS. Horseshoe bat appeared to be its natural reservoir and source of transmission to the humans [3]. In 2012-2013, another severe pneumonia appeared and was called Middle East respiratory syndrome (MERS), and the virus was called MERS-CoV. It was said to be transmitted from camels to human as camels were declared the natural reservoir [4]. COVID-19 is the genome sequence of the same family of virus known as coronavirus. This family of virus are transmitted by respiratory aerosol [5].

Physicians are the frontline force to tackle this pandemic as they have been in previous outbreaks also. They can also become a carrier and can serve as a major source of infection for the population. Sufficient awareness and knowledge are needed so that they can protect themselves from being a carrier and can correctly diagnose the patient of COVID-19. Similarly, as this pandemic is increasing day by day, Government of Pakistan has also ordered the medical students to be reserved as they can be called anytime in case of shortage of the physicians. Hence, it is important to evaluate and increase their knowledge because from knowledge comes the practice.

The purpose of our study is to assess the awareness among healthcare professionals and medical students of Pakistan regarding COVID-19. Our data will be useful for the authorities to check if the medical students are ready to serve as a frontline force. Null hypothesis is that our students and physicians doesn't have sufficient awareness.

B. MATERIAL AND METHODS

In this cross-sectional study, physicians and medical students of government and private sector hospitals and universities across Pakistan were included. A structured questionnaire was used which is available on the official website of University of Health Sciences, Lahore. The questionnaire

was distributed through an online forum. This questionnaire was prepared from the guidelines of WHO to assess the awareness related to COVID-19. The first part of questionnaire contained socio-demographic questions after which in second part there were 10 questions concerning the diagnosis, management, prevention and counselling of the patients of COVID-19. The response of the questions was in the form of "true or false". Only those who answered the questions correctly were said to have knowledge and awareness. The link of the questionnaire is: https://docs.google.com/forms/d/e/1FAIpQLSewPcPm1XMh2FMyqr-YTpgvgq9R6bOBw7dgoR75REU-JdgaiQ/viewform?vc=0&c=0&w=1

The duration of the research is two weeks from 1st April to 15th April. Convenience sampling was done. The participants were informed about the study and consent was taken beforehand. The sample size was calculated by using Raosoft [6]. The Confidence level (CI) of 95% was set with 5% margin of error. There are a total of 250000 physicians and students from different public and private sector hospitals and universities across Pakistan. Our sample size came out to be 384. Demographic data was noted. Data was evaluated using SPSS version 21. Chi-square statistics was utilized to evaluate the relations. A p-value of less than 0.05 was deemed statistically significant.

C. RESULTS

There was a total of 400 responses of our questionnaire. The number the physicians participating in our research was 200 (50%) and 200 (50%) students contributed in our study. Figure 1 corresponds to the demographic data. The number of male participants in our study was 276 (69%) and of female were 124 (31%). Among the age group of <30, there were 229 (57.3%) respondents and in the age group of 31-50 and 51-70, there were 73 (18.3%) and 98 (24.5%) respondents respectively.

The results were evaluated according to the profession also. The first three questions were regarding the diagnosis of COVID-19, The total correct responses to the question number 1 was 357 (89.2%) out of which 169 (47.3%) were from physicians and 188 (52.6%) were from medical students. The p-value for this question was 0.002 which is less than 0.05 (statistically significant) which means the variables (physicians and students) are well related regarding the awareness to this question concerning to the symptoms of COVID-19 and null hypothesis is rejected. Similarly, the correct responses of question 2 and 3 were 294 (73.5%) and 330 (82.5%) with a p-value of <0.05.

Question number 4 was regarding mask being a single most important protection against COVID-19, the correct responses were 219 (54.7%) among

which 90 (41%) physicians and 129 (58%) medical students gave correct response with a p-value <0.05. The question 5 enquired about isolation of the patients with a p-value of 0.2 (not statistically significant) which means that the variables are not connected. In question number 6, the participants were asked of the testing of COVID-19. Only 36 physicians (37.5%) and 60 (62.5%) medical students with a total 96 (24%) participants correctly responded with a p-value of 0.005 (0.05) which means that the variable (physicians and students) were mostly not aware regarding the testing of COVID-19.

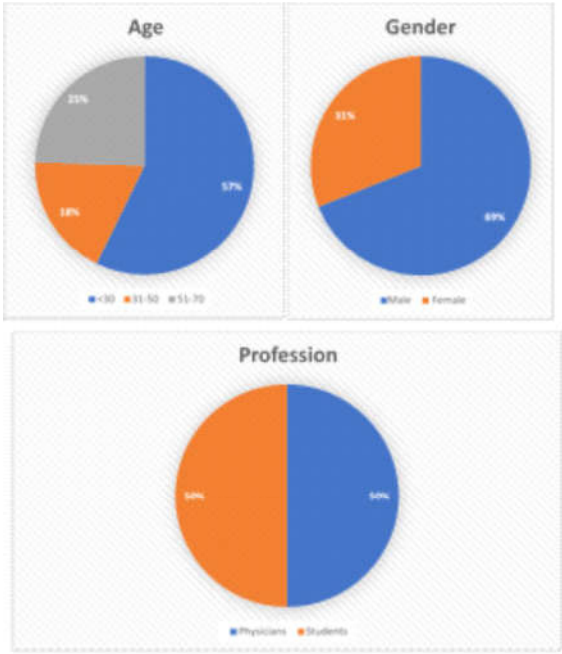

Figure 1. Demographic data

Question number 7 and 8 were regarding the usage of the masks. The p-value for question number 7 was <0.05. There were 198 (49.5%) correct responses out of which 131 (66.1%) were from medical students and the remaining 67 (33.9%) were from the physicians. The answers to question number 8 were 92% correct.

The last two questions were relating the counselling of the self-isolated patients about visiting to the hospitals in case of emergencies. Question 9 was asked about coming to the hospital immediately which showed 116 (29%) correct responses consisting 93 (80%) responses of medical students and only 23 (20%) responses of physicians. The last question asked about the helpline of COVID-19 in case of emergencies and was 92% correctly responded. The

p-value of both the questions is <0.05. Table I shows the distribution of the correct responses.

The total response of 10 questions in our research is 4000 out of which 2730 (68.25%) are the correct responses. The graphical presentation of total and individual responses is shown in Figure 2.

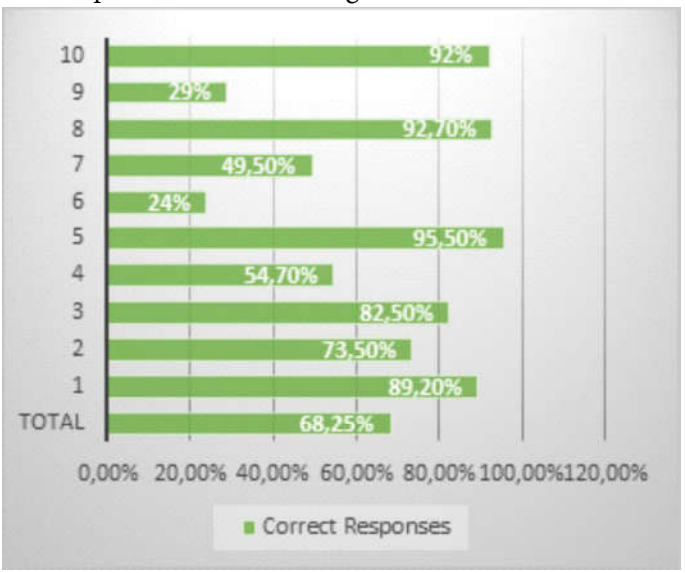

Figure 2. Distribution of correct responses

By evaluating the responses on the bases of profession, 1281 (46.9%) responses of the physicians while 1512 (55.3%) responses of medical students were correct. This is shown in Figure 3.

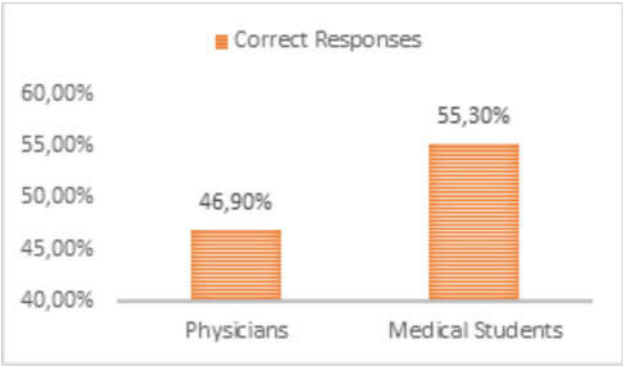

Figure 3. Correct responses according to the profession

D. DISCUSSIONS

A person is diagnosed as a patient of COVID-19 when he has cough, sore throat, shortness of breath and fever along with a travel history or a contact with covid-19 patient. If he has sore throat, painful swallowing and painful glands in neck, the diagnosis of COVID-19 is excluded [7]. The first two questions of our study asked about these symptoms and majority of our respondent were well aware with a correct response of 89.2% and 73.5% respectively. This can be compared with a previous study where there was a correct response of 84.3% regarding the symptoms [8].

When asked about the management of a person without the symptoms of corona virus but of the common cold with no travel history or contact with covid-19 patients in question 3, 82.5% said that they should be treated at home by getting the prescription through the telemedicine [9].

When asked regarding the mask as a tool for protection against COVID-19 in question number 4, 54.7% believed that the mask is not only entity protective against COVID-19, previous study shows that along with the mask, efficient hand-washing is also needed to protect against COVID-19 [10]. Along with this, for physicians on a frontline, personal protective equipment is also needed to tackle this pandemic [11]. Question 7 and 8 asked about who should wear a mask? a person without the symptoms or a person with a symptom. Previous study shows that both the persons should wear a mask for protection but it is more needed for the person with the symptoms as mask may slow down the rate of spread through hindering the respiratory droplets transmission to another person. Mask is basically a tool to stop the spread of covid-19 and not for the personal protection [12]. In our study, 92.7% of our respondents knew that it is must for a person with symptoms to wear a mask however, 50% knew that a person without symptoms can travel without face-mask. This can be compared with a previous study of Pakistan which showed that our healthcare workers had inadequate knowledge regarding the use of face-masks [13].

95.5% of the participants responded it correctly on question 5 that a person who just came from another covid-19 affected area should isolate himself for 14 days. This is an international protocol to isolate the travellers from pandemic affected areas as shown in the previous study [14]. But when asked about the testing of a person without the symptom but with a history of attending a wedding in question 6, only 24% responded correctly that she doesn't had to have her test done. As in Pakistan, there is a limited number of testing kits available so the protocol of testing here is to test only those who are symptomatic as mentioned in the recommendations of NIH, Pakistan [15].

The last two questions were regarding the counselling of self-isolated patients on what to do in case of exaggeration of the symptoms? In question 9, it was asked if they were needed to come to the hospital immediately, only 29% responded correctly that they didn't need to come to the hospital immediately but rather stay at home and call the helpline so that they could assess the symptoms and send an ambulance to take him to the hospital with isolation service. These are mentioned in the guidelines of home quarantine by NIH Pakistan [16]. In the question 10, 92% of the respondents knew about the helpline which has been made by government of Pakistan for the facilitation and consultation of covid-19 patients.

When we evaluate the results based on the profession, it is found that 55.3% correct responses were from medical students and 46.9% of the correct responses were from the physicians. This can be compared with a previous study which also showed that the medical students have more correct response than the physician [17]. This can be due to the fact that medical students are in the lockdown where they have more chance to study about the corona virus but in the questions regarding the management of covid-19, the physicians have responded more correctly.

The overall correct response was 68.25% which can be compared with a previous study which showed that Pakistan is not well prepared to face this pandemic [18]. We recommend that proper training programs may be conducted to prepare the frontline workers to face this pandemic. More research is needed in this regard. Our results can provide a baseline data to know about the awareness of frontline workers of Pakistan. If students are called in case of shortage of doctors, they should be prepared through the online webinars so that they may have adequate awareness regarding diagnosis and management of covid-19. The limitations of this study are its cross-sectional nature, the non-probable sampling technique and subjective limitations of the respondents as this was an online survey. Despite these limitations, our data can define the magnitude of the problem.

E. CONCLUSIONS

To face this pandemic, adequate amount of knowledge is needed specially of the frontline workers. Our study showed 68.25% awareness of the participants and more responsiveness is needed in this regard to tackle this pandemic efficiently.

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Correlation Between Clerkship Program Grading and the Result of National Exam on Medical Student

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ABSTRACT

The result of medical education expressed with Grade Point Average (GPA). Assessment of medical competency conducted by National Exam on Medical Student. There were still many students who fail at National Exam indicates mismatch between them. This study aims to determine whether Clerkship GPA correlated with results of National Exam. This is an analytical observational with a cross-sectional study design. The required data obtained from secondary data by using students' databases during education and results of National Exam in Faculty of Medicine of Universitas Muhammadiyah Surakarta in the 2017-2019 period. There were 335 data used as samples. The result of the National Examination on Medical Student was divided into two variables, the first one was Computer Based Test (CBT) and the second one was Objective Structured Clinical Examination (OSCE). The data then analyzed using Spearman correlation test. The statistical analysis showed that Sig. value of variable Clerkship Program GPA - CBT was p=0.000 and correlation strength r=0,350 which means there was a significant correlation but in a weak positive correlation. The Sig. value of variable Clerkship Program GPA - OSCE was p=0.003 and correlation strength r=0.162 which means there was a significant correlation but in a very weak positive correlation. The result of statistical analysis in this study proved that the Clerkship Program GPA still correlates with the result of CBT and OSCE in the National Exam test.

Keywords: Clerkship, GPA, national exam

A. Introduction

The undergraduate Indonesian medical education program consists of two levels of education. The first one is preclinical and then followed by a clinical clerkship program on medical education [1]. Clerkship program is given to students who have completed the preclinical education. At this level, students undergo real education in hospitals or other educational facilities under a medical practitioner's guidance and supervision. Clerkship programs give students experience in learning by viewing and doing cases directly. The educational curriculum of the faculty of medicine Universitas Muhammadiyah Surakarta (FKUMS), clerkship program is given for 16 periods of rotation, 49 credits, and run for a minimum of 22 months [2].

Each rotation's final result is calculated based on the scientific activity, mini clinical evaluation exercise (mini CEX), and case exam scores. The final grade period percentage can be different for each rotation, depending on the material being studied. The final result of a student's learning process is stated by the Grade Point Average (GPA). This GPA is an important indicator to measure the success of a student's learning process [3].

After completing the clerkship program, students will begin to prepare to go through the final national exam. National examination in Indonesia has been implemented by the mandate of Law Number 20 of 2013 concerning Medical Education mandates to ensure the quality of medical graduates and medical school [4]. The examination- named as *Uji Kompetensi Mahasiswa Program Profesi Dokter (UKMPPD),* has been conducted four times a year in February, May, August, and November [5].

In the national exam, assessment of competency achievement is carried out using written examination by 200 items multiple choice question (MCQ) since 2007, then has been administered using a computerized-based test (CBT) since 2010. A clinical skills assessment in the form of Objective Structured Clinical Examination (OSCE) was added by the committee in 2013 [6]. The national exam has a standard as reference to assess competency, namely *Standar Nasional Pendidikan Profesi Dokter Indonesia-SNPPDI* in 2019, a minimum standard that must be achieved by medical graduate that is compiled by Indonesian Medical Council or *Konsil Kedokteran Indonesia-KKI*. SNPPDI has been used as a reference in developing the competency-based curriculum (CBC) in medical education [7].

As the most recent educational process before taking the national exam, it is hoped that the clerkship program of education will provide knowledge, skills, and behavior for students as provisions to participate and complete the national exam well.

Data from the Ministry of Research Technology and Higher Education showed that only 87% of medical students successfully passed the first take on the national exam in February 2020. The total number of retakers after the national exam in February 2020 reached 2307 students. There were still many students who fail at National Exam indicates a mismatch between them[8].

This statement raises the question, can a student's GPA in the clerkship program guarantee a student's competence to pass the national exam? Thus, this study aims to examine the correlation between the clerkship program's GPA and the national exam score. This research hopes academically is to provide information for institutions to improve the quality medical education learning process.

B. METHODS

1. Design and Setting

This research is an analytical observational with a cross-sectional study design, exploring the correlation between clerkship GPA in medical students and the national exam results. This study uses a cross-sectional approach because the data is collected at one time and there is no intervention in the process.

Subjects of the present study were performed as medical students of FKUMS who took the national exam over three year periods between 2017-2019. This type of data were secondary data collected directly from the medical administration department in Universitas Muhammadiyah Surakarta. During the education and results of the national exam in 2017-2019, the student's database was used. We excluded students who had incomplete data in the student database. The samples that met the criteria were 335 samples.

The independent variable was the clerkship GPA and the dependent variable was the results of the national exam. Explanatory variables in the national exam were divided into two variables included CBT scores and OSCE scores.

2. Statistical analysis

Quantitative analysis procedures have been applied to the data performed of assessment measure for each variable. The influence of independent variables on dependent variable of interest was explored through statistical analysis. Statistical analysis was performed using SPSS 25 program for windows. The existing data, then processed by editing, tabulating, then inputting correctly. The result was compared using Spearman's correlation test because there were data that were not normally scattered.

C. Results

We analyzed scores of 335 medical students who participated in the National Exam both CBT and OSCE in 2017-2019.

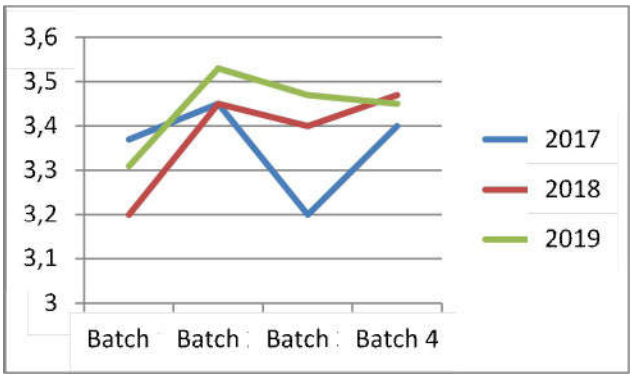

Figure 1. The number of clerkship GPA

Figure 1 shows some differences in distribution data from clerkship GPA of medical students from Universitas Muhammadiyah Surakarta of each batch in three-year periods between 2017-2019. The highest graduation number in this study was in 2019, the second batch, while the lowest was the third batch in 2017 and the first batch in 2018.

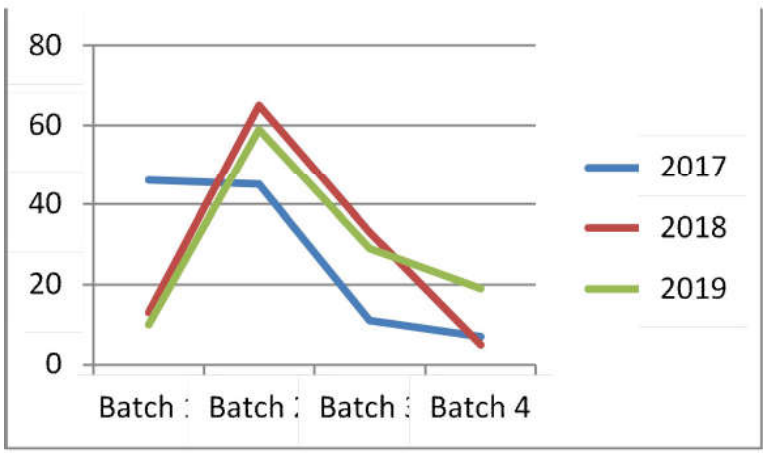

Figure 2. The number of graduates from the national exam

Figure 2 shows the number of graduates in medical students of Universitas Muhammadiyah Surakarta on the national exams for the period 2017-2019. Each year, the number of graduates students will increase from the first batch to the second batch, with the second batch as the highest, then the number will decrease further, until the lowest in the fourth batch. This highest number was the second batch in 2018, while the lowest was the fourth batch in 2017 and 2018.

Bivariate analysis was used to determine the relationship between variables in this study. The data were tested for normality with Kolmogorov-Smirnov test because the number of samples was more than 50 data, the results showed an abnormal distribution of data. After transformation did not produce different results, as an alternative to Pearson correlation test, Spearman correlation test was performed. The correlation test was conducted to determine single relationship between the variables, clerkship GPA and national exam results, both CBT and OSCE scores.

Table 1. Bivariate Spearman correlation test for Clerkship GPA and CBT national exam scores

	Correlation	GPA	CBT
GPA	Correlation coefficient	1	0.350**
	Sig.		0.000
	N	335	335
CBT	Correlation coefficient	0.350**	1
	Sig.	0.000	
	N	335	335

** Correlation is significant at the level 0.001 level (2-tailed)

Table 2. Bivariate Spearman correlation test for Clerkship GPA and OSCE national exam scores

	Correlation	GPA	CBT
GPA	Correlation coefficient	1	0.162**
	Sig.		0.003
	N	335	335
OSCE	Correlation coefficient	0.162**	1
	Sig.	0.003	
	N	335	335

** Correlation is significant at the level 0.001 level (2-tailed)

Table 1 shows the correlation test results between clerkship GPA and CBT scores showing a weak relationship (r = 0.350) and a positive pattern. Statistical tests results between Clerkship GPA and CBT scores showed a significant correlation (p = 0.000). Table 2 shows the correlation test for Clerkship GPA with OSCE scores showing a very weak relationship (r = 0.162) and a positive pattern. Statistical tests results between Clerkship GPA and OSCE scores showed a significant relationship (p = 0.003).

D. Discussions

1. Clerkship Grade Point Average

The medical learning process, including clinical clerkship, is based on competency-based curricula and the National Standards for Indonesian Medical Professional Education (*Standar Nasional Pendidikan Profesi Dokter – SNPPDI)* created as a reference for curricula. This competency standard is set by the Indonesian Medical Council [7]. Clinical clerkship is a teaching and learning process that aims to provide students opportunities to understand the theory, train doctors' clinical procedures, and competence [6]

Academic achievement is an important indicator for higher educational institutions to measure the teaching and learning process's success. One of the indicators used to identify a student's learning achievement is Grade Point Average (GPA) [9]. Figure 1 shows that the average clerkship GPA of medical student graduates at FKUMS varies with the highest GPA as long as it is achieved by the second batch, which is the best graduate period. Meanwhile, in general, the average clerkship GPA achieved by students who graduate in 2019 gave the best for the last three years. Every year, the average clerkship GPA has reached the target, which is above 3.0, and increasing every year. This illustrates the quality process of medical education being implemented is getting better.

The curriculum applied in FKUMS states the clinical clerkship learning process starts after students who have passed the requirements, students will enter clinical clerkship in 16 periods of rotation, 49 credits, and run for a minimum of 22 months [2]. Activities carried out during clinical clerkship in each rotation include structured and unstructured activities. Structured activities are specifically planned and carried out in units of time with a specific report format. Structured clinical clerkship activities include bedside teaching, clinical tutorials, case presentations, referrals, and journal reading. Unstructured activities include students who encounter patients in the ward or outpatient clinics, including follow-up and visit, learning by maintaining emergency and inpatient department, meeting experts, and independent study. Students can actively participate in clinical practice, and these experiments will enhance the students' clinical competency [10].

The final result of learning process at each clinical rotation period in FKUMS is calculated based on the scientific activity score, the mini CEX score, and the case exam scores. The percentage for the final score of rotation can differ for each rotation, depending on the lesson learned. The final result of each rotation will later be accumulated into a clinical clerkship GPA, which is the result of the student learning process while studying in medicine [3].

2. Results of the National Exam

The national exam is a large-scale examination taken early in a career or near the point of graduation, where passing the examination is a licensing requirement to practice medicine [11]. Implementing the national exam is a healthcare regulator's policy decision to protect the public by assuring standards in the profession. For some countries, the national exam also serves the purpose of improving healthcare education quality [12]

For example, in Indonesia, the Ministry of Higher Education and Research then decided to leverage and ensure Indonesian medical graduates' quality to meet specific standards based on competencies in SNPPDI by establishing the national exam on medical students. This examination was also intended to drive improvement or capacity building within medical schools. Managed by a committee coordinated by the Ministry of Higher Education and Research and the Indonesian Medical Council, the national exam was established in 2007, namely *Ujian Kompetensi Dokter Indonesia- UKDI*. [6] The national exam, UKDI, by the Law Number 20 of 2013 concerning Medical Education Article 36 of the Law, has been changed into *Ujian Kompetensi Mahasiswa Pendidikan Dokter Indonesia – UKMPPD* [1].

The national examination must be carried out by fulfilling several principles, so the credibility in ensuring the quality of higher medical education in Indonesia can be accounted. These principles that must be met are validity, reliability, transparency, applicability, and impact on education [13]. The examination started with an assessment of knowledge using Multiple Choice Question (MCQ) since 2007. MCQ has quite a lot of validity and also has reasonably good reliability used in the understanding concept of knowledge, knows or knows how. Students are required to answer 200 question items about basic and clinical knowledge over 200 minutes. The MCQ testing method can be done through CBT in 2010, this provides a better view so that images or imaging of the patient can be better. CBT will also provide results in the assessment, analysis, and reporting are faster and more comfortable [13] [6].

The committee has added a clinical skills assessment in the form of OSCE since 2013. OSCE is an assessment of students' competence in carrying

out clinical skills in an objective and structured manner in the form of examinations with 14 stations (2 rest stations) within a 15 minute each station. Clinical examination is an assessment of clinical ability or performance, which is not only a student's knowledge, but also students have to demonstrate directly. The stations used simulated clinical scenarios in rooms set as outpatient clinics, emergency rooms, and operation/ surgical rooms. There were standardized patient encounter cases as well as simulations using manikins. Examinees were guided by buzzer sounds for the rotation [6] [13].

Medical students must pass both examinations before they can graduate from medical school. Students who pass the national exam gain a certificate of competency. This certificate is required for a license of practice from the Indonesian government. Students who fail the examination must retake the examination, and medical schools must provide remediation programs for them. In addition to ensuring the quality of medical education in Indonesia, the national exam is critical because the students' graduation rate becomes a national benchmark and the ranking of domestic medical faculty institutions in Indonesia. The number of graduation rates in the national exams at the medical faculty of Universitas Muhammadiyah Surakarta still varies widely. During the last three years in 2017-2019, it has about 100-150 doctors graduated each year.

Figure 2 shows that the graduation number of FKUMS over the three years periods in 2017-2019. The second batch gave an number of graduates each year. The number of participants for the second batch of the national exam is usually the largest in FKUMS. These candidates for the second batch national exam generally are students who graduate on time from their preclinical programs and have a good prior academic achievement as reflected by the GPA. Meanwhile, in the fourth batch, the number of participants on the national exam test was the least, so results also decreased.

The steps taken by FKUMS to increase number of graduates were organizing national exam study preparation. Intensive preparation began to be seriously designed in 2015. Internal Try Out (TO) was implemented with a cut-off point of 55 as a requirement for national exam registration. The number of internal TO and cut-off points increasing to 66 points, which is also one reason for motivating national exam participant candidates to be more active in studying to prepare for exams. The study conducted by Santoso (2016) at the Faculty of Medicine Universitas Muhammadiyah Jakarta shows that the national exam preparation and TO's implementation are proven increase the national exam graduation rates. The TO score was also significantly related to the CBT score. The implementation of TO at FKUMS must be maintained as much as possible in order to increase graduation rates [14].

Starting from the 2015/2016 academic year, armed with the experience of conducting national exam preparation that has been running then evaluating the results of previous graduation rates, FKUMS implemented a new learning system change at the preclinical education level, namely the 8th Skill Lab, which provides comprehensive content of all systems that students have passed. The 8th Skill lab ends with a comprehensive exam covering CBT and OSCE with similar questions tested on the national exam.

A CBT exam of each rotation has been held as part of the student assessment since the 2015/2016 academic year. the CBT exam is taken by students at the end of each clinical rotation. The CBT exam contains questions similar to national exam questions collected from clinical lecturers of FKUMS [2]. Implementing the 8th Skill Lab and CBT at the end of clinical rotation were factors that made number of graduates in 2018 increase significantly compared to the previous year in 2017. Unfortunately, the high achievement of the national graduation rate cannot be maintained in 2019. As shown in Figure 2, the number of graduates are lower than 2019 and even tend to decline, although it is still better than 2017.

3. Bivariate Analysisis

Based on the two figures, the interesting, even though the average clerkship GPA for graduate students in 2019 was the highest in the last three years, the national exam's highest graduation rate was 2018. Then in this study, a correlation test analysis was carried out to determine whether there was a relationship between clerkship GPA and the results of the national exam divided into CBT score and OSCE score.

Based on the Spearman correlation test, analysis between the clerkship GPA and CBT score, in Table 1, it was found that there was a significant correlation (p=0.000) with the strength of the weak correlation (r=0.350) in a positive result. This positive result suggests that those who perform well to get higher clerkship GPA scores may also generally get higher results from the CBT score. The previous study also shows a significant correlation in the analysis between the correlation between clerkship GPA and the result of CBT [15] [9].

The Spearman correlation test between the clerkship GPA and OSCE score, in Table 2, found a significant correlation (p=0.003) with the strength of the very weak correlation (r = 0.162) in a positive result. This positive result also suggests that those who perform well to get higher clerkship GPA scores may also generally get higher results from the OSCE score. Previous studies also showed a significant correlation in the analysis of the clerkship GPA correlation with the OSCE score [15].

In this study, we found that the correlation strength between clerkship GPA-CBT was more than clerkship GPA-OSCE. There are several possibility causes for this outcome. Previous studies reported that students thought clinical clerkship helped deal with OSCE tests, and felt that reading books for OSCE was more helpful than their clinical clerkship [16]. Other studies reported that patient-centered care in the clinical clerkship learning environment is being very important[17] while performance on the OSCE was related to well-organized study methods, then clinical experience ranked next [18]. It also reported that prior academic performance, rather than preparatory studying time, is a better predictor of OSCE outcomes [16].

The Spearman correlation test results in this study show the clerkship GPA still has a significant relationship with the national exam results, but in a small effect. Clinical performance is very complex in nature and requires various training and teaching methods, and a certain level of knowledge is crucial for appropriate clinical performance. Students do not always do a physical examination on every patient they encounter. The explanation for this could be any of the following: students may be hesitant to do a physical examination as they are not confident in their skills to conduct the physical examination. Additionally, many physicians do not do physical examination thoroughly, and the importance of the physical examination has declined with the development of diagnostic aids. Therefore, students may have little chance of observing physicians doing physical examinations during the clerkship. This process's success highly depends on students' capacity, ability, and activeness during the clinical clerkship program. Lack of student preparation is also an essential factor in clinical learning, so when carrying out clinical clerkship education, it is not under predetermined competency standards [16] [9].

The highest average clerkship GPA result was obtained in 2019, but the highest average national exam results obtained in 2018 can also be explained. There are other variables outside the clerkship GPA that tend to have a stronger correlation to the national exam results, which is not examined in this study. Several studies have predicted the national exam results are not only influenced by clerkship GPA, but their studies also address several other variables potentially associated with the national exam results. According to Suswati & Rahayu (2019), the results of the national exam can be influenced by several variables. This study studied 30% of the total variables that affect the national exam results. There are five variables discussed in this study, namely preclinical GPA, clerkship GPA, results of the Clinical Integration Assessment (CIA) conducted by the university, Benchmark (BM), which is a national exam tryout for Muhammadiyah Universities (religion-based universities), and local national exam tryout results for each region (AIPKI) [19].

Given previous studies on academic performance, it was stated that the national exam results were actually stronger due to the results of preclinical GPA. The study conducted by Febriyanti (2017) reported both preclinical GPA and clerkship GPA affect the national exam result. Preclinical GPA has a more significant effect on CBT, while clerkship GPA has a more significant effect on OSCE results [15]. Another study conducted by Puspitasari (2017), also reported the relationship between preclinical GPA and clerkship GPA with the national exam results. Preclinical GPA has a more significant effect than clerkship GPA on the national exam results, both CBT and OSCE. This study also reported that clerkship GPA only correlates with CBT but does not with OSCE [9]. It was stated the questions given during the CBT exam are in the form of theoretical questions, and are more directed at the cognitive domain, while OSCE, even though it leads to clinical skills, strengthening the basics of medical science is needed for clinical action. This was a reason why preclinical GPA in that prior academic performance was a better predictor for the national exam. [16] [9].

This study has a number of limitations worth noting. First, as data were obtained from a single institution, our findings may not be generalizable to other medical schools. However, our results likely apply to Indonesia's medical schools, given the core medical curriculum adopted throughout the country. Second, we only analyzed one variable during clinical clerkship administration without analyzing other influencing variables. Therefore, further studies to evaluate other variables that influence national exam result should be done.

E. Conclusions

In conclusion, our study found the result proved statistically that Clerkship GPA still correlates with CBT and OSCE in the National Exam test. Our study suggests that clerkship GPA is weakly associated with student's national exam results. Although only small correlations were present between them, the amount of clinical experience in clerkship cannot be overlooked. Teaching quality and supportive supervision should be improved to increase student performance during clerkship and national examinations.

Authors' Contributions

YR was responsible for research study design, analysis, and authorship manuscript. S and INM were responsible for data collection, ethics approval, authorship manuscript. All authors read and approved the final manuscript to be published.

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Assessing the Perception of Undergraduate Dental Students Regarding Effectiveness of Online Small Group Discussion Sessions

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ABSTRACT

COVID 19 disrupted the whole world included the teaching and learning in academic institutes. The traditional teaching methods were deemed unsafe in context of social distancing measures and were replaced by live or asynchronous online teaching. The aim of the study is to see the perception of the students regarding the online Small Group Discussion sessions and their effectiveness. A cross sectional survey designed study using an anonymous questionnaire to receive feedback on the online Small Group Discussion (SGD) Sessions. The survey included 48 students of first year BDS who have had attended 3 modules (4 weeks each) of online teaching including daily SGD sessions. The data was analyzed using SPSS version 20.0. The results of our study show that the students have a positive response towards the facilitation of Small group sessions in an online manner. Small group discussion sessions are one of the predominant teaching and learning strategies to promote active and interactive learning. Facilitators need to devise strategies to keep the sessions interactive to ensure maximum student participation.

Keywords: Small group discussions, COVID-19, medical education, online teaching

A. Introduction

As the whole world has been disturbed due to Global Pandemic of COVID-19, medical education has suffered as well. The faculty and the students struggled worldwide to cope with the situation and considerable changes were made to consolidate the teaching and learning effectively. Despite the shutdown of all academic institutions all over the world, the medical colleges made the transition to online forums as soon as the lockdown ensued, but the lack of on-campus activities hampered the very nature of modern collaborative interactive learning for students [1].

The traditional teaching methods were deemed unsafe in context of social distancing measures and lectures and clinical trainings were all replaced by live or asynchronous online teaching [2]. It precluded students from gathering in lecture halls, clinics, and small groups [3]. Transition from face-to- face to online learning has not been without challenges. Online learning includes the use of electronic technology and media to deliver, support and enhance both learning and teaching by involving communication between learners and teachers using online content. [4]. In a study conducted in Australia it was reported that the conversion to online learning lowers course satisfaction by about 0.2 points N/A the instructor's satisfaction by about 0.12 points attributing to the unpopularity of courses in online manner [5].

The most important component of classroom learning is the social and communicative interactions between students and teachers and students and students. It is through small group discussions, conversations, and debate that the concepts are cleared, and new ideas encouraged [6]. In online conversion, the component that was affected the most was the reduced interaction and opportunities of effective group discussions to promote active learning. One technique to demonstrate the collaborative learning in these circumstances is to conduct effective Small Group Discussion Meetings in an online forum [1].

Building relationship with other members of the class Is a challenge in online platforms [7]. In face-to-face discussions leaders can recognize body language and expressions of members and draw the non-participatory members in the discussion. This cannot happen effectively in online forums along with the delay in conversations in online forum that reduce the efficiency of online small group discussions [8]. The effective facilitation of online discussion sessions takes time, effort, strategies, and commitment just like face-to-face group discussions or even more so [9]. A sense of community is crucial to student's engagement and satisfaction in learning, which is the most struggled component in online programs as well [10].

A study conducted in India during the COVID-19 era proposes that online teaching surprisingly increased the student participation as compared to the on-campus session. [11]. Another benefit of engaging students online was noted that this helped broaden student horizons by encouraging them to recognize the relevance of what they learning to the issues that are being faced by the society, rendering them more responsible [12].

The effectiveness of Online SGD sessions held for students in COVID lockdown is still questionable and the perception of the students' needs to be studied to see if the implemented teaching strategy is effective for students active learning. The aim of this study is to see the perception of the students regarding the online Small Group Discussion sessions and their effectiveness.

B. Methods

A designed study was quantitative cross-sectional survey using an anonymous questionnaire to receive feedback on the online Small Group Discussion (SGD) Sessions. The questionnaire was designed, and pilot tested in a small sample to ensure accuracy of containing question items. The survey included 48 students of first year BDS at Shifa College of Dentistry, who had attended 3 modules (4 weeks each) of online teaching including daily SGD sessions. Any students that had not attended the online SGD sessions were excluded from the study. The purpose of the study was briefed, and informed consent was taken from the participants. The participation in the study was voluntary. The questionnaire was sent to students through google forms and data was collected.

C. Results

The data was analyzed using SPSS version 20.0. The Questionnaire was distributed to all First Year BDS students (N= 48), out of which majority (46) responded making the response rate of 95.83%. Among these participants majority 37(80.4%) were Females and the remaining 8 (17.4%) were Males. The responses of the participants to 11 items of the questionnaire are summarized in Figure 1.

For Overall Perception, a Mean was calculated for 11 items with scores ranging from 11-44. The Mean score came out to be 28.35. Those who scored less than the Mean (less than 28.35) were considered having positive attitude and those with score of more than 28.35 were considered to have negative attitude towards e-learning as shown in Table-1.

Table 1. Overall perception of Students towards Online SGD Sessions

Responses		N [%]	Mean	Standard Deviation
Overall Perception	Negative	20 [43.5%]	23.3	4.3
	Positive	27 [56.6%]	32.3	3.2

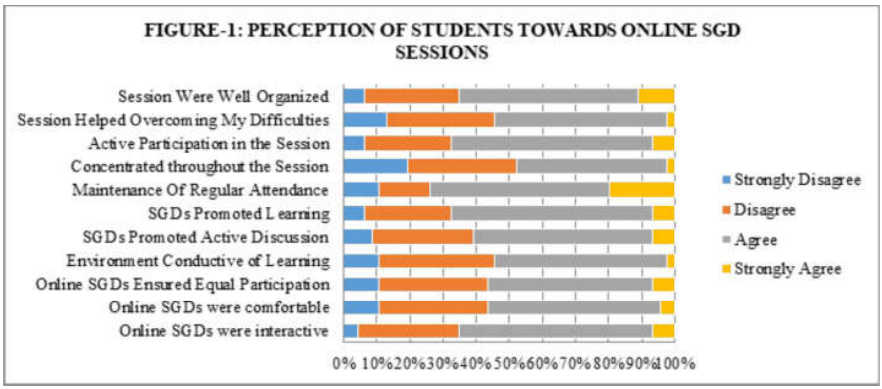

Figure 1. Perception of students regarding effectiveness of online SGD sessions

D. Discussions

The results of our study show that the students have a positive response towards the facilitation of Small group sessions in an online manner. Majority of the students agreed that the online sessions facilitate active learning and participation and promote interaction during the discussion [see table 1]. It was observed that 59% students of the students felt the online sessions to be interactive whereas 67% students believed that the online sessions promoted their active participation. One striking negative response seen is the inability of the students to maintain concentration in the online sessions as 52% of students felt that they are unable to maintain proper attention throughout the sessions. This is one big disadvantage of online sessions as compared to face-to-face discussions that virtual environment tends to reduce the attention span and focus is lost easily during the sessions. Encouraging and maintaining effective interaction and direction of the sessions is one of the most difficult tasks faced group leaders and facilitators [13].

Small group teaching sessions involves teacher acting as a facilitator and it is observed that the learning paradigm shifts from lecturer-centred to student-centred. Equal participation is ensured by all the students, whereas if the discussion goes off- track, the facilitator brings the teaching back on

track. [14]. Literature shows that in an online setting, limited opportunities to interact with peers in person reduced the sense of connection and increased the reluctance to participation in group setting [10].

Student engagement has always been a challenge which needs to be addressed in online as well as face to face teaching sessions [11]. The online sessions hold the advantage of being technically superior, but effort is needed to make the sessions focused and effective for learning. To optimize the efficiency of online sessions, the learning environment should be designed in a way that learning is situated in the context and is active, interactive, and reflective in nature planned with pre learning sessions activities that provoke students thought process [15].

E. Limitations

The limitations of the study include small sample size and single institute study hence results are not generalizable and need larger sample size and multi-institutional sample to ensure generalizability in the findings.

F. Conclusions

Small group discussion sessions are one of the predominant teaching and learning strategies to promote active and interactive learning in medical students. The study aimed at finding the perception of students regarding the online small group discussion sessions amid the COVID 19 lockdown and suspension of on campus activities. We found that the students hold a positive response towards the online SGD sessions and consider them active, interactive, and conducive for learning.

G. Recommendations and impacts

The study was conducted to check the response of students towards online SGD sessions. Most of the students had a positive response. The educational impact of this study is that if in the future, blended learning needs to be followed due to any uncertain circumstances, the effectiveness of the online small group teaching sessions along with on campus activities can also be appreciated. Furthermore, recommendations for future studies include comparing different small teaching activities including PBL, CBL, TBL and studying students and teachers experiences regarding their usefulness.

Authors' Contributions

Both the authors contributed towards idea conception, data collection and writing of the article.

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Students' Evaluation on Online Distance Learning in School of Medicine, Atma Jaya Catholic University of Indonesia

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ABSTRACT

School of Medicine, Atma Jaya Catholic University of Indonesia (FKIK UAJ) has been implementing full online learning and teaching through all medical study programmes since the pandemic emerged in Indonesia. This study aims to evaluate the current distance learning programme, which is implemented as a response to the Covid-19 pandemic. This study was a cross-sectional study carried out in the early June of 2020 in FKIK UAJ. We used a total sampling of 1,118 participants, consisting of preclinical, clinical, and pharmacy students of FKIK UAJ. We used Google form for collecting data about students' perception regarding advantages, limitations and future suggestions of online distance learning. In total, six hundred twenty-five (625) students had filled out the questionnaire. The data were analysed by using the STATA programme vs 16. Data were analysed using univariate and bivariate analysis, and the result was pictured based on each study programme. Participants were predominantly clinical students, and they mostly lived without their parents. In terms of advantages, "no need to worry about food as it has provided" were at the top rank of opinions reported, followed by "more time to study". For limitations of distance learning, participants argued that internet connection and difficulty to understand subjects were the top two opinions found in the study. Participants suggested staff members to interactively provide lectures with video and case simulation and ensure that more organised learning schedules are being provided. For clinical students, in particular, a lack of hands-on practice with patients is reported. Despite the advantages and limitations, university staff members should be reassured to teach, via online distance learning, with the same quality as in direct face-to-face teaching quality.

Keywords: *Education, covid-19, online learning, indonesia*

A. Introduction

The first case of Corona Virus Disease 2019 (COVID-19) was discovered in Wuhan, Hubei Province, China, in December 2019 [1-3]. In response to that situation, WHO has declared COVID-19 as a global pandemic on March 11th, 2020, as the total number of COVID-19 cases were keep rising worldwide [4-5]. On March 2nd, 2020, Joko "Jokowi" Widodo, the President of the Republic of Indonesia, has officially declared the first COVID-19 case in Indonesia [6]. Since then, the number of infected people kept rising in Indonesia, especially in Jakarta. Thus, a Notion by the Governor of Jakarta (No.6 in the year of 2020) regarding temporary cessation of any office activities to prevent the spread of COVID-19 was issued on March 20th, 2020. The Rector of Unika Atma Jaya (UAJ) immediately launched a letter instructing for total campus closure from March 23rd, 2020, as per the Notion by the Governor. Prior to this Notion, the Rector had signed a letter which is stating that all lecture activities were to be conducted by distance by online learning from March 16th, 2020 until further notice.

Weeks before the letter was issued, stakeholders of the School of Medicine (FKIK), Atma Jaya Catholic University of Indonesia (UAJ) had been preparing measures for the impact of the COVID-19 pandemic on the educational process. These preparations include refresher training sessions for lecturers, especially to operate software, so-called the Microsoft Teams, an educational platform to be used for distance learning in Atma Jaya. As a result of a relatively short preparation time, many problems were discovered: some lecturers were actually technologically backwards, the instability of internet connection, and etc. The latter, being supported by a study by Budi et al. in one of the faculties of dentistry in Indonesia, reported that 49% of students and lecturers were not prepared for distance learning due to limited internet quota [7]. Similarly, a quantitative study by Allo on students of English Major in Christian University of Indonesia (UKI) reported that the students in distance learning are expecting the lecturers to deliver their lecture with explanations using Voice Notes, instead of only distributing written material and assignments [8].

As the COVID-19 cases kept mounting with no vaccine currently available, the stakeholders of UAJ have not yet decided on when will the traditional 'face-to-face' teaching be reimplemented. Therefore, for quality improvement, it is necessary to evaluate the currently implemented distance learning programme.

B. Methods

This study was a cross-sectional study carried out in the early June of 2020 in FKIK UAJ. We used a total sampling of 1,118 participants, consisting of preclinical, clinical, and pharmacy students of FKIK UAJ. We used Google form for data collection, sharing it through each study programme's group, which is managed by a coordinator. Among 1,118 participants, a total of 625 students had filled in and submitted the questionnaire. The data were analysed by using the STATA programme vs 16. Data were analysed using univariate and bivariate analysis.

C. Results

Based on the participants' characteristics, females' participants were doubled, compared to males, which imply more female students are participating in the school of medicine. In addition, more than half of the participants (50.4%) were at the clinical group, followed by preclinical and pharmacy participants. Nearly all participants reside in their own respective houses with their parents (93.9%) (Table 1).

Table 1. Number of students based on gender, study programme, and residence (n=625)

Variable	Frequency (n)	Percentage (%)
Gender		
Male	183	29.3
Female	442	70.7
Study Programme:		
Clinical	219	35
Preclinical	315	50.4
Pharmacy	91	14.6
Residence		
Boarding house	23	3.7
Apartment	10	1.6
Home with parents	5	0.8
Home without parents	587	93.9

Mean age of 20.7 years old

In the questionnaire, participants were asked for their opinion regarding the advantages, disadvantages, and limitations of distance learning (Table 2 and Table 3). Questions were in multiple-choice, and participants were able to choose multiple answers. Out of 1,118 participants, we collected 1,668 advantages and 1,215 limitations opinions. In general, most of the participants

(25.1%) agree that one advantage of distance learning is "no need to worry about food as it has been provided" Nevertheless, we found a variety of opinions on different study programmes. Most preclinical participants (32.7%) stated the advantage of distance learning is "there is no need to worry about food because it has already been provided." For clinical students (26.7%), the advantage is "more time to study" whereas, for most pharmacy students (25.5%), the advantage is "it saves money since there is no need to come to the campus." Furthermore, the second least advantage is "getting a better understanding of the lecture" (6.8%) for all groups of study programmes. However, within the study programmes, the order of opinions regarding the advantages differs in order. For instance, in preclinical participants, the advantages of distance learning are about food security, followed by more time to study and to be able to save money. On the other hand, clinical participants argued that having more time to study is preferable over the food security issue.

Table 2. Student's opinion regarding the advantages of distance learning

Variable	Preclinical*	Clinical**	Pharmacy	Total
Getting a better understanding of the lecture	39	62	13	114 (6.8)
More time to study	147	212	50	409 (24.5)
There is no need to come to the campus	138	156	68	362 (21.7)
There is no need to be separated from parents	125 133 33			291 (17.4)
There is no need to worry about food because it has already been provided	168	200	51	419 (25.1)
Others	30	31	12	73 (4.4)

*Preclinical group of medical school
**Clinical group of medical school

Regarding the limitations of distance learning, among opinions, the majority of participants (42.2%) stated a "poor internet connection," followed by "difficulty in understanding lectures that only consist of slides" (26.1%), and "increased expenses (for internet quota)" (17.1%). In contrast to the advantages arm, the order of opinions regarding the limitations of distance learning in each study programme is in the same order. (Table 3).

Table 3. Student's opinions regarding the limitations of distance learning

Variable	Preclinical	Clinical	Pharmacy	Total (%)
Poor internet connection	181	259	73	513 (42.2)
Increased expenses (for internet)	66	107	35	208 (17.1)
Difficulty in understanding lectures that only consist of slides	152	112	53	317 (26.1)
Nothing	7	23	5	35 (2.9)
Others	53	68	21	142 (11.7)

Regarding the suggestions for distance learning (Table 4), we collected a total of 729 opinions from all participants. Approximately 19.1% of opinions were related to "more interesting subjects with video and case simulation," 17% of opinions were classified into "others", which consist of various statements, 16.9% of opinions were related to "the distance learning is good enough," and 14.1% of opinions were related to "more organised schedule for distance learning." Similar to what is seen in the advantages of distance learning, each group has a different distribution of opinions. For the preclinical group, most opinion were related to "providing more interesting subjects" and "others." The opinions in the clinical group were different. The majority of opinions were related to a "more organised schedule for distance learning and "the distance learning is good enough" Furthermore, the opinions with the lowest frequency were "allow the lectures to be recorded" and "give tuition relief" Whereas most of the opinion of the pharmacy group were classified into "others," followed by "providing more interesting subjects".

Table 4. Student's opinion for the future implementation of distance learning

Student's opinion	Preclinical	Clinical	Pharmacy	Total (%)
More organised schedule	11	84	8	103 (14.1)
Consider the number of assignments	10	26	11	47 (6.5)
Internet accessibility	21	22	16	59 (8.1)
Tuition relief	10	6	1	17 (2.3)
Improve the lecturer's skill in using MS Teams	8	13	1	22 (3.0)
More exciting subjects with video and case simulation	76	42	21	139 (19.1)

Distance learning is good enough	34	77	12	123 (16.9)
Allow the lectures to be recorded	16	2	1	19 (2.6)
No suggestion	27	39	10	76 (10.4)
Others	47	54	23	124 (17.0)

As opinion types differ, limitations which constitutes as "others" can be viewed based on the study programme. In preclinical and pharmacy participants, the majority stated that distance learning limitation is "difficulty in skill labs, problem-based learnings (PBLs), and hands-on subjects," followed by "home environment and the devices used are not too conducive." Clinical participants argued that "no direct interaction with the patients" and "unsuitable timing (inconsistent schedule, not on time)." Whereas in the "others" category of the advantage, all participants from each study programme stated, "more time to rest at home, exercise, and doing hobbies." Furthermore, these opinions were followed by "be able to focus on self-learning as we can study repeatedly" and "more flexible" at the preclinical group. In the clinical group, the chosen opinion is "able to study the given subjects further" and "more flexible" The statement of "more flexible subjects"; "able to focus on self-learning as we can study repeatedly"; and "the subject is clearer since it contains the lecturer's explanation" all had the same proportion (1.1%) in participants from the pharmacy study program.

Table 5. "Others" category for disadvantages of distance learning

Opinion	Study programme			Total (%)
	Preclinical	Clinical	Pharmacy	
No direct interaction with patients.	0	30 (9.5)	0	30 (4.8)
Unsuitable timing (inconsistent schedule, not on time)	4 (1.8)	10 (3.2)	1 (1.1)	15 (2.4)
Not able to study because of the many assignments.	3 (1.4)	4 (1.3)	2 (2.2)	9 (1.4)
Difficulty in understanding the subject	3 (1.4)	7 (2.2)	4 (4.4)	14 (2.2)
Difficulty in SLs, PBLs, and hands-on subjects.	24 (11.0)	3 (1.0)	10 (11)	37 (5.9)
Microsoft Teams can be challenging to operate at times, both from student's and teacher's perspective	5 (2.3)	8 (2.5)	0	13 (2.1)

Difficulty in expenses (internet, tuition fees)	6 (2.7)	1 (0.3)	0	7 (1.1)
The home environment and the devices used are not too conducive	10 (4.6)	8 (2.5)	5 (5.5)	23 (3.7)

SLs: skill labs; PBLs: problem-based learnings

Table 6. "Others" category for advantages of distance learning

Opinion	Study programme			Total (%)
	Preclinical	Clinical	Pharmacy	
More time to rest at home, exercise, and doing hobbies	9 (4.1)	15 (4.8)	7 (7.7)	31 (5.0)
Able to study the given subjects further	0	5 (1.6)	0	5 (0.8)
The flow of discussion is better in online lectures.	3 (1.4)	2 (0.6)	0	5 (0.8)
More flexible	7 (3.2)	3 (1)	1 (1.1)	11 (1.8)
Able to focus on self-learning as we can study repeatedly	9 (4.1)	2 (0.6)	1 (1.1)	12 (1.9)
The subject is clearer since it contains the lecturer's explanation	3 (1.4)	1 (0.3)	1 (1.1)	5 (0.8)
More time to prepare for the subjects prior to the lecture	1 (0.5)	2 (0.6)	0	3 (0.5)
Nothing	187 (85.4)	285 (90.5)	81 (89)	553 (88.4)

D. Discussions

Several things could have been discussed from the results, including the characteristics, advantages, limitations, and suggestions of distance learning based on each study programme. To understand the result, context is important and needs to be known in the first place. Contextually, the clinical group is the continuation of preclinical in order to produce a doctor. Therefore, the learning outcomes of the two study programmes are different from one another. Whereas, pharmacy study programme can be viewed equally as a preclinical group, in which both would produce an undergraduate.

Based on the characteristics of participants, we noted that in Unika Atma Jaya, School of Medicine, there were more female students compared to males, with a ratio of more than 1 to 2 (70.7% and 29.3%). From age

perspective, it can be concluded that most of the participants were not married, and thus there was no report for household bias. Based on the characteristics, the number of participants who live alone should be noted, which revealed that most participants are initially not from the capital.

E. Advantages of Distance Learning

In the preclinical arm, most participants argue that "there is no need to worry about food because it has already been provided" and "more time to study" as the top two advantages of distance learning. It is intriguing as students are more focus on food security rather than focus on the educational impact of distance learning. In fact, in contrast to a study in Jordan by Al-Balas et al. [9], distance learning should have given students time-saving and flexibility of class time. However, as many participants live without their parents, distance learning allows them to study from their hometown and eventually reunite with their parents in place and be able to provide them with food. Consequently, students would be able to concentrate on their studies as they did not need to worry about food. Thus, the second most chosen opinion which is "more time to study" completely make perfect sense.

In contrast to the preclinical participants, most clinical participants chose "more time to study" This finding is in accordance with the clinical students' learning objectives. As their educational level is higher than those of the preclinical, they were more able to apply the theories in real-life situations (in treating patients). As the learnings are more relatable to clinical sense, deep learning process becomes more of a priority for the clinical compared to preclinical group. However, this group is the most suffered as they certainly need for traditional or face-to-face interaction with patient. As mentioned in Table 4, most clinical participants have agreed that distance learning prevents them to have contact with patient. In line with a study by Al-Balas et al [9], nearly half of participants disagree to satisfy with distance learning.

The opinion of "more time to study" has given us several outlooks. Firstly, as there was a large-scale social restriction (PSBB) policy during the Covid-19 pandemic, the students had more time to directly study at home. Additionally, online learning stimulated the students to study more independently, as shown by Sadikin et al. [10] Secondly, online learning gave students more flexibility, and students could arrange their study sessions according to their own needs. Lastly, despite having more time to study, more practical and experience-based learning are disrupted, keep clinical students blunt.

Unlike the other two study programmes in the school of medicine, the pharmacy students preferred the opinion "it saves money since there is no

need to come to the campus" as the main advantage of distance learning. This finding deserves a more detailed elaboration as the majority of the participants expressed this statement. Based on the pharmacy students' place of residence, this finding makes perfect sense as it is directly linked to the commute distance and the need for a mode of transportation.

Regarding the study's effectiveness, only approximately 10% of the total opinion agreed that distance learning makes students understand the lecture better. Several studies showed that the evaluation for effectiveness depends on the given lecture, and each study programme would provide different responses. A meta-analysis study by Pei and Wu [11] showed a variant of research instrument tools that could be used to find the differences between online and offline learning. On the one hand, online learning is not so different from offline learning, although the results might differ in various situations.

Furthermore, this study allowed the participant to choose the "others" category and express their own opinion. Out of all participants who chose the "others" category for the advantage of distance learning, most of them chose "more time to rest, exercise, and doing hobbies at home" Most preclinical students chose "able to focus on self-learning as we can study repeatedly" This is understandable due to the accessible nature of recorded lectures; the students could replay the lectures and focus on more personalised learning.

F. Limitations of Distance Learning

Based on the limitation of the distance learning poll, most of the participants in all three study programmes chose "poor internet connection". Our study is in line with the study by Pratiwi [12] in Surabaya, in which the internet is the main issue in distance learning. The internet problem is not related to local universities but rather related to regional infrastructure. Nonetheless, it needs to be reviewed whether this poor internet connection is associated with the lecturer's or student's connection since not all participants chose this opinion. Internet connection is crucial for distance learning as every online meeting requires an internet connection [12]. Compared to offline learning, an internet problem in distance learning would slightly interfere with the teaching process and divert the student's attention[9]. There is an alternative to resolve the internet and concentration problems. Lecturers should have made the lecture not as the primary medium but as a stimulator to learn more. The timing during online learning is crucial as it could be used to discuss difficult subjects, and lectures could be distributed by video [13]. The total of participants who chose "difficulty in understanding lectures that only consist of slides" is in line with the low frequency of participants who had better understandings from

distance learning. Therefore, the combination of video and online discussion might be considered [11].

One of the teaching approaches in FKIK Unika Atma Jaya is student-centred learning, which requires a student's contribution in studying and finding learning materials [14]. Student-centred learning, which requires problem-based learning (PBL), skill lab, and hands-on subject, is not optimal in distance learning [14,15]. Consequently, one of the chosen opinions was "difficulty in skill labs, PBLs, and hands-on subjects" These approaches are not optimal as it requires group interaction, direct communication, and qualified facilities [16]. For instance, the students need the tools for practice to achieve the learning objectives. While in distance learning, the facilities and infrastructures could not support these activities yet. Our result is in accordance with the studies by Pratiwi and McCutcheon et al. [12,17], which stated that online learning should be continuously researched and evaluated in order to efficiently and effectively replace conventional face-to-face learning. Therefore, this study provides an initial signal that online lecture does not give many students better understandings (rather only in few students), and a regular evaluation is needed for this programme.

G. Recommendations

With no vaccine currently available in this uncertain pandemic, lectures of the upcoming odd/spring semester (starts January 2021) and possible fall/even semester will undoubtedly be conducted remotely (the official terminology: distance learning). The fact that every university has different student characteristics and study programmes remains a challenge. In this study, we focused on the school of medicine and health sciences in Unika Atma Jaya, which has three study programmes (preclinical, clinical, and pharmacy).

In this current situation, the distance learning programme should be improved continuously. Several noted suggestions include a "more organised schedule" and "more interesting subjects with videos and case simulations". Considering that these students have never done distance learning before, these suggestions are likely relevant as they are part of the transitional changes from direct face-to-face lectures to distance learning. This adaptation to changes requires time, and it is associated with how the teaching staff could prepare a much different lecture. These suggestions might help prepare the teaching staffs to innovate more for the next semester. Unika Atma Jaya has prepared several platforms to help lecturers with distance learning, one of which is a video recording application to help students with internet quota issues. The combination of lecture videos and online learning should be considered.

Regarding the "case simulation" opinion, it can be done by shortening the lecture's duration and replacing it with case simulations to motivate the students further. Lecture classes can be used for discussion, while activities outside of lectures can be facilitated by study guides and by relying on the active learning method.[10] As of now, technologies are commonplace and therefore, should be optimally utilised to improve higher education.

H. Conclusions

In providing optimal education and helping students to get a better understanding, an escalation of intensive improvements and evaluation for distance learning is always required. For medical and pharmacy students equivalent of an undergraduate, each teaching staff member must innovate to maintain a teaching quality similar to the direct face-to-face lectures, especially for study programmes that do not require direct individual/patient interaction. Lectures related to group learning and dynamics should be developed, becoming a priority for preclinical and pharmacy students. For clinical students, it is essential to find an innovative solution to directly meet patients while also abiding health protocols. In the case where the face-to-face learning method returns, it is noteworthy to mention that students will benefit more if the direct lectures could also be recorded to be learned through repetition. This might be a solution for future learning.

Authors' Contributions

All authors have a huge contribution to the research and the development of the manuscript. YA, LAP and KK ran the research and carried out data extraction. All authors have contributed to cross-checking the data extraction, writing and editing the manuscript. All authors have read and approved the final version of this manuscript.

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Online Teaching and Learning Challenges

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ABSTRACT

The study 'Online Teaching and Learning Challenges' highlights the impact of the Covid'19 pandemic on the overall education of health professions. It is a qualitative study which aims at pointing out the main issues faced during this experience, their effect on physical and mental health. As well as, the overall success of online learning.

Keywords: *Covid'19, challenges, online learning, impact*

A. Introduction

Coronavirus disease, caused by SARS-CoV 2, started in Wuhan, China, brought unaccustomed health and educational crises. It was declared as a pandemic by the WORLD HEALTH ORGANIZATION in March 2020. All the areas of life, including education, got adversely affected by Covid 19. As the circumstances deteriorated, the world lockdown ended up in the closure of educational institutes. This pandemic has prompted the educational institutes to switch to online learning that has brought numerous challenges as well. This study aims to highlight the main challenges faced by students during online learning.

B. Methods

The study entitled 'Online Teaching and Learning Challenges' is qualitative research on the hurdles in online learning for students. It is a cross-

sectional study that highlights the challenges faced by the students through a deductive approach. The sample in the research study is medical students. Whereas, the population consists of the Medical colleges of Rawalpindi and Islamabad, as well as medicine-related colleges.

To carry out this research, Survey Questionnaire was generated by the researchers as per 5 Likert Scale on Google Questionnaires which was filled out by the students. Therefore, a thorough statistical data was provided by Google Questionnaire software. The total number of students enrolled in the study was 105. The study analyzes that statistical data and forms a determined resultant to illuminate these challenges.

C. Results

During these challenging times, the learning strategies have been switched to online learning. This study aims to highlight the main challenges faced by students during online learning ranging from connectivity issues, limitation of practical activities, and unavailability of learning material. About 58.1% of students reported unavailability of study related material as the major issue. 56.2% of disciples have also reported limited access to the teachers. Loss of interest due to poor internet connection was highlighted by 45.7% of students. Also, practical activities have reduced considerably reported by 47.6% of students. Besides technical and learning issues, online learning has created health-related issues as well. About 54.3% of respondents reported that increased exposure to screen has impacted the eye health. As well as, 41.9% face connectivity issues often. On an average each student is spending more than 4 to 5 hours on online learning. That is 49.5%. The availability of teachers is also very less, about 56.2% respondents stated this. Overall, 56.2% students stated that online learning had been moderately or below average effective in enhancing their knowledge.

D. Discussions

Covid 19 has been declared as a global pandemic due to its spread and severity, by world health organization (WHO) in March 2020 [1]. Considering this pandemic, a great threat to humanity social distancing has been directed to curb its spread. As this pandemic has greatly affected the educational sector [2] so our study aims to highlight the issues faced by students and faculty amid this pandemic. The whole education system has been collapsed due to abrupt switching to online learning. Several challenges get aroused due to the ceasing of face to face classes such as digital incompetence, lack of direct interaction with the patients during clerkship, student's performance effected by racial,

economic and resource differences, financial issues and limited access to the faculty members [3].

Digital Competence

Digital competence refers to the skills and knowledge to effectively use the IT for education purpose and information management [4]. Lack of IT awareness could drag the students lag in online learning. According to Omotayo and Haliru [5] the digital library might help in online learning, but low digital competence could make it worthless. For the effective use of digital devices, the students must have basic knowledge of digital devices. Omotayo and Haliru adds further that disciples must be encouraged to learn digital competence.

E. Learning Assessment

Assessment means evaluating the students learning by the instructor with the help of quizzes and examination. In online learning, evaluation is taken online whereby instructors are restricted to intermediary oversight of students making it difficult to manage and control cheating. According to Osterlind, this problem can be overcome by testing formats such as sentence completion, true- false and grading system.

Hands on Experience

According to Leszczyski [6], other fields of studies could be managed with online learning but the medical education demands firsthand experience as part of instructional activities. Online learning could not meet the requirement of practical work [7]. Online learning cannot be proved effective in practical training [6].

F. Conclusions

Amidst this pandemic educational and economic sector have been the most affected. Hence, this study has highlighted that not only the students are experiencing a hindrance in their educational advancement, but their health is also deteriorating. Easy course navigation could be ensured along with repeating lectures multiple times to ensure maximum deliverance.

Authors' Contributions

S.S. made a great contribution in keeping all aspects on time, without delay. As well as, collecting essential data and framing it into the research study. A.A.K. also made a great contribution by keeping up with the team work, and giving the final image to the research study.

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Differences in Learning Outcomes Using the Cornell Method and the Non Cornell Method for Students at the Faculty of Medicine Universitas Baiturrahmah

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ABSTRACT

Taking notes is one of the learning strategies that can be used for effective learning. Taking notes function is to organize, explain, and understand the important information during the study. The Cornell method is considered effective and efficient for learning. The aim of different study outcomes uses the Cornell method and the non-Cornell method in Medical Student. This research was a quasi-experimental research method with a non-equivalent control group design. This research was a quasi-experimental research method with a non-equivalent control group design. This research was conducted from September until October 2019 at the Faculty of Medicine, Baiturrahmah University. The population in this study were students of the first year consists of the experimental group using the Cornell method and the control group using a non-Cornell method with 15 samples in each group. Analytic was used SPSS version 19.0. Univariate data analysis was presented in the form of a frequency distribution table for respondents' characteristics and differences in study outcomes using the Mann Whitney test. There were different study outcomes between an experimental group with a control group with a Mann Whitney value of p=0.025. The participant of the experimental group was female 9 people (53.3%) and the control group were male 8 people (53,3%). Most of the student were from outside Padang which are 10 people (66.7%) of experimental group and 13 person (86,7%) of a control group. Most of them staying in dormitory were 10 person (66,7%) of experimental group and 13 person (86,7%) of control group. There was a difference study outcomes use Cornell method and non cornell method in Medical Student Universitas Baiturrahmah.

Keywords: Cornell method, study outcomes, medical students

A. Introduction

Medical faculties must develop teaching curricula and study strategies to prepare prospective doctors to follow the development of medical science. Students are expected to be able to solve health problems and have lifelong learning skills, this is so that students can digest so much information, think critically, solve problems and understand and integrate basic science and clinical science [1].

The condition of students in the learning process plays an important role in achieving optimal results so that a learning strategy is needed that is by the student's condition so that the objectives of learning can be achieved properly [2]. Effective learning strategies according to Slavin in Catharina Tri Ani, suggest three learning strategies that can be used for effective learning, namely, taking notes, studying in groups, and using the PQR4 method (Preview, Question, Read, Reflect, Recite and Review) [3].

The strategy used when studying from reading or learning from listening to lectures from lecturers is taking notes. Research says that about 86% of lecturers want their students to take notes in class to increase their comprehension skills [4]. tudents' understanding abilities obtained from taking notes must also be improved, they must be able to sort out which information is important to note and which is not. The expected result of taking notes is to help students organize, explain, and understand important information during lectures compared to just relying on memory, as well as improving preparation and results of exams and quizzes [5,6].

Research on the method of recording has been done by many previous researchers, as well as in the world of medicine. Putu Nita Cahyawati and Putu Alit Sudarsana conducted a study in 2017 entitled "Application of Mind Maps to Special Topic Block students (Pirene) at the Faculty of Medicine and Health Sciences (FKIK) Warmadewa University". This study concluded that the application of mind maps to the Special Topic Block (Pirene) had a good impact on student motivation and first taker graduation. This is viewed from the results of learning motivation which reached 82.2% and graduation of first takers which reached 84.48% [7].

Another study, namely Amelia Rhaudyatun, conducted a study in 2017 entitled "The Effect of the Cornell Note-Taking Method on Students' Mathematical Reflective Thinking Ability". This study concluded that learning mathematics using the Cornell note-taking method had a significant effect on students' mathematical reflective thinking skills [8].

Based on the description of the results of the first study, it can be seen that previous researchers applied the use of mind map method to medical students, besides the mind map method, there is a method that is considered effective, namely the Cornell method [8,9]. Students think mathematically, who get the result that there is an influence between the Cornell method with students' mathematical thinking. The Cornell method is one of the note-taking methods recommended by several universities because it is considered effective and efficient, to improve students' ability to record information and is expected to improve student understanding and learning outcomes [9,10].

Learning outcomes can be influenced by the characteristics of the students themselves, gender, the area of origin, and the residence. Gender can affect learning outcomes, where women have higher intellectual abilities than men. The number of students who come from outside the Padang can affect their adaptability to be able to study independently and the home environment which can affect students' attitudes to learning [11].

B. Methods

The scope of this research is the first year students of the Faculty of Medicine Universitas Baiturrahmah who take the Pengantar Pembelajaran Kedokteran module.

The research method used in this study is a quasi-experimental research method (quasi-experimental) with a non-equivalent control group design pattern. This research method is used to find the effect of certain treatments.

This research was conducted on first semester students at the Faculty of Medicine at Universitas Baiturrahmah who were divided into an experimental group and a control group then given treatment. The control group and the experimental group are two classes taken randomly from one practicum class.

In the initial conditions, the experimental group students and control group students were given a pre-test which later the results of the pre-test would be used as a reference for comparing the results of the post-test. Then students in the experimental group and students in the control group were given different treatments, for the experimental group using the Cornell note taking method as a note taking method and for the control group using a method other than cornell note taking as a note taking method. After the treatment was given to the experimental group and the control group, then the posttest was given to find out the student learning outcomes, as well as observations and data collection of the results of notes once a week, during the study period, namely for 2 weeks.

Table 1. Implementation of experimental methods

Group	Prior	*Treatment*	Test
Experiment	*Pretest*	*Cornell method*	*Posttest*
Control	*Pretest*	Non-*Cornell method*	*Posttest*

Data Analysis

Analytic was used SPSS version 19.0. The normality test aims to determine whether the data obtained is normally distributed or not. Univariate data analysis was presented in the form of a frequency distribution table for respondents' characteristics and differences in study outcomes using the Mann Whitney test.

C. Results

A study entitled "Differences in learning outcomes using the Cornell method and the non-Cornell method among students of the Faculty of Medicine at Universitas Baiturrahmah". The sample of this study consisted of 15 people each in the experimental group and the control group and used a quasi-experimental method (quasi-experimental) with a non-equivalent control group design pattern. Based on the results of the research and analysis of the data that has been obtained, the results of the study can be concluded in the explanation below:

1. Frequency Distribution of Respondents Characteristics Based on Gender, Region of Origin and Residence

The results showed that the distribution of the characteristics of the experimental group respondents with the control group based on gender, area of origin and residence of the first semester students of the Faculty of Medicine, Universitas Baiturrahmah can be described as follows:

Table 2. Frequency distribution of respondents characteristics based on gender, region of origin and residence

Variable	Experimental group		Control group	
	f	%	f	%
Gender				
Male	6	40.0	8	53.3
Female	9	60.0	7	46.7

Origin				
Padang	5	33.3	2	13.3
Others	10	66.7	13	86.7
Residence				
With family	5	33.3	2	13.3
Rented	10	66.7	13	86.7
Total	**15**	**100**	**15**	**100**

Based on table 2, it shows that the gender in the experimental group was mostly female 9 people (60.0%), while in the control group more than half of the respondents were male, 8 people (53.3%). Most of the respondents came from outside Padang 10 people (66.7%) in the experimental group and 13 people (86.7%) in the control group. Most of the respondents live in rented houses in the experimental group 10 people (66.7%) and in the control group 13 people (86.7%).

2. Differences in the Learning Outcomes of the Experiment Group and the Control Group

The results showed that the difference in learning outcomes between the experimental group and the control group in the first semester students of the Faculty of Medicine at Universitas Baiturrahmah can be described as follows:

Table 3. Differences in learning outcomes of the experimental group and the control group

Variable	Passed		Failed		p
	f	%	f	%	
Pre-test					
Experimental group	1	6,7	14	93,3	0,554
Control group	3	20	12	80	
Post-test					
Experimental group	15	100	0	0	0,025
Control group	13	86,7	2	13,3	

Based on table 3 shows the pre-test results that passed in the experimental group were 1 person (6.7%) while in the control group, 3 people. The results of the post-test 15 people (100%) passed the experimental group, while the control group was 13 people (86.7%).

Based on the Mann Whitney statistical test on the pre-test results obtained p value> 0.05, it can be concluded that the pre-test results between the experimental group and the control were not different. Based on the results of the post-test, p value <0.05, it can be concluded that there is a difference in learning outcomes or post-test scores between the experimental group and the control group.

D. Discussions

1. Frequency Distribution of Respondent Characteristics by Gender, Region of Origin and Residence

Based on the results of research on 15 students of each experimental group and the control group in the first semester of the Faculty of Medicine, Universitas Baiturrahmah, the gender in the experimental group was mostly female, namely 9 people (60.0%) while in the control group more than half of the respondents were male, 8 people (53.3%). This study is in line with research by A. Majid Hayati in 2009 on students of the Department of English Shahid Chamran University, showing that most of the respondents were female, namely 73%. The difference is, the research conducted by researchers was conducted on students of the English Department and on the subject of English [12].

In contrast to Mohammad Davoudi's research in 2015 on Grammar Learning of Iranian ELF Learners, it was shown that most of the respondents were male, namely 44 people (62.8%). The difference is, the research conducted by researchers was carried out on the subject of English. This shows that the distribution of respondents is not evenly distributed between male and female [13].

Gender statistics in Indonesia, at the productive age show that there are more women than men [14]. In terms of health education it also shows that the majority of women dominate in terms of intellectual ability and achievement compared to men, because women tend to have better reading skills. higher, including students of the Faculty of Medicine, Universitas Baiturrahmah [15,16].

In this study, based on the area of origin, it showed that most of them came from outside Padang, namely 10 people (66.7%) in the experimental group and 13 people (86.7%) in the control group. The Faculty of Medicine is one of the faculties that is in great demand by high school students majoring in Science, in addition to the prestige of medical students, it is also the highest passing grade. It is proven by the average UTBK score in 2019 held by the Faculty of Medicine in sequence. Including at Universitas Baiturrahmah, the

Faculty of Medicine has high interest, especially those from outside the field [17].

In this study, based on residence, it shows that many respondents live in rented houses, 10 people (66.7%) in the experimental group and in the control group 13 people (86.7%). A residence is a building that is used as a residence for a certain period of time. The large number of enthusiasts in the medical faculty at Universitas Baiturrahmah who come from outside Padang, causing these students to live in a rented room [18].

2. Differences in the Learning Outcomes of the Experiment Group and the Control Group

Based on the results of the study, it was obtained that 1 person (6.7%) passed the pre-test in the experimental group while the control group was 3 people (20%). Based on the post-test results, 15 people (100%) passed the experimental group, while the control group was 13 people (86.7%). This shows that the experimental group was 13.3% higher than the control group.

Based on the results of the Mann Whitney statistical test on the pre-test value, the value of $p = 0.544$ ($p > 0.05$) was obtained, this illustrates that before being given different treatment, students did not have a significant difference in scores and were considered equal. The results of the Mann Whitney statistical test on the posttest value obtained p value = 0.025 ($p < 0.05$). So it can be concluded that there are differences in learning outcomes between the experimental group and the control group.

This is consistent with Duane Broe's 2013 research entitled "The Effects of Teaching Cornell Notes on Student Achievement". This study resulted in the conclusion that there were differences and improvements in student achievement in class algebra II by comparing the results of quizzes, tests and checking notes on classes taught using Cornell Notes. The difference is, the research conducted by researchers was conducted at the junior high school level and on the subject of geometry [19].

The difference in the number of passes between the experimental group and the control group is influenced by different recording methods. The method of recording in the experimental group used the cornell method while the control group used the conventional method.

The Cornell method organizes ideas spatially so it's great for visual learners. The idea is to give students space to copy information or record (record), identify questions, answer questions that have been made (recite), reflect on the content of the material, namely by asking themselves (reflect),

and repeat the material recorded (review). So the Cornell method not only helps students take effective notes, but also improves a good understanding of the subject as well as for exam preparation [20].

E. Conclusions

Based on the results of research on the effectiveness of the Cornell note taking method in improving learning outcomes in first semester students of the Faculty of Medicine. The following conclusions can be drawn there are differences in the learning outcomes of the experimental group and the control group. This is evident from the results of the post-test passing of the experimental group of 15 people (100%), while in the control group 13 people (86.7%) and supported by the results of the calculation of the Mann Whitney test with a value of p = 0.025.

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Perception of Medical Student on Learning Methods in Pandemic Era: A Qualitative Study

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ABSTRACT

Background: Responding to the accelerating spread of COVID-19, teaching and learning have been moved from face-to-face to online mode. The impact of this change has not yet been evident. Objective: This study is to assess Indonesian medical student's perceptions of three different learning methods that they have experienced: online, offline, and blended learning. Material and methods: This research was conducted in December 2020. This was a descriptive study with a sample of 6 people taken purposively from the medical students of Alauddin Makassar State Islamic University class of 2017, 2018, and 2019. Result: It was found that most students preferred blended learning. Students highlighted that online learning gave them flexibility in terms of the class schedule and more time to learn outside the class time as compared to offline class. However, students were aware that online delivery was not ideal for all situations. They felt that online learning was not optimal for practicum and clinical skills laboratory as it does not allow hands-on experience. Conclusion: It can be concluded that online and offline can enhance each other to maximize the learning output. Therefore, students hope that mixed learning can be applied.

Keywords: *Blended learning, student*

A. Introduction

This year, 2020, is a challenging year for all countries in the world, including Indonesia. This is caused by the Covid-19 pandemic that has never ended. Covid-19 is one of the world's health problems which was initially confirmed in Wuhan, Hubei Province, China in December 2019. The World Health Organization (WHO) announced the coronavirus disease (Covid-19) was caused by SARS-CoV- 2 viruses [1]. The clinical symptoms experienced by Covid-19 patients are very diverse, ranging from very mild symptoms such as fever, cough, headache to clinical conditions that lead to acute respiratory failure and require patients to undergo treatment in the ICU [2].

Indonesia is the fourth most populous country globally, so a lot of speculation has emerged and estimates that the Covid-19 case will quickly spread and last for a more extended period of time. President Joko Widodo has reported the first Covid -19 case identified in Indonesia on March 2, 2020. The confirmed patient is an Indonesian citizen who attended a dinner banquet in Jakarta, where the patient previously had a history of contact with a foreign national from Japan who settled in [3]. As of December 21, 2020, 671,178 cases had spread in 34 provinces in Indonesia, with the highest number of patients being occupied by DKI Jakarta with 163,111 matters (Gugus Tugas Percepatan Penanganan COVID-19, 2020) [3]. This pandemic has had a severe impact on Indonesia's health, economic, social, and even education sectors. The government is required to solve this pandemic case quickly and the people ask that the continuity of daily activities during the pandemic period must run without significant obstacles. This is caused by massive reforms of various aspects of the government structure.

One of the clear pieces of evidence of reform is the reduced activity of the outdoor population, which impacts changing the teaching and learning system in Indonesia. On May 29, 2020, the Expert Staff of the Minister of Education and Culture in the field of regulation, Chatarina Muliana Girsang, officially issued a rule on the implementation of learning from home to break the Covid-19 chain through a circular guide for organizing learning from home during the emergency period of the spread of Covid-19 number 15 of 2020 (Kemendikbud RI,2020). Since the enactment of this decision, all aspects of teaching and learning activities starting from the elementary school level to the university level have been implemented online.

Like any other decision-making, learning through online methods also has both positive and negative sides [4]. At the tertiary level itself, one of the benefits felt during online learning is that it saves time and energy because

students do not need to travel distances to campus to carry out the learning process. However, from the implementation of this policy, several challenges need to be faced. The challenges faced are that online-based learning is considered less effective because several knowledge competencies are difficult to achieve if done with online methods, for example, practicum activities and other clinical skills activities. Responding to this issue, on December 2, 2020, the Ministry of Education and Culture confirmed that the permit for face-to-face learning activities in colleges and polytechnic/community academies in the even semester of the Academic Year 2020/2021 could be carried out in a mix (hybrid learning), online, and face to face. Advance, with appropriate health protocols. This is based on the Joint Decree of the Minister of Education and Culture, the Minister of Religion, the Minister of Health, and the Minister of Internal Affairs regarding Guidelines for Implementation of Learning in the 2020/2021 Academic Year and the 2020/2021 Academic Year in the 2019 Coronavirus Disease (Kemendikbud RI,2020). As a result of this policy, public opinion began to emerge. Some welcome this policy, but not a few also criticize it. Based on this issue, the researcher intends to obtain information regarding the potential effectiveness of the hybrid learning system during the Covid-19 pandemic for Medical Education Students of the Faculty of Medicine and Health Sciences at Alauddin Makassar State Islamic University [3,4].

B. Methods

This qualitative study involved six medical student participants, chosen purposely from those admitted into the university from 2017 to 2019. Data collection was done through semi-structured interviews using Zoom video conference. Interviews lasted for approximately 12 minutes each. Consent was sought from each participant before the talks. Interview results were transcribed verbatim, then analyzed with thematic analysis. Participant confidentiality and voluntary participation were reassured throughout the data collection, research, and report writing.

C. Results

In total, six participants of medical students at Alauddin State Islamic University Makassar (two males and four females) with ages ranges from 19 to 21 were involved in our study. Characteristics of the participants are summarised in Table 1.

Table 1. Summary of participant characteristics

School Year	Participants	Age	Gender
2017	Participant 1	21	Male
	Participant 2	21	Female
2018	Participant 1	20	Female
	Participant 2	20	Female
2019	Participant 1	19	Female
	Participant 2	19	Male

About significant change from offline to online learning methods, two-three participants said that they were shocked for the first time. They felt unfamiliar with the new system and application that were used for online learning.

"I was shocked because I had never felt this (online learning method) before…." Participant 1, 2018

"....feel a little confused about the media because I have never used a video conferencing application before." Participant 2, 2018

According to participants, about the striking difference between offline with online learning methods, they said that online learning uses some online meeting applications if compared with the offline mode that uses face-to-face. Besides the media that was used, online learning also had more advantages than offline learning where online learning was more flexible than the offline method which showed that all learning activities were carried out from home. Furthermore, it also uses less energy and more time-saving.

"The difference is the media used where online learning uses media such as zoom and several other online meeting applications while offline uses face-to-face media between lecturers and students." Participant 1, 2019

"... the material that was given, much more effective and time-saving. Then, for the offline learning method, the energy and fatigue that you feel is much greater than online" Participant 2, 2019

Participants also admitted that besides the advantages, they were experiencing some obstacles from the online learning methods. The biggest obstacle was the internet connection, whether the connection was bad or runs out. Because of that, they have difficulty following the lecture.

".... an unstable internet connection, so that the audio or video was an error..."

Participant 1, 2018

"If online learning takes place, an unstable internet connection can also cause miscommunication between lecturers and students." Participant 2, 2019

Participants said that their motivation to learn decreased on online learning methods as well. This is due to the lack of a supportive environment and easily drowsy because eyes get tired easily from staring at the laptop screen continuously.

"... drowsiness also very often appears and can be influenced by several things such as eyes that get tired quickly due to staring at the laptop screen continuously…" Participant 1, 2019

"... A strong enthusiasm for learning can not be found on online learning methods because there is no supportive environment such as support from classmates…" Participant 2, 2017

Furthermore, another obstacle was related to the students' understanding, especially for practicum and clinical skill laboratory where online learning does not allow hands-on experience if compared with offline learning methods.

"... for practicum learning, it feels difficult because you cannot practice directly..." Participant 2, 2017

"When online learning was first introduced, a significant change was felt when practicum learning was carried out, so it was difficult to understand." Participant 1, 2017

According to participants' perception, this shows that students were aware that online learning methods in the pandemic era, was not ideal for all situations. They felt that online learning was not optimal especially for practicum and clinical skills.

D. Discussions

Our research study examined medical students' perspectives about learning methods in the pandemic era. In our analysis, we have identified that the sudden transition from offline to online learning model provides participants with many advantages. However, participants were also aware that not all situations were suitable for online learning methods, especially in practicum and clinical skills. This is also in line with the another research, where online learning was more effective within the context of particular medical disciplines, such as for basic medical sciences or preclinical subjects but the missing element in the effectiveness of online learning was clinical practice [5,6].

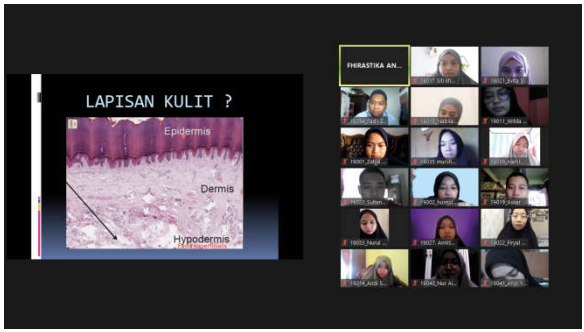

Figure 1. "An overview of online classes medical students from Alauddin Islamic State of University Makassar"

The strength of this study is that this research is still relatively new, especially because of the pandemic, moreover, the participants involved are from Alauddin Islamic State of University Makassar, which can be used as another source of reference for further research. Furthermore, this study also has weaknesses where we still could not generalize because it was conducted in one medical school.

Through this research study, the findings were found to strengthen previous research, where online learning methods in the pandemic era were not effective enough for all situations, especially practicum and clinical skills [7,8].

E. Conclusions And Recommendations

Based on our review of the perceptions of medical students at Alauddin State Islamic University Makassar, we find that blended learning can be done to maximize student learning outcomes.

We know that the COVID-19 pandemic in Indonesia is still ongoing, so online learning is a way to keep education going with various innovations and support from the government. Many positive things were obtained, ranging from reduced paper use in note-taking and changing it to advanced technology through the applications that were used maximally in learning. However, medical students at Alauddin State Islamic University Makassar are concerned about the skills required in medicine through practicum and clinical skills labs that are not effective if implemented online have a low effectiveness scale. Therefore, medical students at Alauddin State Islamic University Makassar are more comfortable with the offline class, especially to hone skills that can be done directly, and interaction between the lecturer and the student is

better with the consideration of not forgetting health protocols and personal protective equipment as a form of vigilance from catching COVID-19 [9,10].

Considering all of the above, in conclusion, online and offline classes can maximize student learning outcomes. Therefore, medical students at Alauddin State Islamic University Makassar prefer hybrid methods or the combination of online and offline courses to apply. The authors also hope that this research can be continued with quantitative methods to obtain statistical data that can be measured and objectivity is built.

Authors' Contributions

ESN: Data acquisition, draft manuscript, supervision, and supervision

NA: Analysis and interpretation of data and technical support

SKNAJ: Conception and design, and technical support.

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Instrument for Assessing Dental Faculty Perception of E-Educational Environment: Modified E-Learning Educational Atmosphere Measure (M-EEAM)

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ABSTRACT

Background: Experiences in e-learning differs from face-to-face learning environment. A valid and reliable instrument was modified to assess perception of faculty in e-learning educational atmosphere. Objective: To evaluate E-learning Educational Atmosphere through dental faculty perception by using Modified E-learning Education Atmosphere Measure (M-EEAM). Methods: A quantitative study employing the Modified E-Learning Educational Atmosphere Measure (M-EEAM) instrument was done with 40 faculty members Foundation University College of Dentistry & Hospital in 2020. The EEAM instrument was modified according to our culture and context. A pilot study of the 28 item question was distributed amongst 12 faculty members. The final instrument (M-EEAM), included 20 questions that covered six factors in a 6-point Likert scale. Instrument content and construct validity were assessed. Also Cronbach's alpha and test-retest were used for studying the internal consistency and reliability of the instrument. Data were analyzed by using SPSS software. Results: The final instrument named 'Modified E-learning Educational Atmosphere Measure' (M-EEAM) consisting of 20 items covering six areas including Program Effectiveness, Teaching Quality, Ethics and professionalism, Learner support, Safety and convenience and Awareness of rules. A pilot study of the 28 item question was distributed amongst 12 faculty members, excluding 8 items with low construct validity in our context in culture. Content validity ratio was more than 0.52 and content validity index

score of all questions was above 0.82. Test-retest reliability was 0.82 (p=0.001) and Cronbach's alpha was 0.842 calculated after pilot study and expert validation. Conclusion and recommendation: M-EEAM gives objectivity for evaluating dental faculty perception of the E-educational environment. M-EEAM is recommended reliable tool to measure the e-learning educational environment in our cultural context.

Keywords: *E-learning, education atmosphere, faculty perception*

A. Introduction

E learning has been actively practiced in today's era but is still in infancy stages. The teacher's perspectives of the educational environment in E-learning have as yet only been sparsely considered [1].

The virtual educational environment is a web based system that provides possibility of conducting teaching and learning process using software tools and application. Moreover, considering factors influencing and impeding self-directed, students-centered and self-paced learning in online education [2].

Medical universities know the significance of educational learning environment is it has a directly proportional relation to successful student learning outcomes [3]. In times of COVID-19 there has been an unconditional shift to virtual working and teaching methodologies [4]. Perception of students in e-learning atmosphere is different from face-to-face learning environment [5]. A wide array of factors contribute to the establishment of educational atmosphere namely involving the stakeholders involved: university, students, faculty, admission, registration and environmental or physical elements [2].

Another noticeable area of consideration in universities measuring education environment is their strategy of competing with peers on basis of quality standards [6]. Appraising previous studies and literature revealed that focus was on factors like theoretical front and technological innovation. Components of blended and distant learning were elaborated upon rather than e-learning settings [7].

B. Theoretical Framework

In order to develop frame work of the research, we reviewed related studies that had defined factors influencing some aspects of educational environment in e learning. For this purpose we performed an advanced search between 2000 and 2020 in Web of Science and SCOPUS database with the

following keywords of survey: Questionnaire, factors influencing e learning educational environment, perception of faculty towards e-learning, virtual learning and learning environment or educational atmosphere. Although, there were relatively fewer studies relevant to our study but we selected some relevant articles and read them thoroughly. These articles were as follows:

One interesting study was by Taylor and Maor (2000) designed a 'Constructivist Online Learning Environment Survey (COLLES) to gauge the learners' preference for learning environment. Considering the student and tutor perception of professional relevance, reflective thinking and cognitive demand.

In 2001, Chang and Fischer studied the 'Web Based Learning Environment Instrument' (WEBLEI) measuring a blended learning framework with emancipatory, co-participatory, information structure and design activities.

Therafter, Aldridge, Dorman and fraser (2004) validated (TROFLEI). A 'technology- rich outcome focused learning environment inventory' consisting of 80 itme and 10 dimensions.

Also, in (2007) "Online learning Environment Survey" (OLLES) and in year (2005)"Distant Education Learning Environment Survey" (DELES). Suggesting a blended online teaching method with no precise description for targets on distant learning programs

This was followed by the introduction of a fairly new validated instrument in (2020) by A Mousavi, 'E-learning educational atmosphere measure' (EEAM). Sounding more like the education atmosphere measure DREEM. Constructed a 40 item instrument covering 6 factor. So in this study a specific valid and reliable instrument was modified for accessing perception of faculty in e-learning educational atmosphere. Under the current COVID-19 era with E-teaching by E-tutors and E-learning by E-students.

Figure 1. The six factors of modified e-learning educational atmosphere measure.

C. Methods

Considering the above stated study in which the factors creating educational atmosphere in e- learning setting were determined as theoretical framework of this applied research in our settings of private medical university [8]. The reason for selecting this study:

- Time sensitivity of study- concordance with current e-learning approach and technique.
- The participants of study- were faculty currently involved with virtual classrooms not he blended type.
- Perspective of faculty members- was used to determine the influencing factors of online e learning atmosphere.

A quantitative study employing the Modified E-Learning Educational Atmosphere Measure (M-EEAM) instrument was done with 40 faculty members Foundation University College of Dentistry & Hospital in 2020. Data was collected with the use of M-EEAM Questionnaire. Firstly the modified EEAM instrument was chosen with respect to EEAM instrument. Instrument content and construct validity was assessed. Also Cronbach's alpha and test-retest were used for studying the internal consistency and reliability of the instrument.

The study was piloted in accordance with research ethical standards and its ethical approval was attained from the university ethics committee and from researchers of EEAM instrument via email. All quantitative statistics were analyzed using SPSS [9].

D. Results

The expert committee devised 28 item as instrument questions that they believed were applicable in settings to be evaluated in e learning educational atmosphere. All the questions were designed in a 6-point likert scale including *strongly agree, agree, slightly agree, slightly disagree, disagree, and strongly disagree* (rated 6 to 1).

A 10 person expert committee approved the face validity. The content validity CVR was greater than 0.54 in addition score of all questions was above 0.82. Content validity of scale was numerically proven [10]. A pilot study of the 28 item question was distributed amongst 12 faculty members. After careful evaluation applying the test-retest inter rater reliability of the individual instrument was 0.82 ($p = 0.001$) and the Cronbach's alpha for the whole instrument was 0.842.

After reviewing multifacited solution and considering the context and subject areas of the items, finally a six factor solution was designated fig 1. Eight items that had no effect on the total explained variance and were not loaded in any of the six principle factors with value less than 0.7 were omitted.

The final instrument named as 'Modified E-learning Educational Atmosphere Measure (M-EEAM), include 20 questions that covered six factor consisting of program effectiveness, ethics and professionalism, teaching quality, learner support, awareness of the rules, and safety and convenience. Graph1 shows the mean and median of each item of instrument and table 1 shows the items of instrument with factors from M-EEAM.

E. Discussions

The study employed quantitative research to answer the research questions. The purpose of this study was to investigate faculty members' attitudes toward e-learning in health profession education in primate medical college. The factors influencing their attitudes. This study examined differences in attitude between faculty members based on age, gender, education level, nationality, and teaching experiences. This research was limited to two universities from different locations in the KSA [11].

A Survey questionnaire was used in this study to collect the data. the results showed that there is a difference between the levels of e-learning based on different components of identity. The gender perceptions were the first indication of differences, with perceptions by females being more positive than that of males. This was followed by age differences in which the ages under 30 had a stronger perception of e- learning than those over the ages of 31. The educational level was also noted as being affected by the perceptions of

e-learning being stronger with those who had a Bachelor's degree. The results showed that faculty member's who had less teaching experience had a stronger perception than those who had been teaching for more than 10 years. There was an overall positive outlook of e-learning by faculty members with the belief that it is a tool which enhances learning. The responding to the challenges and obstructions of e-learning, participants revealed that a lack of tools and knowledge created impediment [12].

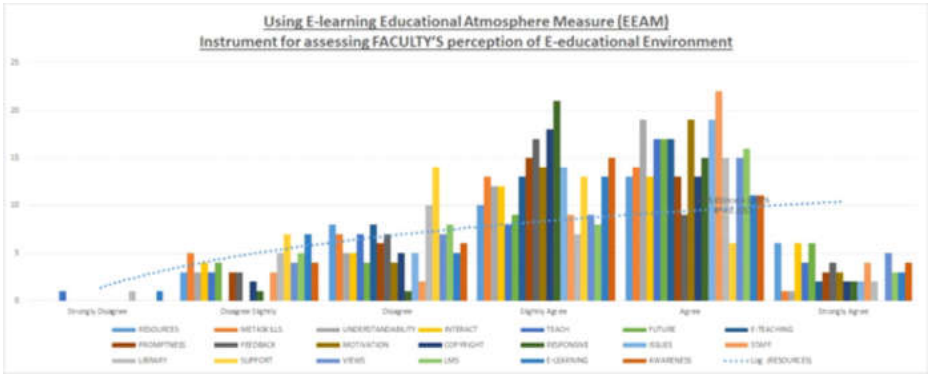

Figure 2. depicts the mean and median of each item of instrument

University of Tabuk, adopts e-learning as one of its academic priorities. For this reason, the study was concerned with investigating the faculty members' perception of the e-learning at the University of Tabuk. In addition, the study examined the relationship between the faculty members' e-learning perception and their major and experience. A perception survey was developed and e-mailed to 63 faculty members. Responded participants were 40. The study findings revealed that 62.9% of the faculty members' overall responses to e-learning perception survey were ranging from negative to 'uncertain' [13]. There was a significant difference among faculty members' e-learning perception related to their major and experience. Novice faculty members showed more positive e-learning perception than experienced ones in e-learning readiness.

This explorative study captured the perceptions of faculty members new to technology enhanced learning and the longitudinal observations of the e-learning manager during dedicated professional development in order to compile a socially transformative emergent learning technology integration framework for open and distance learning at the School of Continuing Teacher Education at North-West University, South Africa. The clusters formed the basis of a model for faculty development towards socially transformative learning technology integration for open distance learning. The five aspects

of the model comprise (i) the environment in which faculty members should gain support from the institution; (ii) the environment in which faculty have to address the realities of adopting TEL; (iii) human factors relating to the adoption of TEL; (iv) concerns and reservations about the use of TEL; and (v) continuing professional development needs, expectations, and motivators. The sustainable integration of ICT into higher education institutions remains a major challenge for the adoption of TEL [13].

Reviewing the literature, we couldn't find any study introducing an instrument for the assessment of educational atmosphere in current e-learning environments from e-teachers perspective. So, this study aims at designing a valid and reliable tool for assessing educational atmosphere in e-learning setting based on factors creating such an environment.

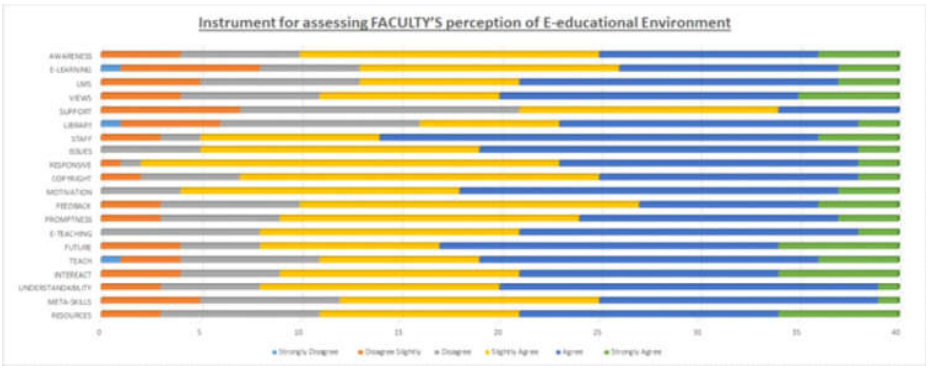

Figure 3. illustrates the repose ratio against the 6-point likert scale

Table 1. Factors and their items of modified e-learning educational atmosphere measure

FACTORS	ITEMS
Program effectiveness	1. Courses' resources and contents are intriguing and motivational for learning 2. The possibility of learning academic meta-skills (such as writing a proposal, working with academic software etc.) is provided for faculty. 3. Courses' contents and activities are understandable and tangible 4. During this program, my ability to interact with others in virtual space has increased.

	5. I have taught what I needed to teach in this program. 6. This program will be effective for my future job/experience.
Teaching Quality	7. Teachers of this program have e-teaching skills. 8. Teachers of this program give timely feedback on assignments, activities and messages. 9. Teachers of this program give complete and proper feedback on assignments, activities and messages.
Ethics and profession-nalism	10. Teachers of this program help raise motivation for learning. 11. Copyright and intellectual property of scientific resources and contents are respected. 12. Teachers of this program are responsive and available. 13. Cultural issues and social etiquette are observed in the educational environment.
Learners Support	14. Administrative educational staff, Technical support staff and authorities are well responsive to faculty. 15. I have access to a decent digital library. 16. Good support system for weak students is available. 17. Students' views on the program delivery and educational services are considered important.
Safety and convenience	18. I can easily work with LMS.
Awareness of Rules	19. There is a good place for e-learning in my society. 20. I have become aware of educational regulations and administrative processes

F. Conclusions

Modified E-Learning Educational Atmosphere Measure (M-EEAM) give objectivity for evaluating faculty perception of the E-educational environment. The evidence based results demarcates and demonstrate zones of E-learning that can be accentuated and improved. It also serves as an insight into the extent to which the faculty development programmers are meeting the perception to improve the virtual education environment of the institute. Assessing educations atmosphere in e-learning settings by M-EEAM could provide managers and investors with useful information to settle an effective education system by prioritizing the necessary changes.

G. Limitations

The study had some potential limitations that may have affected the results. It was limited to a single university and it had a limited sample size. It was unlikely that the result of statistical analysis were attributed to chance, but this did not necessarily imply that they were valid outside this university.

Another limitation of this study was the M-EEAM questionnaire did not account for other stake holder such as students, administrations only faculty members were selected to respond to the questionnaire.

H. Recommendations And Impacts Of Study

It can be recommended that M-EEAM can be used for assessing educations atmosphere in e-learning settings and provide managers and investors with useful information to formulate an effective education system by prioritizing the necessary changes.

Authors' Contributions

All authors had substantial contribution to the conception and design of work. Together all drafted the work and critically revised the content.

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Financial or other conflict of interest

None.

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Evaluation of Efficacy of "Student Support System" in a Medical University in Pakistan

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ABSTRACT

Objectives: The purpose of this study is to evaluate the degree of satisfaction of students by the student support system in King Edward Medical University, Pakistan. Methodology: The medical students of MBBS were recognized as the sample population and a pre-formed, pre-validated questionnaire was distributed online to the target population. Descriptive statistics were applied and results were noted. Results: Out of the total sample population of 268 students, around 39% (105) of the participants had substantial knowledge about the availability of student support services executing in the university premises. About 15% (40 participants) availed the facilitation at least once from support in their undergraduate tenure. 72% (192 participants) were satisfied with the orientation provided at the first day of university. 20% (53 participants) were satisfied with problem solving attitude and serviceability provided by the counseling service of the student support system. Around 43% (115 participants) reported that their various academic issues were resolved after they contacted student support center. Conclusion and Recommendations: Student support system is cornerstone for the facilitation of students, as it contains qualified-professionals. We recommend that proper awareness regarding its services must be done at various levels in university.

Keywords: *Support, satisfaction, performance*

A. Introduction

The students who get admission in any prestigious institute after doing a lot of struggle and hard work often get misled by their seniors and other peeps who are already studying in that institute. They find themselves in a plethora of issues regarding commodities, mental health, study-pressure, demotivation, syllabus, co-curricular and extra-curricular activities. In particular, medical students face substantial amount of stress and anxiousness, regarding issues of academic and non-academic sorts due to competitive environment, compared to the students from other institutions. Especially, newly admitted students are the ones who are more prone to psychological stress of education, career development and family's interpersonal ties. The student support system is a program which acts on a set of guidelines formulated by each institute to facilitate its students in coping with their issues.

Effective support services contain an interrelated organized circle of institutional, social, academic, and financial supports that help the students in various issues [1]. The main aim of a student support system in any institution is to provide an effective medium where students may openly present their complaints and problems of any sort to a team of qualifies professionals and strategic experts who may provide a proper solution and develop an organized strategy so that the issue of that sort may not occur again in future. Guidance regarding academic activities is he area where students need tremendous help and look forward to help from student support system [2]. Also, medical students also need to cope with the competitive environment in their hostels and classrooms. That's why the importance of student support services in such institutions becomes many-fold when it comes to overall stability of students' peace of mind. It is achieved through counseling which varies depending upon the faculty and teams of professionals working in that area. In some cases, students are offered sessions with professional counselors who are experts only in mentoring and strategy-making. In other cases, faculty members serve as mentors to aid students regarding the issues. The faculty-student interactions are often more informal than the professional counseling services (MDRC, 2004).

The student support system may use various sources which students can use to approach for addressing their issues. Some may use an online portal to facilitate students online. Others may establish an office within university premises for easy availability to the students. Some academies are trying to utilize texting and social media apps to inform their students regarding academic news, services, deadlines, and other pieces of information [3].

In short, the importance of the support system in medical schools and universities should be spread and the evaluation must be cross-checked by the authorities so that proper reforms may be carried out for maintaining their effectiveness. This research, therefore, analyzes the effectiveness of student support system operating in King Edward Medical University, Pakistan.

B. Methods

The method which we used for the evaluation of student support system was a survey form which had been designed online, and then was disseminated to the sample population of currently enrolled undergraduate medical students at King Edward Medical University by 'Snowball Sampling Technique'. The sample size of target population was calculated to be 268 by using the WHO sample size calculator. The questionnaire was divided into sections which aimed at analyzing the availability, accessibility, serviceability and satisfaction on Student Support System. The answers collected were processed according to different percentage of participants and a generalized conclusion was extracted out.

C. Results

1. Demographic characteristics

Out of a total sample population of 268 participants, 147/268 (55%) were male and 121/268 (45%) were female. The predominant sample population consisted of the second year MBBS students; 99/268 (37%). Further details are mentioned in the table 1.

2. Accessibility

Most of the students [104/268 (39%)] knew about the presence of student counselling services at their college. However, majority of students [217/268 (81%)] never availed these services. Most of the students[118/268 (44%)]were not sure about the availability to all students of these services. Most students [115/268 (43%)] responded that issues like attendance, academic performance or others are resolved by the support center. Majority of the students [110/268 (41%)] were able to gain advice and support in ensuring they maintain appropriate academic levels, attendance levels, and general support. 177/268 (66%) students reported that their progress and attendance are monitored. [137 (51%)] were not able to gain advice and guidance on personal (including impairment and health issues), accommodation, or family/friend issues. 150 (56%) participants were unable to discuss any issues or concerns with accommodation arrangements. 150 (56%) of respondents

were not requested to advise their lecturer of any disabilities that may affect your learning. Majority of students [193 (72%)] responded that their university arranged an orientation. 155 (58%) students visited classrooms, student areas, student administration area, and any other relevant areas, such as toilets, fire exits, and restricted areas during orientation. 196 (73%) students were not given a hard copy of the Student Manual as given in table 1.

3. Counselling Services

214 (80%) of students did not have counselling services for managing their time. 198 (74%) of respondents did not enjoy counseling service for setting and achieving your goals. 169 (63%) respondents did not have counseling service for motivation. 185 (69%) of participants did not have counseling service for ways of learning. 209 (78%) of respondents did not enjoy counseling service for coping with assessments. 209 (78%) of students had no availability of counseling service for looking after yourself as given in Table 1.

4. Problem Solving Aspect

123 (46%) of the respondents were neutral about the rating of problem solving aspect of student support services. The results of the study are summarized according to per-question as follows:

Table 1. Result frequency

Sr. No.	Variables/Characteristics	Frequency/268 (percentage)
1-	Gender of respondents	Male: 147/268 (55%) Female: 121/268 (45%)
2-	Year of study of respondents	1st: 67 (25%) 2nd: 99 (37%) 3rd: 54 (20%) 4th: 32 (12%) 5th: 16 (6%)
3-	Assessiblilty [Have your university/college a Student Support Center?]	No: 65 (24%) Not sure: 99 (37%) Yes: 104 (39%)

4-	Assessiblilty [Have you ever availed Student Support?]	No: 217 (81%) Not sure: 11 (4%) Yes: 40 (15%)
5-	Assessiblilty [Is available to all students, on an appointment basis, during university/college hours of business]	No: 80 (30%) Not sure: 118 (44%) Yes: 70 (26%)
6-	Assessiblilty [Are the issues like attendance, academic performance or others are resolved by the support center?]	No: 73 (27%) Not sure: 80 (30%) Yes: 115 (43%)
7-	Assessiblilty [Are able to gain advice and support in ensuring they maintain appropriate academic levels, attendance levels, and general support?]	No: 110 (41%) Not sure: 80 (30%) Yes: 78 (29%)
8-	Assessiblilty [Is the students' progress and attendance monitored?]	No: 43 (16%) Not sure: 48 (18%) Yes: 177 (66%)
9-	Assessiblilty [Are you able to gain advice and guidance on personal (including impairment and health issues), accommodation, or family/ friend issues?]	No: 137 (51%) Not sure: 56 (21%) Yes: 75 (28%)
10-	Assessiblilty [Are you able to discuss any issues or concerns with you accommodation arrangements?]	No: 150 (56%) Not sure: 65 (24%) Yes: 53 (20%)
11-	Assessiblilty [Are you requested to advise your lecturer of any disabilities that may affect your learning?]	No: 150 (56%) Not sure: 30 (11%) Yes: 88 (33%)
12-	Assessiblilty [Does your university arrange an orientation?]	No: 46 (17%) Not sure: 29 (11%) Yes: 193 (72%)

13-	Assessiblilty [Did you visit classrooms, student areas, student administration area, and any other relevant areas, such as toilets, fire exits, and restricted areas during orientation?]	No: 86 (32%) Not sure: 27 (10%) Yes: 155 (58%)
14-	Assessiblilty [Were you given a hard copy of the Student Manual?]	No: 196 (73%) Not sure: 37 (14%) Yes: 35 (13%)
15-	Assessiblilty [Is the efficacy of the availability and accessibility of the support services monitored?]	No: 96 (36%) Not sure: 118 (44%) Yes: 54 (20%)
16-	Do you have a counseling service for: [•managing your time]	No: 214 (80%) Yes: 54 (20%)
17-	Do you have a counseling service for: [•setting and achieving your goals]	No: 198 (74%) Yes: 70 (26%)
18-	Do you have a counseling service for: [•motivation]	No: 169 (63%) Yes: 99 (37%)
19-	Do you have a counseling service for: [•ways of learning]	No: 185 (69%) Yes: 83 (31%)
20-	Do you have a counseling service for: [•coping with assessments]	No: 209 (78%) Yes: 59 (22%)
21-	Do you have a counseling service for: [•looking after yourself]	No: 209 (78%) Yes: 59 (22%)
22-	Rate the following aspects of Student Support: [Problem solving]	Bad: 56 (21%) Good: 51 (19%) Neutral: 123 (46%) Very Bad: 35 (13%) Very Good: 3 (1%)

D. Conclusions

The research was conducted to evaluate the awareness, availability and efficacy of student support system that exist in King Edward Medical University Lahore. The major results of the evaluation from the students showed that there is lack of effective awareness regarding the existence of any support system in the university. Major numbers of students were neutral about the efficacy of the system because either they never consulted their issues with the system or they were unaware of the methods to approach the team.

The results show that there is lack of faculty-student interaction at the very basic level and most students don't consult the system. The main reason is because there are many flaws existing at administrative level. Most students don't find any availability of support regarding motivation, time-management, study-plans, ways of learning, coping with assessments and mental health. Also, most students remain neutral in rating the overall performance of the support system within the university premises.

E. Discussions And Recommendations

King Edward Medical University, being the most prestigious institute in all over Pakistan, represents most of the medical schools in Pakistan. The student support system is working but there is lack of proper awareness regarding its existence, management plans, rules and regulations, presence of its office, faculty support, strategic measurements and accessibility. The administration must take proper actions to support its students by conducting seminars and sessions on a regular basis so that more students may come to know about its existence and performance. This can also be done by putting the support system plans and strategies in university gazettes and manuals so that students may come to know more about the working principles and professionals of the support system.

Moreover, there has also been a factor of hesitation and fear in the students to approach the administration directly. The students must think that the administration is always there to facilitate them. They should freely consult the support services, check the efficacy, and spread the word to the other students as well. That's how a proper system would be established on both ends.

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COVID-19 and Final Year Medical Students' Learning Process in Oman: Exploring Knowledge, Consequences and Preparedness for Internship

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ABSTRACT

Background: Coronavirus Disease 2019 (COVID-19) is a cluster of acute respiratory illness that was first identified in Wuhan Province in China. The virus causing this syndrome is known as SARS-CoV-2. The COVID 19 pandemic affects every aspect of our life, including education, work, travel, business, and social life. Aim: To evaluate the final year medical students' perceptions of their preparedness for internship and assess their awareness of COVID-19 and patients' management in the Sultanate of Oman. Methods: A cross-sectional survey of cohort of final year medical students at Sultan Qaboos University (SQU) and National University of Science and Technology (NU) was distributed to 227 students in both medical schools from 21st to 28th of April 2020. A total of 99 students fully completed the survey with a response rate of 43.6%. The survey had five sections exploring perceptions on preparedness for internship and awareness and knowledge on COVID-19, training, and implications. Results: Majority of participants (82.8%) were 24-26 years old. Omani students accounted for 88.9% of the participants. 81.4% of SQU participants were competent in carrying ward's practical procedures

comparing to 39.3% of the NU participants (p<0.05). There was a higher level of awareness of the current ministry of health policies on the management of patients with COVID-19 with NU participants than SQU (p < 0.005). Training on preparedness for COVID-19 was higher in females than males (p= 0.02). Conclusion: COVID-19 has affected the teaching process and limited student- patient interactions. With ongoing rise in confirmed cases every day, the uncertainty of the duration of the suspension of on-campus teaching in higher education institutions in Oman is still ongoing. The overall perceptions of preparedness for internship among medical students in Oman are good. However, further education in emergency management and training on practical procedures are still required.

***Keywords**: coronavirus, COVID-19, medical students, final year, preparedness, internship, Oman. Medical education*

A. Introduction

Coronavirus Disease 2019 (COVID-19) is a cluster of acute respiratory illness that was first identified in Wuhan Province in China. The virus causing this syndrome is known as SARS-CoV-2 [1]. The World Health Organization (WHO) declared the outbreak as a public health emergency of international concern on 30th of January 2020 and on the 11th of March it was announced that the COVID-19 outbreak is a global pandemic [2].

The COVID 19 pandemic affects every aspect of our life, including education, work, travel, business, and social life. This goes from suspending all forms of education, reducing the number of workforce to minimum in different working areas, making people to work online at home, physical distancing and social exclusion, restriction of travel, health system crisis and economic decline are some issues resulting from facing COVID-19 [3].

The COVID-19 pandemic is putting an enormous strain on the health care system. This is due in part to the rapid increase in the number of cases and in part because health care professionals are themselves getting sick—in some cases fatally succumbing to the virus [4]. Moreover, it impacts on medical education in general and the training and preparation of final year medical students in particular. Students are not able to complete their clinical placements in an effective and safe environment because of the lockdown caused by the pandemic. Transferring medical education into online platform results in loss of in hospital clinical rotations, simulation laboratory and interactive medical school's sessions. Thus, limiting the process of preparing

and equipping these students, who will soon be practicing in hospitals, for real life medical emergencies [4].

As final-year medical students are approaching the end of the academic year, in few months, they will be joining the medical forces in different hospitals and practicing as interns/ supervised doctors. Students entering the practice increase the medical workforce which is crucial for the increasing demands in facing current pandemic. This helps the health system to cope with the increasing number of patients, speeding up post-pandemic recovery, maintaining the essential medical services, and providing safe society to prevent disease transmission. Effective human resources are essential to ensure adequate staff capacity and the continuity of the main operations [5].

There are two medical schools in Oman: one public (Sultan Qaboos University, SQU) and one private (National University of Science and Technology, NU). The internship is a term used in medicine for the graduates who attained their medical degree and still not licensed to work without supervision. It is a transition of the medical students to doctors [6]. In Oman, the internship is a one-year period divided into three 4-months rotations. The new graduates will be able to join various departments in different hospitals in the coming few months. Interns will transform their medical school knowledge into practice which will equip them with skills to approach and manage patients under the supervision of senior doctors. The internship period is very crucial to strengthen intern's clinical skills and helps them learn the professional attitudes and behaviors [7]. It also helps to produce a capable and independent doctor for future practice.

The new graduates join the medical workforce with substantial knowledge and clinical experience, yet preparation and guidance provided varies by institution. The literature found that inadequate career preparation, either due to inadequate institutional guidance or level of awareness, is one of the key stressors for medical students [8].

This cross-sectional study aims to evaluate the final year medical students' perceptions on their preparedness for internship and assess their knowledge on COVID-19 and patients' management. It also extends to illustrate COVID-19 specific training and explore the pandemic consequences on the medical education in the Sultanate of Oman.

B. Material And Methods

1. Participants and Setting

A cross-sectional study of cohort of final year medical students at Sultan Qaboos University (SQU) and National University of Science and Technology (NU) was conducted with distribution of electronic survey. The electronic survey was sent to all final year medical students in both medical schools (n=227) and survey fieldwork ran from 21st to 28th of April 2020. A total of 99 students fully completed the survey with response rate of 43.6%.

Inclusion criteria were final year medical students. Exclusion criteria were students not in final year, abroad studying students and incomplete responses.

2. Questionnaire Design

A structured self-administered questionnaire consisting of five sections was distributed electronically to all potential participants in their final medical year. The survey five sections had close ended questions and included; a) socio-demographic questions (6 questions), b) perceptions on preparedness for internship (8 questions), c) awareness and knowledge on COVID-19 (10 questions), d) COVID-19 training (4 questions), and e) COVID-19 consequences and implication (6 questions). Awareness questions were based on the interim guidance and information for healthcare workers provided by Centre of Disease Control (CDC), and Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers published by WHO [9,10].

The survey elements were developed according to the objectives and variables of the study. All survey questions, except demographics, were closed questions of either 2-scales (Yes or No) or 3-scales (True, False or I do not Know). Content validity of the survey was checked and critiqued by group of experts in medical education. The survey was piloted on 10 subjects prior to conducting the study. Participants' consent to participate in the study was given through return of the completed questionnaire.

In order to exclude participants not in final year, expected year of graduation was added to the demographic part. Figure 1 shows the flow diagram for the inclusion and exclusion of response. Collected data were tubulated in Excel and statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS v21 Inc, Chicago, Illinois, USA). Numbers and percentages were used to represent categorical variables data. Continuous variable data were presented as mean and standard deviation.

Associations and significance differences between variables were tested using Fisher's Extract Test and Chi square test. A p-value of <0.05 was considered statistically significant.

3. Statistical Analysis

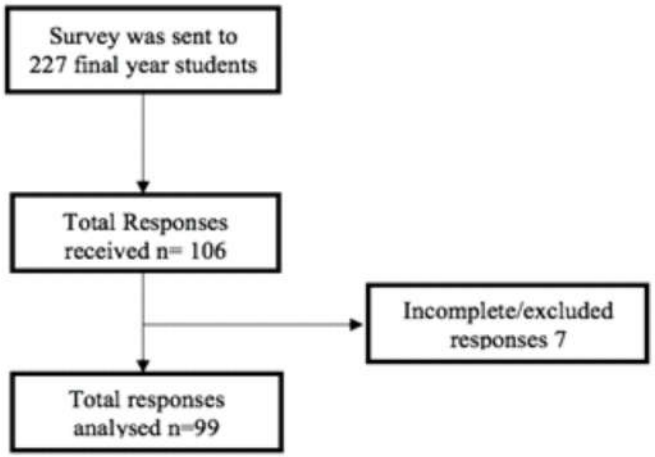


Figure 1. Flow diagram for inclusion and exclusion of responses

C. Results

1. Demographics

Total completed responses received that met the inclusion criteria of the study were 99 (84 females, 15 males). Majority of participants (82.8%) were 24-26 years old. Omani students accounted for 88.9% of the participants. Four of the participants are intending to do their internship program abroad. Participants' demographics are shown in table 1.

Table 1. Demographic information of participants

Characteristics	Percentage (n)
Age	
21-23	15.2% (15)
24-26	82.8% (82)
27-29	2.0% (2)
Gender	
Male	15.2% (15)
Female	84.8% (15)

Nationality	
Omani	88.9 (88)
Non-Omani	11.1% (11)
University	
National University of Science and Technology	56.6% (56)
Sultan Qaboos University	43.4% (43)
Total	100% (99)

2. Perceptions on Preparedness for Internship

Eight closed ended questions were used to evaluate participants' perceptions on their preparedness for internship. In four questions (B1, B3, B5 and B8), more than 90 participants answered there were competent in the specific questions. Lower numbers of competency were found in questions related to emergency management of ill patients (B6 n=49) followed by confidence in carrying ward procedures (B4, n=57). Participants responses are shown in figure 2.

The study found that 81.4% of SQU participants were able to carry basic ward procedures (e.g. cannulation and NG-Tube), while only 39.3% of the NU students answered they were competent with these procedures. The difference in the competency in carrying basic ward procedures between the 2 medical schools was statistically significant ($p < 0.001$). The competency with principles of infection control and the ability to take part in ACLS in emergency situation were also significant between the two medical schools ($p < 0.001$).

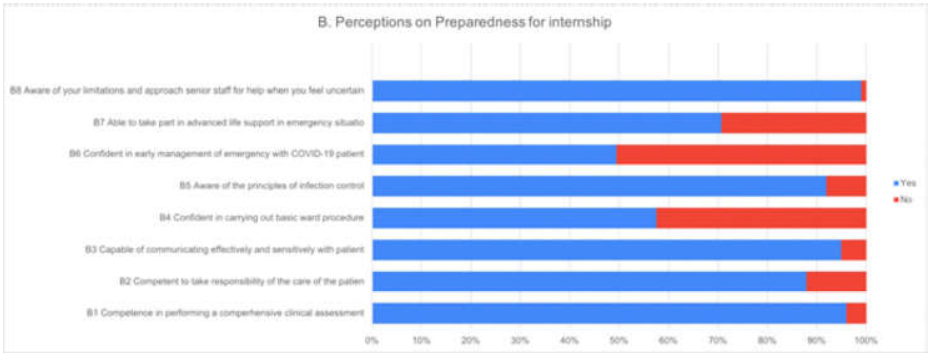


Figure 2. Participants Perceptions on Their Preparedness for Internship

3. Covid-19 Awareness

To evaluate the level of awareness of the participants, 10 knowledge-based closed-ended questions were asked (Table 2). Questions were then categorized into five themes (Pathogenesis, WHO role, Health Measures, Medical Managements, and Infection Control). Correct answered per theme were then compared to identify gaps in knowledge as shown in the graph (Figure 3)

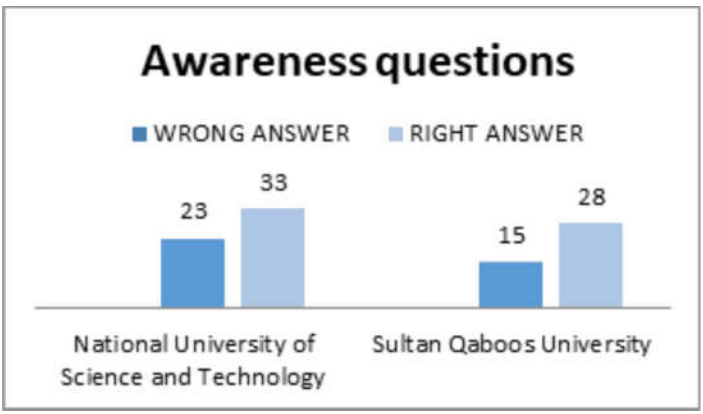
Table 2. Themes of knowledge based questions

Theme	Questions
Pathogenesis	Coronaviruses are a newly discovered family of viruses
	Molecular tests, using Polymerase Chain Reaction (PCR) have been developed and are being used to detect the SARS-CoV-2 virus causing COVID-19
WHO role	The response to COVID-19 is entirely dependent on the World Health
	Mental health and psychosocial support are not an important part of emergency planning and response measures in outbreak
Health measure	Syndromic screening aims to detect people in the incubation period
	The incubation period is the time from exposure to the causative agent until the first symptoms develop and is characteristic for each disease agent
Medical management	For the management of COVID-19 in hospital, the flow and transfer of patients should be planned ahead
	Existing medicines for other diseases may be able to be re-purposed for COVID-19
Infection control	Surgical mask is enough personal protective equipment for transferring asymptomatic positive patients with covid-19
	Hand rub with soap and water for at least 10 second is the preferred method for soiled hands

Figure 3. COVID-19 awareness: number of correctly answered themes

The number of correct answers were low in questions related to infection control followed by Health measures themes. Despite the overall satisfactory level of awareness (>50% correct answers) for each theme, gaps in the knowledge have been identified when looking at questions individually. The question related to hand hygiene duration (C10) was the least correctly answered question (Correct 39, incorrect 57, I do not know 3). The overall of participants answers of the knowledge-based questions per medical school are shown in figure 4.

Figure 4. showing the difference in awareness questions between the 2 medical school



4. COVID-19 Training

Training and latest guidelines and recommendations updates on COVID-19 for medical students were explored in this section. Majority of participants had training on hand hygiene in the last 12 months (86.9%). However, only 18 participants had formal specific training about COVID-19

preparedness and management (18.8%). About 12.1% of participants participated on online course or a form of teaching about COVID-19. There was higher level of awareness of current ministry of health policies on management of patients with COVID-19 among NU participants than SQU ($p < 0.005$). Training on preparedness for covid-19 was higher in female than male ($p = 0.02$).

5. Covid-19 Consequences

Along with other aspects of life, the pandemic of COVID-19 also affects the education process. This section illustrates the implication of the pandemic on the teaching process. Participants from the 2 medical schools are currently off campus and continuing their college education online. With all participants, clinical rotations, examinations, and clinical clerkship have been affected by the pandemic. About one quarter of the participants have volunteered to help with the healthcare professionals during the pandemic. This was significant for different age groups ($p=0.04$). The measures and preparedness in tackling the pandemic have illustrated the role of infection control and public health and increased participants knowledge on these as a specialty. Therefore, 47 participants have expressed their interest in pursuing Public Health and infection control as a career.

D. Discussions

This prospective cross-sectional study explores final year medical students and COVID-19 perceptions on preparedness, awareness, training, and implications on education. The first two confirmed COVID-19 cases were diagnosed in the Sultanate were linked to travel and were diagnosed on the 23rd February 2020 [11]. To date, there are 8118 confirmed cases [12]. This wide spread of COVID-19 has serios implications for public institutions and raised concerns for medical students. While final year medical students are preparing to take assessments and examinations, substantial number of medical schools across the globe has suspended clinical rotations and direct patient interactions. In countries like the United Kingdom [13], Kuwait and Ireland, several medical schools have announced the end of the academic year and expediated graduation to allow newly graduated doctors to join the medical force.

The study demonstrated overall high levels of perceptions on preparedness for internship by final year medical students in Oman. However, further training on carrying basic ward procedures (e.g. cannulation and NG-tube) is required. There is low perception of competency in early emergency

management of patient with COVID-19. This indicates the necessity of further education and training in this matter as interns are part of the frontline dealing with patients with COVID-19.

The response to COVID-19 is dependent on the individual country emergency plan under the guidance of the WHO [5]. However, the study found mixed responses in perceptions were only 63% of participants agreed that the response to tackle the emergency is not entirely the role of the WHO but rather individual country. There is a good understanding on the incubation period of the SARS-CoV-2 virus. However, the study found low levels of understanding on syndromic screening which is the screening of travellers in the airport to prevent travel of symptomatic individuals. Based on the early data from China, the average incubation period for COVID-19 is five days [14].

The overall of correctly answered knowledge-based questions on COVID-19 awareness levels were different between the two medical schools with higher levels in SQU than NU students (65.1% and 58.9% respectively). A study on COVID-19 awareness among healthcare students and professionals in Mumbai [15] showed a higher percentage of correct answers in medical students (74.10%) than our overall findings (61.6%). However, the finding of a survey of participants perceptions on knowledge on emerging infection in the Kingdom of Saudi Arabia showed that 61% of participants perceive their knowledge as low [16].

Hand hygiene is an effective way to prevent the spread of pathogens and infection in healthcare setting. The two basic techniques to clean hands are hand washing and hand rubbing. For healthcare setting, the CDC recommends the use of Alcohol Based Hand Rub (ABHR) with at least 60% ethanol or 70% isoproranol. The recommendation for visibly soiled hands is to be washed with soap and water for at least 20 seconds [17]. In this study, although 86 participants had training on hand hygiene in the last 12 months, only 38 participants correctly answered the infection control hand hygiene question. A recent study reported that only 51.9% of their respondents were aware one the preferred method of hand hygiene in health care settings [18].

Personal protective equipment (PPE) plays a particularly important role in the prevention of transmission of the COVID 19 infection. PPE needed for patients with confirmed and possible COVID infection and needed for the health care workers when caring for suspected or confirm cases of COVID-19 [19]. PPE indicated for use in COVID-19 include face mask, eye protection like goggles or disposable face shield, clean nonsterile gloves, and clear isolation gowns. All PPE should be donned before entering patient care area, must remain in place and worn correctly and must be removed slowly and

deliberately in sequence to prevent self-contamination [18]. In this study, 84.9 % of participants has a good knowledge on the use of appropriate PPE when dealing with patients with COVID-19. No previous study done to evaluate the PPE knowledge and preparedness in medical students, however, a recent international survey discussed this issue in neurosurgical residents and found that receiving formal training of the correct sequence for donning and doffing PPE was not sufficient [18].

Two thirds of the student are aware of the current Ministry of Health policies and recommendation on dealing with patients with COVID-19. Despite the emerging evidence on the importance of preparation and training for preparedness and management of patients with COVID-19, the study found a low levels of formal teaching and self-learning on management of patients with COVID-19 (18.2% and 12.1% respectively). Inadequate career preparation has been identified as one of the core stressors for medical students [8].

In the Sultanate, on-campus classes in Higher Education Institutions have been suspended from the 15th March 2020 till further notice. The process of continued learning for these students has been affected. Both medical schools in Oman have relegated medical education to virtual learning platform. Alhaj et al reported that the number of daily studying hours was affected in approximately 80% of respondents. The same study revealed a significant impact of this pandemic on the mental health of 90% of the participants [18].

Several factors have been reported in influencing decisions on future specialities among senior medical students [19]. The challenges of the current pandemic prompted an emergent response and highlighted the role of Public Health and the WHO response in tackling such situation. In this study, about half of participants have agreed that the response to the pandemic has increased their interest in Public Health as a future career. The desire to work in challenging environment could be the reason for this motivation. This positive outcome of the pandemic or the affect on future career was not previously explored.

E. Conclusions

Graduating medical students join the medical taskforce with knowledge and experience gained throughout the undergraduate years. With ongoing rise in confirmed cases every day, the uncertainty of the duration of the suspension of on-campus teaching in higher education institutions in Oman is still ongoing. The COVID-19 pandemic has affected the teaching process and limited student- patient interactions.

The overall perceptions on preparedness for internship among medical students in Oman is good. However, further education in emergency management and training on practical ward procedures are still required. This study highlighted that a good effort in delivering the specific knowledge and practices on COVID-19 and patient management is recommended. Overall, there is satisfactory level of knowledge on COVID-19 between participants, however, gaps in knowledge related to hand hygiene and measures for infection control have been identified. The global response to COVID-19 pandemic has increased participants' interest in Public Health and Infection Control as a career.

Conflict Of Interests

Authors declare no conflict of interest

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Abbreviations

ABHR	:	Alcohol Based Hand Rub
ACLS	:	Advanced Cardiovascular Life Support
CDC	:	Center for Disease Control
COVID-19	:	Corona Virus Disease 2019
NU	:	National University of Science and Technology
PPE	:	Personal protective equipment
SPSS	:	Statistical Package for the Social Sciences
SQU	:	Sultan Qaboos University
WHO	:	World Health Organization

Communication Assessment Tool (CAT) in "Bahasa" Indonesian Version

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ABSTRACT

Physician communication can be assessed using the Communication Assessment Tool (CAT) questionnaire. This questionnaire can also be used to assess the communication of residents or medical students. This study aims to develop a "Bahasa" Indonesian language version of CAT, and to examine the validity and reability of the questionnaire. This research was conducted at an ophthalmology clinic in Samarinda. The CAT questionnaire was developed by Makoel et al., (2007) with 15 questions. We will evaluate only 14 questions because 15th question is not used to assess doctor communication. The study was conducted in several stages. First, the CAT questionnaire was translated into Indonesian. Then the questionnaire was tested for readability by 5 people to assess the readability and understanding of the questionnaire. After that, the questionnaire was distributed to patients. Evaluation of the construct validity of CAT was assessed by calculating the score of internal consistency and *item' validity.* A total of 96 patients filled out the questionnaire. The result shows that 14 items of CAT have a Cronbach alpha value of 0.77 and validity value per item > 0.3. It can be concluded that CAT in Bahasa Indonesian version proved to be valid and reliable.

Keywords: *CAT, bahasa*

A. Introduction

Communication is an important skill that a doctor needs to have [1]. Effective doctor-patient communication serves a vital function in the delivery of high-quality health care. Patient doctor communication aims to improve patient health and medical care. Good doctor-patient communication can help regulate patient emotions, facilitate understanding of medical information, and enable better identification of patient needs, perceptions, and expectations [2].

A medical student needs to be equipped with the ability to communicate well. Competency Standards for Indonesian doctors [3] have determined that one of the competencies a doctor must have is communication. Levinson (2010) states that communication skills must be taught systematically, including practice and providing constructive feedback [4].

Physician communication can be assessed using the Communication Assessment Tool (CAT) questionnaire. This questionnaire was developed by Makoel (2007) to look at the patient's perceptions immediately after a meeting with a doctor. This questionnaire has not looked at perceptions for some time. This questionnaire can be used to assess the communication of residents or medical students. The results of the questionnaires that the patient has 1filled in can be used as feedback for residents and medical students. Hajil's validity and reliability test shows that the CAT questionnaire is valid and reliable to measure patient perceptions of doctor's interpersonal skills and communication skills [1].

This questionnaire has been used by Ferranti et al., (2010) to assess the communication skills of hospital employees [5]. The reliability test results showed that the CAT questionnaire was reliable with a Cronbach alpha value of 0.97. The results of the research by Ferranti et al, (2010) concluded that CAT can be used to assess employee communication in hospitals [5]. Myerholtz et al. (2010) [6] and Myerholtz (20140 [7] also conducted research to use CAT in family doctor education. The results of his study recommend CAT as a tool for evaluation and learning and recommend using CAT in other specialists.

This study aims to develop the Indonesian version of the Assessment Communication Tool (ACT) and assess the questionnaire's validity and reliability. This Indonesian version of the questionnaire can be used to assess medical student communication and feedback, especially for students at the professional stage.

B. Methods

1. Data Collection

This research was approved by the Health Research Ethics Committee of the Faculty of Medicine, Mulawarman University number 35 / KPEK / FK / IV / 2018 dated April 17, 2018. Participation in the study was voluntary, and respondents were given informed consent before participating in the research. This research was conducted at one eye clinic in Samarinda. This clinic is a private clinic that serves general and insurance patients (BPJS). A total of 4 ophthalmologists are on duty at this clinic. The research design used an analytic cross-sectional approach. Respondents who filled out the questionnaire were patients who went to eye clinics aged over 15 years and were willing to become research respondents.

2. Instrument

The CAT questionnaire was developed by Makoel et al. (2007) with 15 questions [1]. The questionnaire was assessed using a Likert scale, namely a scale of 1 to 5 ("Not good" to "satisfactory"). This study would determine only 14 questions because the 15th question is not used to assess doctor communication. The research was conducted in several stages. First, the CAT questionnaire was translated into Indonesian. The questionnaire was then tested for legibility by 5 people to assess the readability and understanding of the questionnaire. After that, the questionnaire was distributed to the patient. The researcher will interview patients who have been served by doctors and waiting for medication. For patients who were unable to complete the questionnaire due to eye problems, the researcher read the questionnaire.

3. Data Analysis

Test the questionnaire's validity using 2 methods, namely assessing the reliability of the questionnaire by calculating the internal consistency value (Cronbach's alpha). The instrument has a good reliability value if the Cronbach alpha value> 0.7. The second way is to assess each question item's validity by using the Pearson test by connecting each item's value with the total value. Each item of question is declared valid if it has a value of r> 0.3. Data were analyzed using the Statistical Package for Social Science (SPSS) program version 16.

C. Results

A total of 96 patients filled out the Indonesian version of the CAT questionnaire. Patient demographic data can be seen in table 1.

Table 1. Patient demographic characteristics

Characteristic	n	Percentage (%)
Gender		
Female	55	57.3
Male	41	42.7
Age		
15-20 years	5	5.3
21-30 years	8	8.3
31-40 years	6	6.2
41-50 years	15	15.6
51-60 years	23	24
61-70 years	21	21.9
71-80 years	12	12.5
81-90 years	5	5.2
91-100 years	1	1.0
Profession		
Civil servants	10	10.4
Housewife	35	36.5
Private	30	31.3
Student	6	6.3
Retired	12	12.5
Does not work	3	3.0
Education		
Tidak Sekolah	5	5.2
Elementary School	30	31.2
Junior High School	11	11.5
Senior High School	32	33.3
Diploma	4	4.2
Bachelor	14	14.6

From the calculation results, the Cronbach alpha value was 0.77 (> 0.7). This means that the Indonesian version of the CAT questionnaire has good reliability. The results of calculating the validity of each question can be seen in table 2.

Table 2. Communication assessment tool: original (English) and translated (Indonesian) version

	Very original	Bahasa Indonesia Version
Item 1	Greeted me in a way that made me feel comfortable	Menyapa saya dengan cara yang membuat saya merasa nyaman.
Item 2	Treated me with respect	Memperlakukan saya dengan hormat.
Item 3	Showed interest in my ideas about my health	Menunjukan perhatian tentang kesehatan saya.
Item 4	Understood my main health concerns	Mengerti masalah keluhan utama saya.
Item 5	Paid attention to me (looked at me, listened)	Memperhatikan saya (menatap saya, mendengarkan dengan saksama).
Item 6	Let me talk without interruptions	Memberikan saya kesempatan berbicara tanpa melakukan interupsi.
Item 7	Gave me as much information as I wanted	Memberi saya informasi sebanyak yang saya inginkan.
Item 8	Talked in terms I could understand	Berbicara dalam istilah yang bisa saya pahami.
Item 9	Checked to be sure I understood everything	Memastikan bahwa saya mengerti apa yang telah dijelaskan oleh dokter.
Item 10	Encouraged me to ask questions	Mendorong saya untuk mengajukan pertanyan.
Item 11	Involved me in decisions as much as I wanted	Melibatkan saya dalam keputusan sebanyak yang saya inginkan.
Item 12	Discussed next steps	Membahas langkah selanjutnya, termasuk rencana tindak lanjut.
Item 13	Showed care and concern	Menunjukan kepedulian dan perhatian.
Item 14	Spent the right amount of time with me	Menghabiskan waktu yang cukup untuk saya.

From table 3 it is found that all the questions have a value of $r > 0.3$. This means that all the questions on the Indonesian version of the CAT questionnaire are valid.

Table 3. Value of validity per item question

	item 1	item 2	item 3	item 4	item 5	item 6	item 7	item 8	item 9	item 10	item 11	item 12	item 13	item 14	JUMLAH
item1	1.000	.891	.787	.626	.798	.558	.570	.557	.572	.586	.453	.359	.573	.524	.785
item2	.891	1.000	.774	.685	.784	.614	.609	.640	.696	.631	.505	.416	.607	.522	.832
item3	.787	.774	1.000	.702	.732	.632	.682	.658	.667	.581	.522	.476	.606	.590	.836
item4	.626	.685	.702	1.000	.708	.585	.552	.607	.617	.536	.454	.477	.554	.470	.763
item5	.798	.784	.732	.708	1.000	.688	.657	.646	.614	.547	.485	.521	.641	.447	.823
item6	.558	.614	.632	.585	.688	1.000	.622	.711	.595	.554	.599	.587	.598	.535	.793
item7	.570	.609	.682	.552	.657	.622	1.000	.772	.653	.646	.500	.473	.540	.511	.785
item8	.557	.640	.658	.607	.646	.711	.772	1.000	.752	.565	.464	.538	.596	.558	.807
item9	.572	.696	.667	.617	.614	.595	.653	.752	1.000	.711	.631	.649	.648	.564	.840
item10	.586	.631	.581	.536	.547	.554	.646	.565	.711	1.000	.721	.590	.655	.579	.806
item11	.453	.505	.522	.454	.485	.599	.500	.464	.631	.721	1.000	.800	.729	.592	.767
item12	.359	.416	.476	.477	.521	.587	.473	.538	.649	.590	.800	1.000	.738	.600	.746
item13	.573	.607	.606	.554	.641	.598	.540	.596	.648	.655	.729	.738	1.000	.760	.832
item14	.524	.522	.590	.470	.447	.535	.511	.558	.564	.579	.592	.600	.760	1.000	.746
JUMLAH	.785	.832	.836	.763	.823	.793	.785	.807	.840	.806	.767	.746	.832	.746	1.000

D. Discussions

Reliability shows the consistency of a CAT in measuring the same symptoms. In this study, reliability was assessed by calculating the Cronbach alpha value. Reliability is declared high if the Cronbach alpha value is 0.7-0.9. In the Indonesian version of the CAT questionnaire, the Cronbach Alpha value of 0.77 indicates high reliability.

This result is the same as the research conducted by Ferranti et al. (2010), which showed that the Cronbach alpha value for the CAT questionnaire was 0.77. These results are the same as the research results by Makoel et al. (2007) [1], which showed that the Cronbach alpha value was 0.96.

To determine the Indonesian version of the CAT questionnaire's validity value by bending r count with r table. If r count> r table, then the question item is declared valid. In this study r count = 0.3. The validity test value of each question item shows that all the questions have a value> 0.3. This means that all questions are valid.

Conclusions And Recommendations

The Indonesian version of the CAT questionnaire is valid and reliable. This questionnaire can be used to assess students when communicating with patients.

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Evolving Perception Regarding Online Learning and Teaching in COVID-19 Era of Graduate Students With Diverse Educational Backgrounds Enrolled in 'Masters-'Health Professional Education' Program of a Pakistani University

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ABSTRACT

Objectives: to analyze the evolving perception of graduate students of 'Health Professional Education' regarding online learning and teaching at the end of two online teaching sessions. Methods: this 'Mixed-Method' study was carried out from Mar–Sep 2020 at Riphah University, Rawalpindi, Pakistan. A total of 25 graduate students of 'Health Professional Education' were selected after purposive sampling and informed consent was obtained. These students had diverse educational background. A Semi-structured questionnaire was distributed at the end of each online teaching sessions. Both quantitative and qualitative data were analyzed separately. Results: quantitative data analysis revealed the mean scores of 3 domains of 'Student's perception of learning', 'Contents and Teaching Strategies' and 'Educational environment' in 1st vs. 2nd online sessions as follows respectively: (4.37 0.42 vs. 4.09 0.45; *p* value 0.04),

(4.40 0.47 vs. 4.29 0.58; *p* value 0.44) and (4.43 0.43 vs. 4.23 0.69; *p* value 0.36) based on Likert scale. The students agreed that contents covered, teaching strategies and education environment were satisfactory and the perception was not different between two sessions statistically in these domains whereas students' self-perception of learning was more satisfactory in 1st online session. Qualitative analysis of transcribed data supported the statistical trends. Conclusions: the graduate students of 'Health Professional Education' were equally satisfied regarding contents covered, teaching strategies and education environment in two online teaching sessions whereas their perception about their own learning depreciated in 2nd online teaching session.

Keywords: *Covid-19, online teaching, education, medical, graduate students*

A. Introduction

"Education is the most powerful weapon which you can use to change the world" – Nelson Mandela ("Education: The Most Powerful Weapon for Changing the World | USAID Impact," n.d.) [13]. The COVID-19 era has changed the concepts of learning and teaching dramatically [1]. The need of imparting quality education to students globally caused almost every university to shift to online teaching [2] and for developing countries like Pakistan, it was an abrupt and unavoidable change for which most of the universities were not prepared [3].

Online teaching and learning demands from the learners; a lot of commitment, self-discipline, motivation, incorporation of technology and self-directed learning. Similarly, the teachers need to step-up their efforts to keep students engaged & focused, innovate for digital interaction, inculcate netiquettes, strengthen learners' autonomy and ensure ethical practices in a virtual education environment [4,5]. If both students and teachers are self-motivated and obstacles are tackled, then online learning and teaching can be coped very well with desired results [5].

In Pakistan, the online teaching and learning has many challenges [6]. Technology-readiness, connectivity issues due to frequent load-shedding, students situated in remote areas, training of faculty in online teaching and students' readiness to learn online to name a few [3]. This abrupt wake-up call to shift educational system to online modalities though challenging; has resulted in many advantages as well. The COVID-19 situation has led to the realization of need to develop a hybrid system of learning and teaching to get maximum benefits for all the stake-holders [7]. This makes the need to explore

the advantages, limitations and recommendations of e-learning by scientific research all the more important.

Many international studies have reported the dynamics of online learning and teaching [1,2,5,7]. The number of local studies on the topic are few and far in between and are mainly regarding public awareness & socioeconomic impact [8], pathogenicity [9] and preventive measures of COVID-19 [10]. There are very few studies regarding online education in general [11], ("Moodle and Online Learning in Pakistani Medical Universities: An opportunity worth exploring in higher education and research - PubMed," n.d.) [12] and impact of this pandemic in particular on medical education [4,6]. The studies reported students' and faculty perspective regarding online teaching with set of students of uniform educational backgrounds [4]. The graduate program of HPE is a unique program in which there is diversity of the students being enrolled with no age limit. Achieving the learning outcomes with diverse group of students is challenging even in face to face interaction and require careful planning of contents, teaching strategies and very skilled faculty. The challenge of this task become many folds when the teaching has to be shifted to online. There is no study reported internationally or locally in which impact of online teaching and learning was explored in a group of students with significant diversity in their age and educational background.

The present study aims to explore the evolving perception regarding online learning and teaching in COVID-19 era of graduate students of diverse educational backgrounds enrolled in Master's program of 'Health Professional Education' in a Pakistani University.

B. Material And Methods

This 'Mixed Methods' study of 'Convergent Parallel Design' [14] was carried out at Riphah University, Rawalpindi from Mar-Sep 2020. The 'Mixed Methods' study protocol was chosen to qualitatively explain the quantitative results as there was significant diversity of participants in their educational backgrounds and age. Participants were voluntary and were selected by purposive sampling after informed consent. These were graduate students with MBBS/BDS degrees enrolled in 'Health Professional Education (HPE)' Master's program in Sep 2019 at Riphah University. The program is hybrid program of 32 credit-hours with module-based 12 basic and advanced courses with 10-days intensive face to face teaching contact session every 3 months with assignments and self-directed learning in between. The enrolled students had very diverse educational background ranging from PhD qualified faculty members, Head of department of basics and clinical departments, Principals of medical colleges, clinicians to as young as fresh medical and dental graduates.

The study sample size was 25. The students had two face to face contact sessions but due to COVID-19 situation the next two contact sessions; 10 days each, were held as online teaching through 'Zoom' during which use of 'Socrative', 'Kahoot' and 'Padlet' soft wares were included as well. The teaching strategies were also modified accordingly.

A semi-structured, self-report instrument was administered twice to the enrolled subjects. The questionnaires were filled by students online. The questionnaires were administered twice; once at the end of 10-days online teaching session from 24 Mar-2 Apr 2020; as questionnaire 1, and second time, the same one was administered; as questionnaire 2, at the end of 2nd 10-days online teaching session conducted from 6–15 Jul 2020. The data-collecting form was designed by the 'Department of Medical Education' of the institute to collect both quantitative and qualitative data simultaneously. It comprised of 17-item questionnaire that evaluated the students' perception of online learning and teaching. The items 1-11 were scaled on Likert scale with range of scores from 1-5 (strongly disagree, disagree, neutral, agree and strongly agree). The items 12-18 were open-ended and non-directional and required subjects to offer their own opinion in their own words to the questions asked. The Design and ethical aspects of the study were approved from 'Ethical Review Committee' of the institution.

Data Analysis

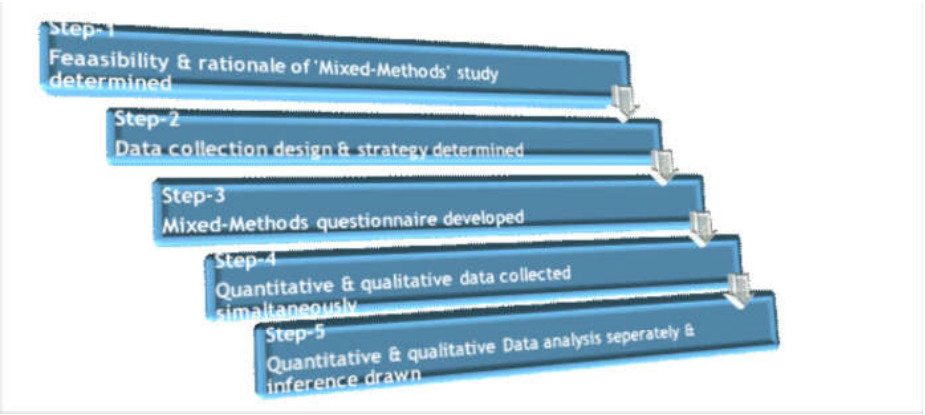
The quantitative data obtained from items 1-11 were analyzed using SPSS version 25. The scores were on the Likert scale of 1-5 for each item for items 1-11 and mean scores for each item were calculated for questionnaire 1& 2 each. The quantitative data was qualified by factor analysis and these factors were grouped as themes. These themes were titled as 'Students' perception of Learning' (items 1,2,4,5,11), 'Contents & teaching strategies' (items 3,6,8) and 'Educational environment' (items 7, 9,10) domains. The mean scores for 3 themes of online learning and teaching were calculated.

The qualitative data was obtained from items 12-17 of the questionnaires as narrative answers to open-ended questions. The text data was transcribed from the questionnaires and was analyzed following the steps for qualitative analysis. The step I was reading & re-reading the transcript and making notes. The step II was 'coding/indexing' by identifying and labelling relevant words/ phrases, repeated/important-stated/surprising phrases/statements. Pre-conceived concepts were also taken into account by already done review of literature. The step III was 'creating categories/themes' by combining codes. The step IV was 'labelling categories' and finding out if there is a hierarchy/ connection among categories if any and description of that connection. The

data was analyzed and interpreted by all authors independently and then validated to ensure analytical triangulation.

The themes analyzed from qualitative data obtained were then compared with those obtained from qualifying quantitative data. To draw the inference, the results from qualitative data were then directly compared with those from quantitative data to find weather qualitative themes were supported by statistical trends or not.

Figure 1. Steps involved in the process of the study



C. Results

The majority of the participants of the study were females and the age range of all the participants was 26-65 years with male to female ration of 1:2.4 approximately. All the participants were the enrolled graduate students of HPE. The questionnaire 1 was distributed to all 25 students after 1st online session. The response rate was 96%. Till 2nd online teaching session, one of the students dropped-off due to health issues and questionnaire 2 was distributed to 24 students and response rate was 87.5%. The characteristics of the participants are shown in Table 1.

Table 1. Participants' characteristics

Participants	Graduate Students HPE	
	1st online teaching session	2nd online teaching session
Gender		
Male	7 (29%)	6 (30%)
Female	17 (71%)	14 (70%)
Male: Female ratio	1:2.4	1:2.3

Age groups (in years)		
25-35	10 (42%)	09 (45%)
36-45	08 (33%)	06 (30%)
46-55	05 (21%)	04 (20%)
> 56	01 (4%)	01 (5%)
Basic Sciences	08	06
Clinical Sciences	16	14
Bachelor's degree		
MBBS	14	11
BDS	10	09

1. Quantitative Data Analysis

The mean score for the first domain 'Student's perception of learning' was found to be 4.37 0.42 for the first online session and 4.09 0.45 for the second online session indicating that overall, students 'Agreed' (Likert scale) that their learning was enhance. However, the satisfaction was greater in 1st than 2nd online sessions as depicted statistically (*p* value 0.04). 'Contents and Teaching Strategies' mean score was 4.4 0.47 for the first and 4.29 0.58 for the second online session (*p* value – 0.44). 'Educational environment' mean score was 4.43 0.43 for the first and 4.23 0.69 for the second online session (*p* value 0.36). The students agreed that contents covered, teaching strategies and education environment was satisfactory and the perception was not different between two sessions statistically.

2. Qualitative Data Analysis

a. 1st Online Teaching Session

The qualitative data analysis of 1st online teaching session resulted in emergence of total 3 themes each for advantages and limitations from transcribed data namely; 'Students' perception of learning', 'Contents and teaching strategies' and 'Educational environment'. (Table 2 & 3)

Table 2. Advantages of e-learning perceived by participants in two online sessions

S. no.	Quantitative & Qualitative data interpretation					Quantitative data (p value)
	1st online teaching session		Mean ± SD	2nd online teaching session	Mean ± SD	
1	Students' Perception of learning	Effective interaction	4.37 0.42	Learning new technologies	4.09	
		Task-based learning		Asynchronous learning		
		Peer learning		Self-directed learning	0.45	**0.04**
2	Contents &Teaching Strategies	Organized contents	4.40 0.47	Organized contents	4.29	0.44
		Use of new technologies		Effective small group discussions		
		Excellent Faculty		Excellent Faculty	0.58	
3	Educational Environment	Technology based	4.43 0.43	Feasibility	4.23	0.36
		Relaxed environment		Relaxed environment	0.69	

Table 3. Limitations of e-learning perceived by participants in two online sessions

S no	Qualitative data interpretation				
		1st online teaching session		2nd online teaching session	
	Themes	Sub-themes	Excerpts	Sub-themes	Excerpts
1	Students' Perception of learning	Varied Learning styles	"Medical education is such a volatile subject, you need to rehearse it over and over again".	Less-interactive	"Getting your voice heard is a big problem while asking a question when other people are not paying attention to the concept of taking turns".

			"I prefer e-learning on blended learning. I can get lecture recordings later on".		"Less opportunity to asked queries related to research"
		Less Focused	"Just please make sure balance of unrelated questioning during lecture as most of time important topics remain unexplained"	Cognitive load	"Continuous cognitive load as well as eye straining while looking at computer screens" "Apply cognitive load theory to session duration, both on daily basis and on overall length of contact session days".
2	Contents & teaching strategies	Difficult concepts	"In coming session if students would be given a little bit more scaffolding by worthy teachers to develop difficult concepts then it would reduce cognitive load of the students".	Difficult concepts	"Research intro and basics should have given more time and in this section specifically we need help as we are new in research especially Qualitative".
		Fast-paced teaching	"While teaching difficult concepts teachers should ensure adequate understanding of the students about basic concepts before assigning individual tasks".	Fast-paced teaching	"Detailed slow paced component on "bio-statistics" should be added as this is one thing in which most of us are deficient".
		Self-directed learning strategies issues	"Provision of reading material should be a day ahead of class so that students can go through it before coming to class which will make understanding of concepts much better".	Long duration of sessions	"The length of the sessions makes the sessions hard to tolerate as the screen time on computers tire me more than other activities. The after lunch session if made shorter or totally removed would make these much bearable".

3	Educational Environment	Techno-logy glitches	"The most serious problem was related to glitches in IT"	Technology glitches	"Issues related to IT including sound distortion especially at participants end would have to resolved at individual members end".
		Ineffective Participation	"No individual group should dominate the sessions and all the learners should get the chance to speak and convey their opinions. All the teachers should make the entire batch involved and encourage them to voice their concerns".	Less conducive	"Whole session should be face to face to address the social context of learning, peer learning and having a focused learning environment that is free of distractions".

b. Advantages

The Students' perception of learning had three subthemes based on analysis of transcribed data; effective interaction *[Participant # 14: I would say more interactive than routine sessions".]*, task-based learning and peer learning *[Participant # 6: "I had a very different learning experience in this contact session. I have realized that medical education is learned more by discussion than by self-learning. The innovative ideas pop up in team work and group learning. I have learned decision making and management skills and coping with learners with different styles".], [Participant # 11: "Break Out Rooms were most effective as there was chance of peer learning, group participation and collaborative work & learning".]*

The 'Contents and teaching strategies had three subthemes; 'Organized contents' *[Participant # 20: "The content of the session was brilliantly covered by the faculty".]*, 'Use of new technologies' and 'excellent faculty' *["The teachers are an excellent blend of experience and knowledge".]* The 'Educational environment' theme had two subthemes namely; 'Use of new technology' and 'Relaxed environment'. The comparison of these themes with quantitative data are shown in Table II.

c. Limitations

The students had their share of disadvantages too. The limitations opined included technical glitches, fast-paced teaching, difficult concepts, less focused and varied learning styles to name a few. The themes, sub-themes with excerpts are shown in Table 3.

3. 2nd Online Teaching Session

a. Advantages

The themes of advantages of 2nd online are the same as those of 1st online session. The sub-themes varied a little and are shown in Table 2. The students opined about educational environment being very favourable *[Participant # 8: "The most important element which promoted learning was a relaxed and conducive environment"]* and feasibility of attending this session *[Participant # 20: "It is feasible for me to take classes from home, as there is difficult to make arrangements for kids even for few days during COVID pandemic"]*. The details are given in Table 2.

b. Limitations

The limitations attributed by most of the participants to this online teaching session include difficult concepts, fast-paced teaching and technology glitches. (Table 3)

4. Evolving Perception of Students After Two Consecutive Online Teaching Sessions

The overall satisfaction regarding enhancement of learning by online approach with teachers' interaction and activities was inquired (Item 11). All participants (100%) agreed in unison about improvement of learning in the 1st contact session whereas 81% of same participants agreed that blended e-learning approach is a good learning environment.

Comparing the advantages of two consecutive e-learning sessions through quantitative data, the statistical difference was not found significant between two themes out of total three namely; 'Contents & teaching strategies' as well as 'Education environment (p value 0.44 & 0.36 respectively). It indicated that graduate students were satisfied in these two domains over the period of these two sessions. The satisfaction level being based on Likert scale has already been mentioned above in quantitative result section as mean values. However, the 'Students' self-perception of learning' varied between 2 online teaching session ((p value 0.03). Analyzing quantitative data, the students were

more satisfied in 1st online session (Mean: 4.37 0.42) as compared to 2nd online teaching session (Mean: 4.09 0.45) and is supported by analysis of transcribed qualitative data.

5. Recommendations by The Students

Session 1: The students suggested that reading material to be provided by the teachers a day or two earlier for better preparation by students rather than given on the spot just before assigning tasks. The suggested contents to be included in future sessions were SPSS, standard settings, research methodology and medical writing.

Session 2: The students suggested to introduce the hybrid model permanently for contact sessions with inclusion of online teaching session in addition to face to face after catering for technical glitches. Some of the students opined that the duration of contact session needs to be reduced to manage cognitive load. Difficult concepts are recommended to be revised specially research methodology by some. A few students (12% & 9% in 1st session & 2nd session respectively) chose not to give any suggestions.

D. Discussions

The present study highlights the advantages, limitations and recommendations regarding online teaching sessions from graduate students' perspective conducted due to lockdown of institutions during the COVID-19 era. The unique feature of this study was the significant diversity of the participants in age, educational background and professional appointments; all being enrolled in a graduate program of a reputed university of Pakistan and analyzing their perceptions. The perception of these MBBS/BDS graduate students were analyzed and compared at the end of two online teaching session of Masters in HPE.

According to the participants, online teaching session though adopted as an emergency plan; is a welcome change and can be included as a choice in hybrid model of this graduate degree. This modality of teaching was found to be flexible, feasible, resource-convenient with relaxed and conducive learning environment. These findings are in accordance to the other studies reported in literature [4,5]. In Mukhtar et al. local study, the feedback from both faculty and students were obtained. In our study, the students appreciated the opportunity of asynchronous learning as they could easily access the recorded lectures with uploaded learning materials which catered for the varied learning styles of the diverse students; the fact supported by other studies [2,3]. The mode of online teaching with these advantages over face to face teaching reinforces the objectives of this graduate program to inculcate the qualities of self-directed and long-life learning.

However, the participants viewed the long duration of sessions, inability to remain focused, facing frequent technical glitches, cognitive load and difficulty in grasping complex concepts as limitations of this teaching model. These findings are reported in literature as well [1]. In both session, online connectivity issues have been repeatedly highlighted and has been reported in literature as well. In Mukhtar et al. local study, additional limitations reported include lack of hands-on training and plagiarism in assignments as well [4].

One interesting finding was the perception of one dominant group of students which over-shadows others and resulted in discernment of unequal opportunities to participate in online interactive session. Though this can happen in face to face session too but in online scenario, may have been overlooked or could have been difficult to trouble-shoot due to fast-paced session.

When evolving perception of students was analyzed, the students were found more satisfied in 1st online session than 2nd based on quantitative data in the domain of 'Students' perception of learning'. The analysis of transcribed qualitative data however revealed that the major contributing factor was the inclusion of research methodology and development of original research question in the syllabus of 2nd online session. Despite a wide range of students in age, teaching experience and educational background, more than half of the participants did not have any experience in research. Even a few of the participants did not have even the theoretical background of research. This hampered their learning and increased the stress level *[Participant # 11 – 2nd online session: "Research intro and basics should have given more time and in this section specifically we need help as we are new in research especially Qualitative"].* Other contributing factors included the fast-paced teaching and cognitive load which has been reported in other studies as well [6]. However, regarding the perception of contents covered, teaching strategies and education environment, there was no statistical difference between the two online sessions.

The recommendations by the students reflect the need of stepping-up the technical support for students in the form of robust internet connection with back up. Moreover, duration of sessions can be reduced or the whole session can be split with a break of two-days in between.

E. Conclusions

This study highlights the evolving perception of graduate students and concludes that graduate students are increasingly satisfied in two consecutive online teaching sessions regarding conducive educational environment, educational strategies and contents covered. However, due to inclusion of

complex concepts and fast-paced teaching as well as their diverse educational backgrounds, their own perception of learning depreciated in 2nd session.

F. Limitations Of Study

The number of participants were limited as all the enrolled students of Masters in HPE of a single university; and not many, were included to ensure the exposure of the students to identical education environment. However, the findings of the study cannot be generalized to all the HPE programs of the region. Moreover, faculty members' perspective was not included due to time constraint. Despite the limitations, the study offers an insight for understanding the advantages, limitations and recommendation from adult learners' perspective for improvement in online learning and teaching.

G. Recommendations

It is recommended that further studies are carried out exploring the faculty's perspective regarding the benefits, challenges and recommendations of online teaching to graduate students of HPE. Moreover, comparison of face to face contact session and online teaching session and impact of online teaching on learning outcomes can be carried-out from perspective of all stake-holders specially the HPE graduate students with diverse educational background and teaching experience.

H. Impact of Study

The study highlights the strengths and limitations of graduate program of HPE in the domain of online teaching and learning specially from students' perspective. The study emphasizes that with experienced and skilled faculty, carefully planned contents and teaching strategies, even online teaching model can be robust resulting in satisfactions of graduate students with wide range of teaching experience and educational background.

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Impact on Mental Health of Undergraduates and The Ways to Cope Stress During Covid-19 Pandemic

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ABSTRACT

Objectives: to evaluate the mental health status of undergraduate's students of three different programs. To correlate the related factors influencing GAD-7 score and to assess the coping methods practiced by undergraduates during COVID-19 outbreak. Study design: cross-sectional survey. Place and duration of study: from 10th to 30th May -2020 during COVID-19 lock down period among public and private universities in Karachi. Methodology: it was conducted among the medical, dental and engineering students of private sector universities of Karachi. The GADS-7 (Generalized anxiety disorder scale 7-items) validated tool was used along with the demographic variables, related stress factors and the coping skills practiced. Total 571 questionnaires were found completed in all sections. Results: from the total students (n=132-23.1%) experienced mild, (n=343-60.1%) moderate and (n=78-13.7%) had severe anxiety level on GADS-7. All related stressors were significantly associated with GAD-7 scale at p-value of < 0.01. Moreover the results depicted that there was a moderate positive correlation found (0.489, 0.342, 0.310 and 0.328) for all related stressors. Taking breaks from watching, reading news about outbreak of COVID-19, meditation and engaging in some other activities were the most frequently used coping strategies among undergraduates'. Conclusion: study has shown 96.9% drastically augmented level of anxiety. There was significant difference found in mental health of all three cohorts. There was a moderate positive correlation found for all related stressors. Taking breaks from watching, reading news about the outbreak of COVID-19 was the most frequent coping behavior practiced by all students.

Keywords: *Coping method, COVID-19, dental undergraduates, medical undergraduate, mental health*

A. Introduction

The COVID-19 termed as novel COVID-19 has aggressively expanded in entire world from China in December 2019 [1] and in Pakistan from February 26-2020.[2] The COVID-19 expressed as acute pneumonic infections.[1] It is termed as novel due to its typical features of previously unknown MERS (Middle East respiratory syndrome) in 2011 and SARS-COV-2 (Severe acute respiratory syndrome coronavirus 2) in 2002-2003.On January 30-2020; WHO declared public health emergency of international concerns [2].

Worldwide; COVID19 causes 432,437 fatalities till June-15-2020 according to the global data on Govt of Pakistan reports [3]. These escalating figures placed a huge burden on healthcare system worldwide including Pakistan. There were total 2,729 deaths, 144,478 confirmed cases, 53,721 recovered cases of COVID-19 in Pakistan till June-15 -2020 [3]. The development of vaccination or treatment against the pandemic of COVID-19 is formidable challenge for international community of developed and developing countries. Strict precautionary measures are imposed in majority of countries where case incidences and case fatalities are increasing not on daily basis but on hourly basis [2].

The precautionary measures includes closure of educational institutes, physical distancing, frequent hand washing for 20 seconds, wearing mask, social-isolation and lock down is been practiced worldwide. The COVID-19 pandemic has dreadful consequences on every aspect of human life such as economical, healthcare, educational, social and cultural [2]. In Pakistan the educational institutes were closed from March18-2020 to implement physical distancing and to prevent the local transmission of COVID-19 among students. Therefore complete lock down was imposed from March 23rd-2020 which was converted into smart lock down on May 9th -2020 in Pakistan [4].

Fear is a virus which has completely infected the general population due to poor information processed on social media. People all around the world are facing various mental disorders during this COVID-19 outbreak such as anxiety, post traumatic disorder during self-isolation and quarantine because of the uncertain consequences of this outbreak [5]. Recent study revealed the crucial role of psychiatrists to assess the psychological status of vulnerable population such as healthcare personnel, older people, children [5].

The mental health of college students were assessed in recent study conducted in China; in which 24.9% of college students were experiencing anxiety during the COVID-19 crisis [6]. The mental health of the undergraduate student is also affected during this public health emergency due to the risk

factors such as academic delays, economic influence, daily life influence and lack of social support according to the study conducted in Faisalabad, Pakistan on pharmacy student [4]. However; the association of loneliness during this pandemic outbreak is unclear [7]. Though the impact of COVID-19 on psychological health of undergraduates' medical, dental and engineering students and the related stressors in Karachi Pakistan is unattended in literature to date and indeed it was the rationale of this study. There are various anxiety assessment tools used in literature to assess the psychological health of dental undergraduates [8,9].

The GAD-7 (Generalized Anxiety Disorder Scale) is 7 item validated tool used for screening and diagnosis of anxiety disorders. The GAD-7 is a modified version of "Patient Health questionnaire-PHQ" which was the first developed self-reported questionnaire to screen the general anxiety disorders in primary health care settings [6]. The GAD-7 tool is easy to score and takes approximately less than 3 minutes [6]. Now; GAD-7 is widely used in research and in clinical practice to screen anxiety disorders because of its efficiency and diagnostic reliability [6,10]

It was hypothesized that mental health of the undergraduate students is gravely affected during this public health emergency of COVID-19 outbreak. Therefore it is vital to address their stress coping ways and indeed it was the rationale of study Hence the primary objective of this study was to evaluate the levels of anxiety on GAD-7 scores. The secondary aim was to correlate the related factors influencing level of anxiety and o assess preferred coping methods practiced by dental, medical and engineering students of Karachi during COVID-19 outbreak.

B. Methods

This cross sectional survey was conducted online among dental, medical and engineering undergraduates' university students of private sector in Karachi through consecutive sampling technique. This study was executed from 10thto 30th May -2020 after approved from Bahria University Medical and Dental College (BUMDC) Karachi numbered; 50-2020. The administrative permission was obtained verbally before executing the study in engineering institute. The engineering students were included in the study to assess more comparative results. The inclusion criteria include the current medical, dental and engineering students of Private Sector Universities; repeaters and students from various allied subjects were excluded. Study consent was obtained from the participants by providing rationale of the study and anonymity of the subjects was assured. The sample size was calculated by standard formula for sample size calculation N= (Z) 2 x P (1-P) / d2 by keeping the prevalence of

24.9%.[6] The calculated sample size was 288 but as to bring more significant results and keeping in mind the 20% wastage; the augmented sample size was 600.

The questionnaire comprised of five sections; in first section the participants were requested for consent and rationale of the study was written. The second section comprised of the demographic parameters such as age, gender, undergraduate course, steady family income, live with parents and any relative infected with COVID-19. The third section was regarding the psychological assessment based on GAD-7 questionnaire. The GADS-7 is a validated tool and has established internal consistency of Cronbach's ⊠= 0.911) [6]. The psychological assessment was rated as normal, mild, moderate and severe. The minimum and maximum score was 0 and 21. The 0 score is rated as normal, 1-7, 8-14 and 15-21 scores were rated as mild, moderate and severe respectively. The fourth section was regarding the preferred stress coping method/behavior during COVID-19 lockdown period and nine options were provided. The options were as take breaks from watching, reading or listening to news/stories regarding pandemic, take deep breaths and stretch, meditate, exercise regularly, get plenty of sleep, try to do some other activities you enjoy, connect with others and any other coping skills apart from the mentioned options. The last section was inquired about the related stressors of anxiety and the responses were based on four point likert scale as 0-3 same as the responses of GAD-7 tool. Participants were rated the responses as experienced during last two weeks. The content validity of the study tool was reviewed by five public health experts of the institutes and the corrections was incorporated before conducting the pilot study among fifteen students of physiotherapy. The results of pilot study were not incorporated in final data analysis. Total 600 questionnaires were emailed among the targeted students. Total 571 questionnaires were found completed in all sections.

The data was analyzed on SPSS version 23. P-value <0.05 was considered as statistically significant. Mean was calculated for age, frequency was calculated for gender, undergraduate course, steady family income, lived with parents and any relative infected with COVID-19. Kolmogorov-Smirnov and Shapiro-Wilk test was used to check the normality of data. The parametric tests were performed when data was normally distributed and nonparametric analysis was carried out in case of not normally distributed. Association of demographic variables in three cohorts of students was analyzed with chi square and fisher exact test. Kruskal Wallis test was performed to compare the GAD-7 score among all three cohorts of undergraduate students. The linear regression analysis was performed for the related stressors such as academic delays, economic influence, social support and daily life influence and GAD-7

scores during COVID-19 among students of three programs and was expressed as R.

C. Results

The mental health of the students was assessed on GADS-7 scale as normal, mild, moderate and severe levels. From the total majority of students (n=343-60.1%) experienced moderate anxiety level on GADS-7 scale-Table-1.

Table 1. Undergraduates students with levels of anxiety on GAD-7

Levels of Anxiety	n= (%)
Normal	18 (3.2)
Mild	132(23.1)
Moderate	343(60.1)
Severe	78 (13.7)

There were total (n=203-35.5%) medical, (n=228-39.9%) dental and (n=140-24.5%) engineering undergraduates. The mean age of the students was 21.75± 2.39. Majority of participants were female 417 (73%) students. From the total subjects (n=453-79.3%) lived in urban areas, (n=401-70.2%) have steady family income, (n=501-87.7%) lived with parents and (n=120-21%) students' relative or acquaintance were infected with COVID-19 (Table-2).

Table 2. Levels of anxiety and demographic factors of students during COVID-19 pandemic

Demographic variables	N (%) 571	Normal (n=18)	Mild (n=132)	Moderate (n=343)	Severe (n=78)	P-Value
Gender						
Male	154 (27)	5(27.7)	28 (21.2)	101 (29.4)	20 (25.6)	0.05**
Female	417 (73)	13 (72.2)	104 (78.7)	242 (70.5)	58(74.3)	
Residential Place						
Urban	453 (79.3)	17(94.4)	117 (88.6)	260 (75.8)	59(75.6)	0.01*
Urban rural	87 (15.2)	1 (5.5)	11 (8.3)	62 (18)	13(16.6)	
Rural	31(5.4)	0 (0)	4 (3)	21 (6.1)	6 (7.6)	

Steady family Income						
Yes	401 (70.2)	16 (88.8)	111 (84)	219 (63.8)	56(71)	< 0.01**
No	170 (29.7)	02 (11.1)	21 (16)	124 (36.1)	23(29)	
Live with parents						
Yes	501(87.7)	16 (88.8)	126 (95.4)	292 (85.1)	67(85.8)	0.01**
No	70 (12.2)	02 (11.1)	6 (4.5)	51 (14.8)	11(14.1)	
Relative or family got COVID-19						
Yes	120 (21)	2 (11.1)	8 (6)	88 (25.6)	22(28.2)	< 0.01**
No	451 (78.9)	16 (88.8)	124 (94)	255 (74.3)	56(71.7)	

*Chi square ** Fischer exact test

Table-2 revealed the demographic factors which influenced levels of anxiety of during COVID-19 outbreak. Female students were found to have greater levels of severe anxiety as compare to male students. The students lived in urban areas, steady family income, lived with parents experienced mild levels of anxiety at (88.6%, 84%,95.4%) respectively. Living in urban areas, steady family income, lived with parents were the protective factors towards anxiety. There was statistically significant difference found in levels of anxiety and students' residential place, steady family income and lived with parents during COVID-19 on GAD-7 scale at p-value of 0.01, < 0.01 and 0.01 respectively. Relative or acquaintance got infected with COVID-19 was a risk factor for anxiety. In our study; (28.2%) students experienced severe level of anxiety as their relatives were infected with COVID-19 and calculated p-value was < 0.01.

There was statistically significant difference found between the GAD-7 score among all three cohorts of undergraduates at p-value=0.034. (Table 3)

Table 3. Comparing the GAD-7 score of three cohorts of undergraduate students

BDS n=228			P-Value
Median		10.0	0.03*
Percentiles	Q1	7.0	
	Q3	14.0	
MBBS n= 203			
Median		9.0	
Percentiles	Q1	7.0	
	Q3	13.0	
Engineering n=140			
Median		10.5	
Percentiles	Q1	8.0	
	Q3	14.0	
*Kruskal Wallis Test			

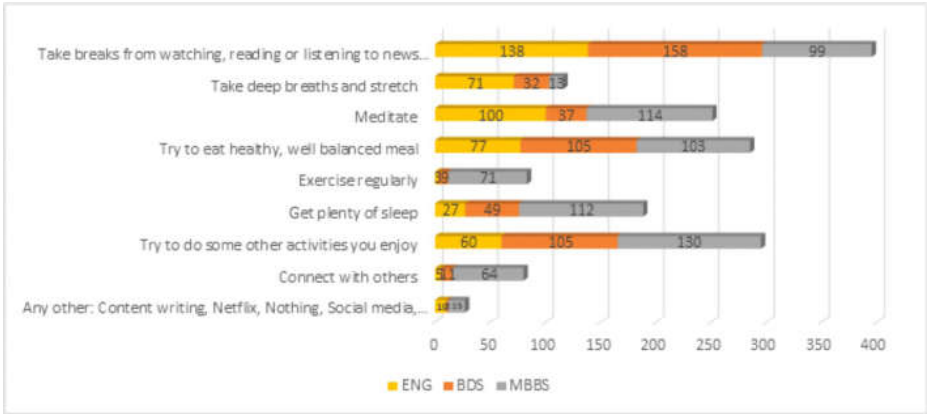
The related stressors of COVID-19 included economic influence, academic delays, influence on daily life and social support. The linear regression analysis revealed that the GAD-7 scores were positively associated with the related stressors at p-value of 0.000. There was moderate and positive correlation found as (0.489, 0.342, 0.310 and 0.328) for all related stressors and GAD-7 score. Moreover there was highest R score found as 0.489 for worried about economic influence-table 4.

Table 4. GAD-7 score and the related stressors of COVID-19

Related Stressors	GAD-7 Score R	P-Value
Worried about economic influences	0.489**	< 0.01
Worried about academic delays	0.342**	< 0.01
Influence on daily life	0.310**	< 0.01
Social Support	0.328**	< 0.01
R=Regression analysis**		

Graph-1 depicted that taking breaks from watching, reading news regarding the outbreak of COVID-19 was practiced by n=395 students; meditation by (n=231) students and engaging in some other activities were the most frequently used coping methods (n=295) practiced by all three cohorts of

students. On the other hand meditation and get plenty of sleep was the second most equally used coping behavior in MBBS and engineering students. Eat healthy and well balanced meal was approximately equally enjoyed among all three groups of students. There was statistically significant difference found at (p-value=< 0.01) between the copying methods of all three cohorts of students. Therefore the results of the study were accepting the research hypothesis that mental health of the undergraduates was gravely affected during this COVID-19 pandemic.



Chi-square-< 0.01

Graph 1. Coping ways during COVID-19 outbreak practiced by undergraduate students

D. Discussions

According to various studies; the mental health of undergraduate students was expressed as psychological distress, depression, high level of anxiety and stress due to routine challenges of teaching and assessment [11-14]. However; this study was aimed to assess the impact of COVID-19 outbreak on mental health of undergraduate students. Though this study has shown 96.9%level of anxiety during COVID-19 outbreak. The drastically increased level of anxiety in our study might be related to closure of educational institutes, lock down period and social distancing.

Interpersonal communication is decreased in this social distancing phase which is one of the important reasons to deteriorate the mental health of the students [6]. Even if emergency remote teaching has been executed in various educational institutes but it is difficult to conduct clinical content on virtual student environment which might be the reason of increase level of anxiety and fear of future employment [6]. The similar levels of stress were

reported by the study of Kevin A conducted Karnataka, India in 2020 [14] in this study, potential psychosocial, academic and environmental stressors was assessed by using Perceived Stress Scale (PSS) among n=301 MBBS students. Moreover; in this study Kevin A[14] reported higher PSS score in 2nd year MBBS students and the potential academic stressors were (92.4%) inadequate study leave, (84.1%) vastness of academic curriculum, (70.4%) of poor quality of food in mess or home, (60.1%), accommodation away from home, and (48.5%) students had high parental expectations [14].

However among medical students the global prevalence of psychosocial disorder was 33.8%.[15]In our study female students were found to be more affected with this pandemic situation comparing to male students. Increased level of anxiety reflecting compromised psychological health and analogous results were revealed from the study conducted in UK [7] during COVID-19 outbreak revealed that being a female of younger student age, having insufficient household income and having no employment were the risk factors for severe classification of loneliness and mental health ailments. Conversely no significant gender difference was found in our study as COVID-19 outbreak has similar psychological effects on general population irrespective to gender [6].

It is indicated in that demographic factors such as living in urban areas, steady family income, live with parents and any relative or acquaintance got infected with COVID-19 were associated with general anxiety disorder scale-7 items; as living in urban areas has conducive effects on student's anxiety level due to available resources [6,16]. Living with parents and sound family finance has positive effects on the stress level.

These results were comparable with the study of China [6]. Moderate anxieties in medical students was found higher and severe anxiety was greater in engineering students in our study. These results were contrary with the study of Naseem S in 2017 [17] and discovered the high prevalence of depression among medical students as compare to engineering students. According to literature more stress was observed in medical students as compare to engineering students [18]. According to the study conducted in Peshawar, Pakistan by Ali M in 2018 [19] revealed that among four medical students every three medical students were experiencing mental stress. On the other hand; increase psychological distress was found in medical/dental students of clinical years and in unmarried students according to the study conducted in Jeddah [20].

Our study findings demonstrated positive and significant correlation between related stressors and GAD-7 scores on mental health during

COVID-19. The worried about economic situation of the families influenced more on mental health of undergraduates than other stressors during the pandemic as people are isolated in their homes and complete and partial lock down was enforced and these results are in consistent with the study of China [6]. In literature [21] social support is known as health promoting agent and act as buffer against all life stressors across all cultures. However literature evident that the most usual effecting stressors were academic concerns, fear of poor performance in examination, lack of recreation, loneliness, living in hostel or rental houses and family problem [21].

In contrast recent study reported that facing financial problem, poor social support, lack of interest in their field of study and unresolved conflict with roommate were the risk factors of stress among engineering students in Ethiopia [22]. To get rid of the stress is really very essential to evade the emotional losses and find the appropriate behavior or skill to deal with public health emergency among undergraduates. Otherwise this stress can ends up in "increased utilization of maladaptive (dysfunctional) coping methods" [22].

The most preferred coping skills practiced by students in this study were taking breaks from watching news and television along with getting engaged in activities they enjoy. According to study conducted in Brazil; [23] the escape and avoidance coping skills enable students to mindfully handle the stress. As the alarming sensational headline regarding COVID-19 pandemic have multiply the stress level [6]. However in a non pandemic conditions positive reframing, praying or spiritual activity, followed by watching movies, communication with friends and family support was commonly practiced coping skills [14]. In our study, meditation and get plenty of sleep was the second most equally used coping behavior to reduce the stress caused by this outbreak. Spiritual activity affects negatively and positive thinking helps medical students to reduce stress and surprisingly the strong coping strategy reported was social support. Social support from love partner or friend is buffering stress related problems among youngsters and not the family support [14].

According to the study of [24] conducted during COVID-19 among nurses to assess their coping strategies and emotional response; it indicated that nurses have strong emotional response and were using problem focus coping strategy.

The limitation of the study cannot be ignored. Due to subjective nature of study it was unfeasible to assess temporal relationship between mental health and steady family income, living with parents, preferred coping skills. The causal sequence can be observed by adding the variables of students of

private and public sector, year of undergraduate study, increase sample size, academic performance, and curriculum modification such as remote teaching in public health emergencies and health promoting behavior during COVID-19 outbreak, [5] motivation and validated coping tool in future. The data can be generalized to the entire undergraduate students of Pakistan cautiously due to the pandemic outbreak

It is recommended to start systemic online counseling sessions in this remote educational era so that the students can seek assistance from professional counselors to get appropriate psychological support or care [11]. There are universities having strong mentoring system such as BUMDC; to provide one to one positive reinforcement to every undergraduate. Additionally, universities should work on to modify the stressful academic content and try to implement necessary changes. As there is a change in learning environment, new engaging strategies of assessment, teaching and learning should be incorporated and a multidisciplinary approach would be fruitful and appropriate.

E. Conclusions

Study has shown 96.9% drastically augmented level of anxiety. There was significant difference found in mental health of all three cohorts. There was a moderate positive correlation found for all related stressors. Taking breaks from watching, reading news about the outbreak of COVID-19 was the most frequent coping behavior practiced by all students.

Conflict Of Interest

Not declared

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Preceptor-Learner Collaborative Learning at The Interprofessional Demonstration Case Discussion

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ABSTRACT

Background and aims/objectives: the demonstration case discussion is currently the most common interprofessional education (IPE) model. However, the effectiveness of the demonstration case discussion for preceptor-learner collaborative learning is still unknown. This study tries to explore the effectiveness of preceptor-learner collaborative learning at the interprofessional demonstration case discussion. Methods: this is a correlation descriptive study. We attempt to develop the "self-assessment effectiveness scale of the Interprofessional demonstration case discussion" according to the IPEC four core abilities. The structured questionnaire contains background variables and self-assessment effectiveness scale. There are 16 items in the effectiveness scale. The average CVI scored by the experts was 0.93. There are two factors extracted by exploratory factor analysis, including Interprofessional observation (IPO) and Interprofessional application (IPA), and their total explanation variation is 68.61%. Cronbach's coefficient of the scale is 0.96. The results showed the effectiveness scale has good validity and reliability. Results: a total of 184 participants joined in this study in June-July 2020. The results showed the preceptors' scores are significantly higher than the learners. The preceptors' scores of most items are significantly higher than learners ($p<0.05$) except item IPA 7, IPA 8 and IPA 11. However, whether "preceptor-learner collaborative learn", whether "read the abstract in advance", and "the times of participation", there were no significant differences in the scores of each item. There is a significant difference in whether the personnel who read the case report before the meeting can actively participate in the meeting (F value=9.24, p= 0.004). Conclusion: the results show preceptors' self-assessment effectiveness

is significantly higher than learners. Preceptors should take the advantages of their own experience guide learners to observe and apply in their clinical.

Keywords: *collaborative learning, interprofessional education, IPEC*

A. Introduction

Effective interprofessional education (IPE) enables healthcare professionals (HCPs) to perceive patients' integrated care needs, organize interdisciplinary teams, and provide patient-centred interprofessional collaborative practice (IPCP) [1-3]. The demonstration case discussion is currently the most common interprofessional education (IPE) model. The Interprofessional Education Collaborative (IPEC) in the United States proposed in 2016 the core competencies for IPCP that HCPs should possess. The core competencies are: Values/Ethics for interprofessional practice (VE), Roles/Responsibilities (RR), Interprofessional communication (CC), Team and team work (TT) [4,5]. Although Taiwan has adopted the "KAS" (Knowledge, Attitude, and Skill) thinking model to design IPE courses and evaluate the effectiveness. However, the effectiveness of the aforementioned HCPs demonstration meeting for clinical teachers and trainees is still unknown. In addition, how the curriculum design and evaluation methods correspond to the four core competencies of IPEC has not been explored. Therefore, this study expects to explore the effectiveness of preceptor-learner collaborative learning at the interprofessional demonstration case discussion

B. Methods

1. Research Design and Objects

This research is a correlation descriptive study. study with purposive sampling. The research site is a medical centre in the southern Taiwan. The research objects are HCPs engaged in clinical medical care, including physicians, clinical teachers and post-graduate staff in various health professions. A total of 184 questionnaires were collected from April to June 2020.

2. Research Tools

The questionnaire contains basic information and a self-developed "Scale for Effectiveness of IPCP Demonstration Meeting" according literature review. A total of 22 questions, using the Liker scale with five-point, from 1 point "strongly disagree" to 5 points "strongly agree", the higher score indicate the higher effectiveness of self-evaluation.

We invite six experts to evaluate the content and the average CVI of the original scale was 0.83. The CVI values of item 1 to item 16 of this scale are all higher than 0.8 and shall be retained. The CVI values of item 17 to item 22 are 0.67, 0.50, 0.50, 0.50, 0.67 and 0.67 respectively, which are all lower than 0.8, so they are deleted. After deleting items with a CVI value lower than 0.8, the average CVI scored by the experts was 0.93.

EFA was used to test the validity of the scale. After factor analysis, 16 questions are retained, and the names of the question items contained in the facet are defined as interprofessional application (IPA) and interprofessional observation (IPO). The eigen-value of the two domains behind the axis are 9.92 and 1.06 respectively, the explained variance is 61.98% and 6.63%, and the total variance is 68.61%. The Cronbach's coefficient of "Scale for Effectiveness of IPCP Demonstration Meeting" is 0.96, and the Cronbach's coefficients of IPA and IPO are 0.94 and 0.91 respectively.

3. Statistical Methods and Ethical Considerations

In this study, exploratory factor analysis (EFA) was used to test the scale. This study was reviewed by the Institutional Review Board (IRB) of the research site (IRB number: KMUHIRB-E(I)-20190384) and was implemented after approval.

C. Results

1. Basic Information of Participants

A total of 184 participants joined in this study. Nurses accounted for the largest number of participants (59.2%), other healthcare professions accounted for 22.8%, and physicians accounted for 17.9%. Clinical teachers accounted for 37.2% and trainees accounted for 54.6%.

2. The Effectiveness of Preceptor-Learner Collaborative Learning

In this study, the basic data and the results of the scale was analyzed at the same time. It was found that clinical teachers' performance in IPO (mean ± SD = 4.7 ± 0.4), IPA (mean ± SD = 4.6 ± 0.4) and overall score (mean ± SD = 4.6 ± 0.4) were significantly higher than the trainees ($p<0.5$). The clinical teachers' scores of most items are significantly higher than trainees except item A7, A8 and A11.

In addition, "whether clinical teachers lead trainees to study together", "whether to read the case summary beforehand" and "participating times in the IPCP demonstration meeting" have no difference in scores. The question item "Is there a case summary read beforehand" is compared to A3 "I can raise

patient care issues from the standpoint of a spokesperson in the discussion of the clinical medical team" reaching a significant level (F value= 9.24, p= 0.004). Therefore, there is a significant difference in whether the personnel who read the case before meeting can actively participate in the meeting and raise the care of the patient.

D. Discussions

The IPCP demonstration meeting is the most commonly used IPE and training mode in Taiwan. A detailed analysis found that the timing of clinical teacher-trainee co-learning did not produce significant results. There may be some reasons. Firstly, each clinical teacher may not have the ability to conduct pre-meeting discussion and post-meeting reflection. Secondly, whether clinical teachers conduct co-learning at an appropriate time according to the recommendations. Lastly, a more effective teacher-trainee co-learning model need to be further explored. Exploring deeper teacher-trainee co-learning benefits through qualitative feedback will be a future research direction. It is recommended that exploring deeper teacher-trainee co-learning benefits through qualitative feedback.

E. Conclusions

The results show the measurement results can be applied to the curriculum design and practical application of IPE that can enhance and enrich IPE knowledge. The preceptors' self-assessment effectiveness is significantly higher than learners. Preceptors should take the advantages of their own experience guide learners to observe and apply in their clinical.

Authors' Contributions

Study design, data collection and analysis, and manuscript preparation: C. L. L., J. C. Y., & Y. C. L.

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Relationship Between Stress, Anxiety, and Depression with Learning Achievement in Medical Student During Online Learning in The COVID 19 Pandemic Era

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ABSTRACT

The 2019 corona virus disease (Covid-19) pandemic force the colleges to conduct online learning. Online learning forces the students to be independent, adaptive new applications, and have a strong internet network. This causes stress, anxiety, and even depression in students, which may affect their academic performance. To analyze the relation between stress, anxiety, and depression with learning achievement in medical students of Muhammadiyah Surakarta University in Covid-19 pandemic era. This study used a cross sectional study design and was conducted in November 2020. There were 151 respondents in 3rd, 5th, and 7th semester who participated in this study and taken using stratified random sampling. The data collection of stress, anxiety, and depression scores was conducted using DASS 42 (Depression, Anxiety, Stress Scale 42) questionnaires and academic performance data using documentation of first blok exam scores in odd semester, there are immunology, ENT (Ear Nose Throat), and psychiatry. The data were analyzed using chi square and logistic regression. Chi square test results obtained stress p = 0.001 and OR = 3,011, anxiety p = 0.001 and OR = 3,054, and depression p = 0.094. Logistic regression test results of p value for stress, anxiety, and depression were obtained 0.024, 0.033, 0.172, and R2 value of 15%, so the equation Y= -1,314 + 0,831X1 + 0,797X2 + 0,542X3.

Keywords: *Stress, anxiety, depression, learning achievement*

A. Introduction

Coronavirus disease 2019 (Covid-19) outbreak that has hit 215 countries in the world, presents its own challenges for educational institutions, especially universities. The government has banned crowding, social restrictions, maintaining physical distance, wearing masks, and always washing hands to fight Covid-19. The ministry of education and culture has banned universities from conducting lectures face-to-face and ordered to hold lectures or online learning [11]. Universities are required to be able to do online learning [7].

Online learning systems can affect a student's mental health condition. Learning tasks are the main factors causing stress during the Covid-19 pandemic [13]. Online learning makes students feel anxious because they have to adapt to applications that they have never used before [5]. Unstable networks during online learning or exams can add to student anxiety. Prolonged and constantly occurring anxiety disorders can cause stress that interferes with daily activities. Untreated if not treated immediately can lead to more serious psychological problems such as depression. These psychological disorders can interfere with learning by lowering the ability to focus, decrease memory, interfere with the ability to connect one thing with another, and can decrease the arousal or passion to do activities. This can affect student outcomes or achievements [8].

Learning achievement is one of the indicators to know the success of an educational process where high learning achievement indicates good knowledge. Learning achievement in Indonesia is important to improve because it can affect the competitiveness of other countries. According to data obtained from the Global Talent Competitiveness index report 2019 ranked Indonesia at 67th out of 125 other countries with a score of 38.61 [10].

Based on Maia & Dias research results (2020) showed that students evaluated during the pandemic showed much higher increases in anxiety, depression, and stress. Research conducted by Hasanah *et al.* (2020) obtained the results of research on the majority of psychological problems experienced by students in the process of online learning, namely anxiety.

Research conducted by Dewi (2020) shows that student achievement during the online learning period is caused by the Covid 19 pandemic at most on the achievement index of 3.00-3.49 as much as 52% at mild anxiety of 78.9%. Research conducted by Febriana (2018) showed that there is a significant relationship between stress and learning achievement. Zavera (2018) stated that there is a significant relationship between anxiety levels and student academic achievement in Bandung. This is in line with research conducted by Hasibuan & Riyandi (2019) which stated that there is a significant relationship

between the level of anxiety symptoms and the student achievement index of the Faculty of Medicine, Muhammadiyah University of North Sumatera.

Researchers are interested in conducting research because there is still no analytical research on the relationship of stress, anxiety, and depression to the learning achievements of students of the Faculty of Medicine during online learning in the Covid-19 pandemic.

B. Methods

This research uses analytical observational research design with cross sectional approach. This research method was used to look at the relationship between stress, depression, and anxiety as free variables with learning achievement as variables bound at one time. This research was conducted online using google form while complying with existing health protocols. The implementation time is November 2020. The subject of this study was a student of Doctor Education Program of the Faculty of Medicine, Muhammadiyah Surakarta University as many as 151 respondents. The restriction criteria in this study include which consists of: active colleges Doctor Education Study Program Faculty of Medicine, Muhammadiyah Surakarta University, physically and spiritually healthy, willing to be a research respondent, and follow online learning activities. Exclusion criteria consists of: colleges who has a previous history of psychiatric disorders, does not fill out the entire questionnaire, and who in the last 3 months experienced the death of a family member / occurred a parent divorce. Respondents to this study were selected with stratified random sampling techniques. Data collection of stress, anxiety, and depression using DASS 42 questionnaire and learning achievement data using the first blok exam score in this odd semester, namely: immune, ENT (Ear Nose Throat), and psychiatry blok. Data is analyzed using computer software. Bivariate analysis using Chi Square. Multivariate analysis using logistic regression. This research has been approved by the Health Research Ethics Commission of the Faculty of Medicine, Muhammadiyah Surakarta University with number 3084/B.1/KEPK-FKUMS/XI/2020.

3. Results

Table 1. Characteristics of respondents

Variable	Amount	Present (%)
Stress		
Stress	71	47,0
No Stress	80	53,0
Anxiety		
Anxious	83	55,0
No Worries	68	45,0
Depression		
Depression	39	25,8
No Depression	112	74,2
Learning Achievements		
Good	87	57,6
Not Good	64	42,4

Data from table 1 shows the number of respondents in the study was 151 students. Students who experienced stress as much as 71 (47.0%), students who experienced anxiety as much as 83 (55%), students who experienced depression as much as 39 (25.8%), and students who received not good learning achievement as much as 64 (42.4%).

Table 2. Results of bivariate analysis of stress with learning achievement

			Learning achievements			Value P	OR value
			Good	Not good	Total		
Stress	No stress	N	56 (37,1%)	24 (15,9%)	80 (53%)	0,001	3,011
	Stress	N	31 (20,5%)	40 (26,5%)	71 (47%)		
	Total	N	87 (57,6%)	64 (42,4%)	151 (100%)		

In table 2 shows data that out of 80 respondents who did not experience stress there were 24 respondents who got not good learning achievements (15.9%), while out of 71 respondents who experienced stress there were 40 respondents who got not good learning achievements (26.5%).

Table 3. Results of analysis of anxiety bivariate with learning achievement

			Learning feast			Value P	OR value
			Good	Not good	Total		
Anxiety	Not anxious	N	49 (32,5%)	19 (12,6%)	68 (45,0%)	0,001	3,054
	Anxious	N	38 (25,2%)	45 (29,8%)	83 (55,0%)		
	Total	N	87 (57,6%)	64 (42,4%)	151 (100%)		

In table 3 showed data that out of 68 respondents who did not experience anxiety there were 19 respondents who got not good learning achievements (12.6%), while out of 83 respondents who experienced anxiety there were 45 respondents who got not good learning achievements (29.8%).

Table 4. Results of analysis of depression bivariate with learning achievement

			Learning achievements			Value P	OR value
			Good	Not good	Total		
Depression	Not depressed	N	69 (45,7%)	43 (28,5%)	112 (74,2%)	0,094	0,534
	Depression	N	18 (11,9%)	21(13,9%)	39 (25,8%)		
	Total	N	87 (57,6%)	64 (42,4%)	151 (100%)		

In table 4 showed data that out of 112 respondents who did not experience depression there were 43 respondents who got not good learning achievements (28.5%), while out of 39 respondents who experienced depression there were 21 respondents who got not good learning achievements (13.9%).

The results of bivariate analysis in this study showed that all variables are eligible to be included in multivariate analysis $p<0.25$ value and variable to 3 outcomes. The multivariate analysis used is logistic regression analysis because the variables tied to this study are categoric variables.

Table 5. Multivariate analysis results

Variable	B	Value p	Exp (B)	95.% C.I for EXP (B)		
				Minimal	Maximum	
Stress	0,831	0,024	2,296	1,118	4,717	
Anxiety	0,797	0,033	2,219	1,065	4,627	$R^2 = 0,150$
Depression	0,542	0,172	1,719	0,790	3,743	
Konstanta	-1,314	0,000	0,269			

In table 5 variable stress shows a value of p= 0.024 (p<0.05) which states there is a relationship between stress and learning achievement and in the anxiety variable shows a value of p=0.033 (p<0.05) which states there is a relationship between anxiety and learning achievement, but the depression shows the result of p=0.172 (p>0.05) which states there is no significant relationship between depression and learning achievement in students of the Faculty of Medicine, Muhammadiyah Surakarta University during online learning.

D. Discussions

The results of bivariate analysis between stress and learning outcomes obtained a value of p= 0.001 (p<0.05) and so it can be concluded that there is a meaningful relationship between stress and learning achievement OR= 3,011 so that respondents who experience stress will be at risk 3,011 times with not good learning achievement. The results of this study are in line with Febriana (2018) at the Faculty of Medicine, Muhammadiyah University of Surakarta, which states that there is a meaningful relationship between stress to learning achievement indicated by the value p=0.001 (p<0.05). Pratama (2014) also mentioned that there is a significant relationship between stress levels and learning achievement with a value of p= 0.004 and mentioned that the negative relationship direction means that the higher the student stress level, the lower the learning achievement. Stress in the academic environment is the situation most often experienced by every student up to the student, whether studying at the school level or in college. This is due to the many academic demands that must be faced, such as exams, assignments, practicum and many other [23].

There are many relationships between learning achievement and the soul, namely psychic factors have a very important role in the learning process and its results. Moods, emotions and feelings are decisive. Psychological circumstances can affect behaviour, the relationship between an individual and the achievements achieved by a person such as achievement in student learning achievement. Things that affect learning achievement due to impaired physical health due to stress experienced by a student can cause students easily tired, difficult to concentrate, and headaches that interfere with the student during the learning process or during the exam resulting in the student's learning achievement is not maximal. Students with lower stress levels achieve good learning achievement [17].

The results of bivariate analysis between anxiety and learning achievement obtained a value of p= 0.001 (p<0.05) so that it can be concluded that there is a meaningful relationship between anxiety and learning

achievement and OR= 3,054 so that respondents who experience stress will be at risk 3,054 times with not good learning achievement. Kusumastuti (2020) stated that from the results of the review literature obtained a value of $p<0.05$ which means there is a significant relationship between anxiety and learning achievement. Based on systematic reviews anxiety has a negative relationship with student academic achievement. This means that the higher the anxiety experienced by students, the lower the level of academic achievement.

Azizy *et al.* (2019) also mentioned that there is asignificant relationship between anxiety levels and academic achievement had p value= 0.021 ($p<0.05$). Syokwaa (2014) also stated that there is a significant relationship between anxiety levels and academic achievement indicated by a value of p= 0.000 ($p<0.05$). High anxiety influences a person to work effectively, affecting academic achievement. Students who are able to maintain physical and psychological health can achieve better academic achievement [1]. High anxiety can affect memory performance, decrease memory, and interfere with learning concentration [22].

The result of bivariate analysis between depression and learning achievement obtained p value= 0.094 ($p>0.05$). This result is in accordance with Septianto's research (2014), that there is no relationship between depression and student learning achievement of UIN Syarif Hidayatullah Jakarta Faculty of Medicine indicated by the results of p= 0.666 ($p>0.05$). The same result was also obtained in maulida research results (2016) obtained a value of p= 0.0912 ($p>0.05$), which means there is no significant relationship between depression and student learning achievement doctor education University of Tanjungpura. Depression is just one of the many other factors that can affect learning achievement. These factors include intelligence, physical health, high motivation, and environmental factors such as the learning environment and residence [15].

The results obtained are not in line with Praptikaningtyas's research (2019) showed from analysis correlation results obtained p value= 0.004 ($p<0.05$), which means there is a relationship between significant variables. From these results it is concluded that the nul hypothesis is rejected and alternative hypotheses are accepted so that there is a relationship between depression rates in adolescents and academic achievement. The correlation test also showed a correlation coefficient value of -0.226 which stated that the relationship between depression levels and academic achievement had a weak relationship. Negative signs (-) in the correlation coefficient have a negative relationship meaning, which means when the level of depression obtained is low, then the academic achievement obtained will be high.

The multivariate analyzed with logistic regression obtained meaningful value only on variable stress and anxiety only. From the table can be obtained the value of R2 of 0.150, which means that in the three variables free together can affect the bound variable by 15%, while for 85% it is influenced by other variables that i do not research. Obtained B values on the three variables are positive value 0.831, 0.797, and 0.542 so that the logistics regression equation obtained this research Y= -1.314 + 0.831X1 + 0.797X2 + 0.542X3.

In variable stress obtained a value of p= 0.018 (p<0.05), which means there is a meaningful relationship between stress and learning achievement. This is in line with research conducted by Febriana (2018) which stated that stress and learning achievement have meaningful relationships, evidenced by the results of logistical regression value p= 0.004 (p<0.05). Asshiddiqie (2019) also mentioned that there is a meaningful relationship between stress and learning achievement in students of the Faculty of Medicine, Muhammadiyah University of Surakarta with a value of p= 0.000 (p<0.05) in the results of logistic regression. Stress can affect students' learning interests. Interest in learning is a tool to trigger student learning motivation so that there are several factors that can optimize learning motivation, namely goals, learning ability, student conditions, environmental conditions, and dynamic elements in learning. Many of these incidents caused among them not to continue their studies, not the spirit of learning and others [4].

The results of the logistics regression test of anxiety variables get a value of p= 0.047 (p<0.05) which means there is a meaningful relationship between anxiety and learning achievement. Hasibuan & Riyandi (2019) also mentioned that there is a significant relationship between anxiety and learning achievement indicated by a value of p=0.05. Factors that influence the difference in anxiety levels of Faculty of Medicine students include three areas, namely lifestyle problems, learning style, and psychological factors. Lifestyle problems include lack of rest and physical activity, bad nutrient intake, and inefficient time management. Ineffective learning strategies such as studying all night before exams, lack of understanding and material review are also important factors in the onset of anxiety. Psychological factors that play a role in the occurrence of anxiety are negative and irrational thoughts about the course of the exam, and fear of not being able to control the situation at the time of the exam.

Depression variables do not get meaningful results indicated by the value p= 0.152 (p>0.05). This is in line with Setiawan's research (2015) which stated that there is no meaningful relationship between depression and student learning achievement that is indicated with a value of p= 0.5 (p>0.05). The research conducted by Saputri (2017) showed the value of p= 0.497 (p>0.05),

this indicates that there is no meaningful relationship between depression and learning achievement.

E. Conclusions

From the study it was concluded that there is a significant relationship between stress and anxiety to learning achievement and anxiety has a greater influence compared to stress on student learning achievement during online learning. This research can be developed again by adding a wider sample so that it is not limited to one institution / faculty or one place and is expected to expand the categories of stress, anxiety, and depression.

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Covid-19 The Pinnacle of Technology Enhanced Teaching-Faculty Needs Assessment

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ABSTRACT

Introduction: undergraduate Medical education in Pakistan like most countries world-wide is a full time on campus program. The curriculum design, teaching strategies, assessments and evaluations are planned according to face to face teaching learning format. With the onset of the Covid-19 pandemic all educational institutions scrambled to convert their programs to a compatible online version. Now that the urgency has waned it is time to do a comprehensive faculty needs assessment regarding technology enhanced teaching to equip them with the appropriate skill and strengthen their self-efficacy to avoid faculty stress and burn out. The purpose of this study is to assess the training needs for technology enhanced teaching in faculty members of academic medical centres in Pakistan. Material and methods: a randomized survey of faculty members of different medical and dental colleges across Rawalpindi, Islamabad from various institutions was done to assess the faculty teaching experience during Covid-19 pandemic and the faculty needs coming forth. These included members currently teaching undergraduate students for more than 2 years with regular class schedule. The survey questionnaire used was validated by 3 experienced medical educationists and piloted on 5 faculty members. Institutional Review board approval was sought from STMU and RMU. Results: ninety faculty members from various medical and dental colleges responded with 70%female participants and 30% male participants. The survey questionnaire had four main heads regarding faculty training needs: software (mean score 3.8), modes of information transfer (Mean score 4.1), assessments (mean score 4), research (mean score 4.2), providing feedback (mean score4) and student engagement (mean score 3.9). Conclusion: the

faculty has courageously overcome the barriers to technology assisted learning in the COVID emergency. However focused and committed faculty training to improve the teaching effectiveness and skills in technology enhanced teaching are the need of the hour.

Keywords: *Technology enhanced teaching, teaching methodologies, faculty training, faculty needs*

A. Introduction

Undergraduate Medical program is a very robust program worldwide [3]. The curriculum design, teaching strategies, assessments and evaluations are planned to address competencies of knowledge, skills and attitudes to ensure holistic learning [15]. With the onset of the Covid-19 pandemic educational institutions world-wide faced two choices. First to delay all teaching and wait for the pandemic to pass and second to use alternatives to face to face on campus curriculum delivery. All institutions had uncertainty regarding pandemic hence they scrambled to convert their programs to a compatible online version. For most institutions the decisions were taken in urgency and the technology enhanced curriculum delivery was initiated keeping student needs and requirements in the fore front [12].

Faculty as a stakeholder was a neglected entity. They were the service providers and sacrificed a lot of time and effort to make the online teaching a success [11]. As the first wave of panic and urgency has waned it is time to do a comprehensive faculty needs assessment regarding technology enhanced teaching to equip them with the appropriate skills [5]. During the last few months, they had struggled to teach the content they are expert at. But with the change in the mode of information transfer they felt less confident in their job. Their stress level and anxiety increased as they tried to familiarize themselves with new technology and strengthen their self- efficacy to avoid faculty stress and burn out [2].

The purpose of this study is to assess the training needs for technology enhanced teaching (TET) in faculty members of academic medical centres in Pakistan, as well as the challenges, support and pathway of self- learning the faculty adopted to speed learn TET in face of the COVID 19 pandemic.

B. Methods

1. Settings and Participants

Purposive sampling of faculty of both private and public medical college of Rawalpindi and Islamabad was done. Faculty members of Shifa college of Medicine, Shifa College of dentistry, Rawalpindi medical college, Nafees medical college, Riphah medical college, Foundation medical college and Hazrat bari Sarkar Medical College were sent survey form. To maximize response participants fulfilling eligibility criteria were sent an email message enquiring their willingness to be part of study. This was followed by sending them the survey link a week later. The participants were sent a reminder two weeks after sending the survey form. A total duration of 4 weeks was allowed for response. However, for faculty members with unknown emails the questionnaire was printed and hand filled in person by the principal investigator (PI) followed by data entry by PI.

The study protocol was approved by the Institutional Review Board of Shifa Tameer e miIllat university Islamabad, Pakistan. Informed consent was taken electronically from all participants.

2. Data Collection and Analysis

A Survey questionnaire was developed by the authors. It was reviewed and validated by 5 senior medical educationists. The questionnaire was then piloted on 4 faculty members and their observations regarding attempting the survey form on google document were co-opted. Survey items assessed: faculty experience of technology enhanced teaching in the COVID era, their ability to use the various e- teaching interfaces, their degree of satisfaction with their own competence in using e-teaching and their learning needs. Survey items included demographic data along with questions requiring 5-point Likert type scale questions with responses ranging from1 (strongly disagree) to 5(strongly agree) as well as a few open-ended questions (Supplemental Appendix S1). The 5-point Likert type scale with the above anchors was used in survey as this type of evaluation is easy to attempt rather than a yes no. Faculty needs on 7 components of technology enhanced teaching and evaluation was enquired.

Data was analysed using Microsoft excel version and SPSS version. Demographic data was analysed using percentages and mean. The quantitative Likert scale questions were analysed using t test and P value. Our survey included open ended questions to gather data that we felt was not appropriately recorded on Likert scale questioning.

C. REsults

A total of 90 completed forms were analysed. The Cronbach alpha for the questionnaire was 0.952. Demographic data of the survey population is given in table 1.

Table 1. Demographic data

Gender	**Frequency**	**Percentage**
male	27	30
female	63	70
Designation		
Professor	8	8.9
Associate Professor	9	10
Assistant Professor	29	32.2
Senior Registrar	9	10
Instructor/ medical officer	35	38.9
Age	**Mean**	**Standard deviation**
	38.1889	7.633
Teaching experience in years	**Mean**	**Standard deviation**
	8.34	6.351
Satisfaction of faculty with software	**Mean**	**Standard deviation**
Designation		
Professor (assistant and associate)	3.87	0.885
Junior faculty (registrar, demonstrators)	3.98	1.11

Sixty six percent participants had a university email address, 56.6% had attended one or more workshops on technology enhanced teaching and 31.1% said that they had attended some workshops and seminars related to technology-based student assessments. However, 23.3% participants said that their institution arranged formal faculty training for online sessions before actually designating the task of online teaching during COVID-19.

The faculty was enquired who was their first choice for trouble shooting of online session glitches? 51.1% took help from colleagues and IT department but 47% said that their colleagues were enough for trouble shooting. The commonest issue faced during sessions was network and connectivity (27%) issues during their lecture. The means and median points of respondents' current knowledge and future needs for various educational domains (Cronbach's alpha=0.968).

Table 2. Correlation between software currently being used for teaching purpose

Designation	ZOOM	Google classroom	Microsoft teams	Zoom and Microsoft teams	Zoom and Google classroom	Google classroom and Microsoft team
Professor (assistant and associate)	5	7	5	7	22	0
Junior faculty (registrar, demonstrators)	6	8	7	5	15	3

Table 3. Faculty needs in software training

Faculty interested for training in using	Mean	Stan. Dev.
Google classroom	3.97	1.12
Microsoft Teams	3.78	1.34
Moodle	3.87	1.24
ZOOM	3.29	1.41
Socrative	4.28	1.02
Padlet	3.98	1.12
Cumulative software training need in Assistant, Associate and Professor	3.88	0.94
Cumulative software training need in instructors and registrars	3.82	0.66

When the mean scores of software and e- educational strategy training were correlated with designation of the teachers, the need for training mean score was higher for all components in the senior group (Assistant professor and above) rather than the junior (demonstrators and Registrar) group however this difference did not reach statistical significance.

Table 4. Faculty e-educational strategy training

Faculty interested for training in online	Mean	Standard deviation
Voice recording with lectures	4.33	0.92
SGD and PBL	3.83	1.27
Teaching e- clerkship	4.00	1.19
Teaching virtual patients	3.82	1.19
Others	3.94	1.18

Table 5. Comparison of means between junior and senior faculty

Cumulative training need		Mean	Stan. Dev
Assessment	Ass, Assoc. & Professor	4.01	1.01
	Instructors & registrars	4.16	0.82
Mode of Information Transfer	Ass, Assoc. & Professor	4.14	0.94
	Instructors & registrars	3.81	0.81
Research training	Ass, Assoc. & Professor	4.06	0.82
	Instructors & registrars	4.27	0.59
Feedback training	Ass, Assoc. & Professor	4.10	0.88
	Instructors & registrars	3.96	0.73

The mean score by faculty for needs in training regarding student engagement and motivation were 4.14 in senior faculty and 4.07 in instructors and registrars.

Table 6. Method of training for faculty needs

	Workshop	Webinar	Lectures	Asynchronous	Synchronous	Face to face
Strongly agree	63.3%	40%	11.1%	52.2%	35.6%	44.4%
Agree	17.8%	25.6%	14.4%	26.7%	10%	14.4%

D. Discussions

Covid-19 pandemic halted the world and even developed countries seemed un-prepared for it in many ways. As the world struggled to find a cure many countries went into a lockdown to prevent and slow the spread. Due to COVID, educational institutes closed till indefinite period of time. Thus, came the debate of "how to smoothly run the education program" and the importance of online education.

The debate of training faculty to teach undergraduate medical competencies effectively online has closely followed online learning student issues. In our survey on use of different teaching soft wares ZOOM along with the combination of Google class room was opted by 41.1% of the teachers. ZOOM was the favorite as 66.6% respondents used it. Their mean satisfaction score with the interface was high as they labeled it as easy to self-learn and use. However due to ZOOM bombing and inability to upload assignments and lectures they combined it with any other learning management system [4].

Rapid acclimatization and training of faculty to different soft wares and e-educational strategies has been a challenge. The faculty and curriculum of undergraduate medical schools is aligned and planned with on campus face to face teaching of competencies in mind (Conrad,2004). In our study since most teachers during COVID teaching had uploaded lectures in power point format. They felt that adding voice recorded explanations would help building student concepts. This feeling was shared in other international studies [10] [6].

Junior Faculty felt difficulty on online clinical assessments and was of the view that they needed greater training in designing e-OSCE. Assessment needs regarding both cognitive, skills and attitudes were inquired in the survey. Online skills and attitude assessments need logistics and training for high fidelity assessments. Online assessments are marred by cheating thereby decreasing their reliability [8]

Research learning questions spanned from project planning, proposal writing, and analysis till referencing using different citation managers. Junior faculty had greater mean score in Research training. The highest scores 93.3% were for "project planning", "proposal writing" had 53.3% faculty strongly agreeing for training. This was followed by proposal grading with 51.1% strongly agreeing to need for training. Similarly, 41.1% strongly agreed that reference manager training was needed. This could be due to the fact that Research component is not rigorously taught in undergraduate level and most of Research writing is self-directed learning of medical graduates [14].

The survey questionnaire inquired regarding faculty training in different online teaching strategies such as video lectures, PBL and clinical modules. Faculty felt that teaching clinical modules was as big a challenge as their assessment. They had high scores in training needs in clinical subjects. The lack of training and time were common barriers in online education [7]. Faculty indicated that they are ill-equipped and not formally trained in use of e-tools for education and assessment. In our survey teachers in clinical years were especially concerned with holistic learning of their students and wanted faculty training sessions on soft wares and e-strategies to impart knowledge, skills and attitudes online effectively. Other researchers have also reported online undergraduate medical teaching as an opportunity and a challenge [13].

Finally, when faculty was enquired regarding mode of training that they would prefer for their learning needs, the most popular training method was workshops as 63.35% participants strongly agreed to this method followed by asynchronous training 52.2%. Teaching and instructional style varies between face to face and online teaching [9].

E. Conclusions

The faculty has courageously overcome the barriers to technology assisted learning in the COVID emergency. However focused and committed faculty training to improve the teaching effectiveness and skills in technology enhanced teaching are the need of the hour.

Authors' Contributions

It was collaborative work of both authors. MB designed the faculty assessment form and distributed it. GA took an ethical approval and manuscript writing. Data collection and analysis done by both MB and GA.

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Online Learning on Medical Students, Challenges and Strategies: Cross-Sectional Study in the UAE

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ABSTRACT

Background, Aim and Objectives: owing to the Covid-19 pandemic, medical institutions adopted online learning. However, it presented with challenges including technical issues, and feeling overburdened. The objective was to assess the challenges faced by medical students with online learning. This would help medical institutions to calibrate their online learning environment and improve learning experience. Methods: this cross-sectional study was conducted among 98 students from Gulf Medical University in Ajman, UAE. Students included were from: first till fourth year; 18 years or older; of all genders and nationalities; who accepted to participate in the study. Convenience sampling technique was utilized to recruit participants. After receiving the IRB approval, the questionnaire was sent to participants through Google forms. The collected data was stored in a Google Spreadsheet. SPSS version 27 was used to analyze the data. The data was presented in descriptive statistics to assess the effects of online education on medical students. Results: according to the responses, challenges faced by medical students included: feeling overburdened by increased numbers of online notes and assignments (77.6%); getting distracted during discussions/lessons due to background noises (75.5%); facing connectivity issues during online sessions or assessments (71.4%); experiencing health issues such as headaches, vision problems because of increased use of digital devices (66.3%); experiencing technical issues with device, browser or software during online sessions or assessments (66.3%); feeling uncomfortable with turning on camera from home (66.3%); lacking motivation to study due to a lack of face-to-face interaction (66.3%); device shutting down unexpectedly during online sessions or assessments (52.0%).

Conclusion and Recommendations: significant issues were faced by students during online learning. Studies should be conducted on a larger scale to find more practical solutions which can be implemented.

Keywords: Online learning, medical students, Covid-19

A. Introduction

The COVID-19 pandemic brought in a lot of changes around the world. One such change occurred in the medical education system. Universities adopted online education during the pandemic. According to a recent synthesis of the global responses by universities to the COVID-19 pandemic, majority of universities had adopted online learning [1].

However, online learning comes with its own challenges. A study conducted highlighted that the major issue in online education was whether it can provide an interactive learning environment for the students [2]. The findings showed that the students were concerned about the limited interaction opportunities provided by the technology as they indicated dissatisfaction with the one-way communication [2]. Another issue highlighted was the absence of development of social relationships among the students, that may have impeded their interaction causing the students to feel uncomfortable in expressing their views and sharing their perspectives when they did not know each other [2].

For some, the absence of face-to-face interactions was a hindrance for relationship building, leading to adverse consequences for learning and completing tasks [3]. Similarly, the lack of face-to-face time with instructors occasionally adversely impacted the quality of feedback and clarity of instructions [3]. Students also reported having issue with asynchronous communication environment as it presented challenges for communicating clearly, collaborating, sharing the workload, and establishing relationships [3]. Some students found it difficult to understand others' point of view or had their own points misunderstood [3].

Technical issues was another challenge faced by students as many cited cumbersome navigation, the lack of intuitive functions, the multiple number of board sites and discussion areas used, and difficulty tracking assignments and resources [3]. They also reported difficulties in tracking, viewing, and responding too long, complex discussion threads [3]. Furthermore, technical issues such as insufficient computer hardware or software, inadequate computer

and typing skills, and slow or unavailable internet access at home are among the commonly reported challenges [3]. Lack of participation among students and lack of feedback from instructors are major hindrances to effective online collaboration [4].

The COVID-19 pandemic has highly impacted the medical education system as online education was adopted in many countries, including UAE. Studies have shown that students encounter one or more challenges in their online learning experiences [5]. This research was conducted in order to assess the challenges faced by medical students during COVID-19 pandemic with online teaching and learning. This would help the medical institutions to calibrate their online environment and improve the learning experience for students.

B. Material and Methods

It was a cross-sectional study conducted on the students of Gulf Medical University, Ajman, UAE. The inclusion criteria were: students from GMU in years one to four, all genders, all nationalities, and those who accept to participate in the study. The exclusion criteria were: students who refused to give informed consent and who were not available at the time of data collection.

This was a population study and was conducted among 98 students. The study setting was Gulf Medical University, Ajman, UAE. The duration of study was one month. Study instrument and validation procedure included a self-administered questionnaire that was developed by the research team and was validated by 3 experts. The questionnaire was sent to the participants through Google forms.

Ethical approval from IRB was a mandatory requirement for research, informed consent was obtained from participants before enrolling them into the study, respondents were informed about their rights to participate in the study and about the objectives of the study. The study was anonymous, confidentiality of the information was respected and only the research team and members of IRB had access to the data.

The study was feasible. It did not include lab analysis nor payment by the respondents. The questionnaire did not include any sensitive questions.

SPSS version 27 was used to analyze the data. The data was presented in descriptive statistics that included tables, figures and text format, to assess the effects of online education on medical students.

C. Results

There were 72 females (73.5%) and 26 males (26.5%) who participated in this study. Out of the total participants, 32.3% were below the age of 20, 38.5% of the participants were between the ages of 20 and 21, and 29.2% of the participants were above the age of 21. 71.0% of the participants, below the age of 20, were females while only 29.0% were males. 73.0% of the participants, between the ages if 20 and 21, were females while only 27.0% were males. 75.0% of the participants, above the age of 21, were females while only 25.0% were males.

Table 1. Distribution of participants according to age and gender

Gender	Age						Total	
	<20		20-21		>21			
	No.	%	No.	%	No.	%	No.	%
Female	22	71.0	27	73.0	21	75.0	70	72.9
Male	9	29.0	10	27.0	7	25.0	26	27.1
total	31		37		28		96	

Figure 1 shows the connectivity difficulties faced by participants. There were 70 students (71.4%) who faced connectivity issues during online sessions or assessments, 65 participants (66.3%) experienced some sort of technical issues with the device, browser or software during online sessions or assessments and only 13 participants (13.3%) found the software or programs used for online learning difficult to use.

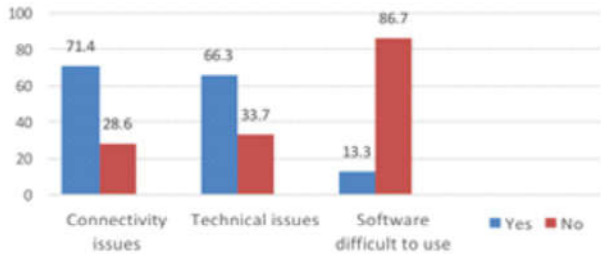

Figure 1. The connectivity difficulties faced by participants

Figure 2 shows device difficulties faced by participants. There were 51 participants (52.0%) who experienced sudden or unexpected shut down of device during online sessions or assessments. 9 participants (9.2%) felt that they did not have enough knowledge to use the devices and programs properly. 13 participants (13.3%) did not have adequate resources and devices for online learning.

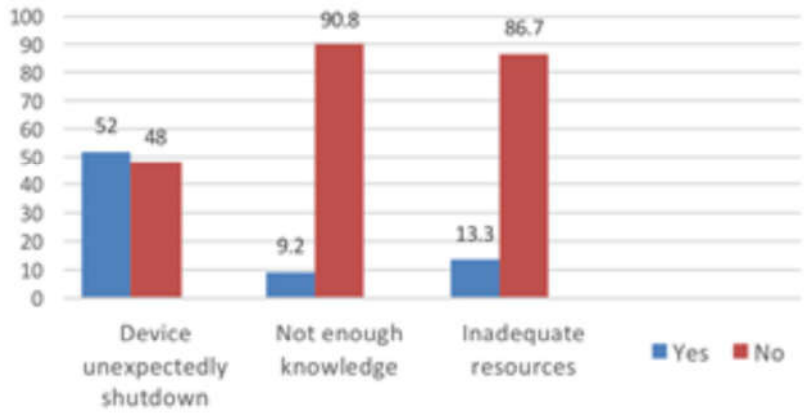

Figure 2. Device difficulties faced by participants

Figure 3 shows personal and educational challenges faced by participants. Out of the total, 65 participants (66.3%) were uncomfortable with turning on the camera from home, 53 participants (54.1%) experienced behavior and mood changes because of a lack of social interaction, 65 participants (66.3%) experienced health issues such as headaches, vision problems – like increased eye strain and/or blurred vision – because of the increased use of digital devices, 64 participants (65.3%) found themselves disconnected because of lack of face-to-face interaction, 65 participants (66.3%) lacked motivation to study due to a lack of face-to-face interaction, 55 participants (56.1%) felt hesitant interacting online because people listen and may record what they are saying, 74 participants (75.5%) felt distracted by the background noises during the sessions, 65 participants (66.3%) felt like they are developing a sedentary lifestyle because of doing everything online, 13 participants (13.3%) had difficulty in communication and understanding because of language barrier, 29 participants (29.6%) felt uncomfortable because of the off-topic discussions on group forums, 57 participants (58.2%) found it difficult to monitor their progress in classes with online learning, 42 participants (42.9%) felt that a lack of tutor supervision made them doubt their work, 58 participants (59.2%) felt that there was a lack of feedback from the instructors, 76 participants (77.6%) felt overburdened by the increased numbers of online notes and assignments.

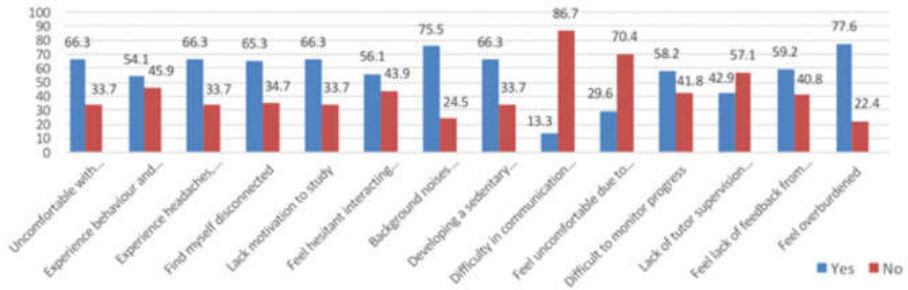

Figure 3. Personal and educational challenges faced by participants

D. Discussion And Conclusions

Significant issues were faced by students during online learning. Based on the challenges faced by students in online education, researchers have also conducted studies in how to overcome these challenges. It includes ensuring that the instructors engage students in collaborative activities in their online courses and instructor's role is more emphasized during collaborative learning; finding ways of motivating the students in order to increase their level of participation in collaborative learning; finding ways of motivating the instructors in order to make them more active in monitoring students' collaboration and come up with mechanisms of training instructors with e-pedagogy skills which can enhance collaborative learning; finding ways of increasing internet bandwidth in order to avail more bandwidth to students who are studying online [4]. Encouraging students to participate in face-to-face sessions can help them to develop social support networks for learning [2]. Overall, more studies should be conducted on a larger scale to find more practical solutions which can be implemented since numerous universities from different countries have adopted online teaching and learning.

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Are Values Valuable? Role of Values in Clinical Decision Making Among Medical Students of A Public Sector Institute of A Developing Country

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ABSTRACT

Values which may affect the decision-making skills of clinicians may develop during the time they spend learning clinical sciences in the hospital as medical students. Published qualitative literature suggests that the students who prioritized different values, showed much greater conviction and firmness in their clinical decision-making skills. This qualitative study was conducted from December 2019 to March 2020 which included 120 MBBS students from the third, fourth, and final year along with recently graduated students from Rawalpindi Medical University, Pakistan. The students who ranked equality higher also considered patient safety less frequently which shows that promoting same treatment options for all the patients can compromise on patient safety. We also found that the students who ranked professionalism higher considered self-awareness more frequently which shows that greater self-awareness has been linked to more professional behaviour.

Keywords: Clinical decision making, values, patient safety

A. Introduction

Decision making is a cognitive process for the selection of a strategy or an approach among all different possible alternatives [1]. Clinical decision making is a complex multifactorial process and important aspects such as clinical knowledge, reasoning, skills, and experience may affect it. In addition to these aspects, other factors such as culture, ethics, personality, and values may also have important implications for clinicians in making clinical decisions for patients. Clinical decision making is the crux of daily clinician-patient interaction, as physicians constantly make decisions for and with the patients for delivery of quality health care [2].

The rapid advancement in medical care, vast options for diagnostic evaluation, and extensive treatment possibilities make clinical decision-making a challenging task for the clinicians. Moreover, theories have suggested that personal and professional values can significantly influence the decision-making skills of the clinicians. These values may complement the decision-making skills of clinicians or may counteract to negatively impact this skill, resulting in personal biases of which the clinician might be unaware. These biases may compromise the patients' quality of life and the quality of health-care delivered to them. To reduce the physicians' unconscious biases a new, constructive patient-centered care approach has been introduced in the health care system and the conventional paternalistic approach has been disregarded. Shared decision making (SDM) is an approach in which the clinical decisions are made by patients and professionals mutually. In SDM, patients' perspectives, preferences, social factors, and clinical aspects are taken into consideration to improve patient's knowledge, level of trust, satisfaction as well as compliance with the provided treatment.

The values which may affect the decision-making skills of clinicians may develop during the time they spend learning clinical sciences in the hospital as medical students. Published qualitative literature suggests that the students who prioritized different values such as truth, spirituality, and human dignity, showed much greater conviction and firmness in their clinical decision-making skills. Moreover, another study suggested that the students who prioritized values of comfort over equality showed poor decision-making skills as compared to those who preferred equality. The present studies focus on ethical considerations and dilemmas in making clinical decisions but the role of values in effecting such decisions is largely under-researched. The gap in knowledge regarding how these values affect the decision-making abilities of medical students demands the need for a study like ours to be done.

The study aims to assess the factors that are important in clinical decision making among medical students and to investigate the effect of values on making clinical decisions for patients. A clear understanding of these values in affecting clinical decision making can aid in assessing the current practices and highlight potential areas that will need improvement in developing a good doctor-patient relationship. Therefore, according to the bio-psycho-social model, there is an urgent need to evaluate the role and potential effects of values in clinical decision making among medical students.

B. Material And Methods

This qualitative study was conducted from December 2019 to March 2020 which included 120 MBBS students from the third, fourth, and final year along with recently graduated students from Rawalpindi Medical University, Pakistan. The students were interviewed with four clinical scenarios in which they were asked to mention the factors that they considered were important for making a clinical decision. The responses of the students were recorded by the investigators. After the interview, the students were asked for rank-ordering a set of eleven values on a scale from most to least important. The students who refused to take part in the study were excluded. Ethical permission was granted by the Ethical Review Board, Rawalpindi Medical University.

1. The Health-Care Practitioner Values Scale (Quantitative Part)

The HPVS [3] incorporated personal and professional values: authority, capability, pleasure, intellectual stimulation, critical thinking, equality, altruism, spirituality, tradition, professionalism, and safety. Participants were asked to rank these values according to the importance of each to them as a guiding principle in their health-care practice. The most important value was ranked as 1 and the least important as 11.

2. Clinical Decision-Making (Qualitative Part)

Participants were asked to list as many factors that mattered to them and their patients for making a clinical decision for each of the four clinical scenarios. There were no right or wrong answers. The clinical scenarios were adopted from Moyo M et al. [4] Permission to use the clinical scenarios, as well as the scale, was taken from the author of the referenced study.

3. Data Analysis

Data was entered and analyzed using spss v 25. Qualitative variables were expressed as frequencies and percentages and quantitative ones as mean and sd. Each value was ranked on a scale from 0(least important) to 11(most

important). In each of the clinical scenarios the difference between the mean ranks was found. Cohen's D was used to find the effect size of mean difference between the ranks. The difference of mean ranks for each value was compared between the students who considered a certain value most or least important in clinical decision making in each of the four clinical scenarios. P value less than 0.05 was considered significant

C. Results

1. In the PSA Scenario

- The students who ranked equality higher considered patient safety less frequently than the students who placed equality at lower rank (p=0.032, Cohen's D=0.041)
- The students who ranked altruism higher considered their self-awareness less frequently than the students who placed altruism at lower rank (p=0.037, Cohen's D=0.902)
- The students who ranked intellectual stimulation higher considered their self-awareness more frequently than the students who placed intellectual stimulation at lower rank (p=0.009, Cohen's D=0.814)
- The students who ranked professionalism higher considered their self-awareness more frequently than the students who placed professionalism at lower rank (p=0.01, Cohen's D=0.55)
- The students who ranked safety higher considered their self-awareness more frequently than the students who placed safety at lower rank (p=0.011, Cohen's D=0.85)
- The students who ranked spirituality higher considered their self-awareness less frequently than the students who placed spirituality at lower rank (p=0.001, Cohen's D=0.64)
- The students who ranked capability higher considered service cost less frequently than the students who placed capability at lower rank (p=0.046, Cohen's D=0.486)
- The students who ranked professionalism higher considered service cost more frequently than the students who placed professionalism at lower rank (p=0.012, Cohen's D=0.511)
- The students who ranked safety higher considered service cost more frequently than the students who placed safety at lower rank (p=0.004, Cohen's D=0.56)

2. **In the Isoteratoin Scenario**

- The students who ranked authority higher considered patient perspectives less frequently than the students who placed authority at lower rank (p=0.03, Cohen's D=0.403)
- The students who ranked intellectual stimulation higher considered family and social circumstances less frequently than the students who placed capability at lower rank (p=0.025, Cohen's D=0.52)
- The students who ranked morality higher
- symptom and treatment efficacy more frequently than the students who placed spirituality at lower rank (p=0.009, Cohen's D=0.47)

3. **In the End of Life Scenario**

- The students who ranked Altruism higher considered symptom and treatment efficacy less frequently than the students who placed altruism at lower rank (p=0.034, Cohen's D=0.466)
- The students who ranked capability higher considered service cost more frequently than the students who placed capability at lower rank (p=0.04, Cohen's D=0.51)

4. **In the Botox Scenario**

- The students who ranked spirituality higher considered patients' perspectives less frequently than the students who placed spirituality at lower rank (p=0.003, Cohen's D=0.472)
- The students who ranked spirituality higher considered patients' safety more frequently than the students who placed spirituality at lower rank (p=0.037, Cohen's D=0.40)

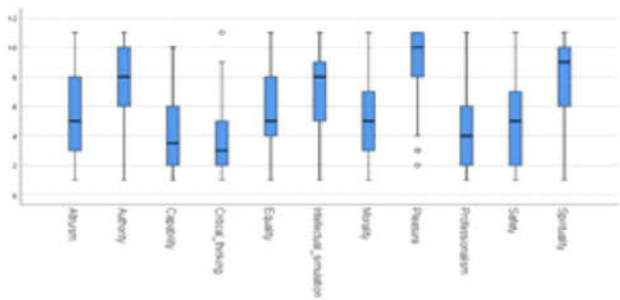

Figure 1. Showing box plot of mean ranks of the values

D. Discussions

Values play an important role in treatment decisions made by health care providers. It plays an important role not only in everyday clinical decisions but also in advanced treatment plans [5].

In our study it was observed that pleasure had the highest mean rank which shows that it was the most important value medical students considered in their clinical decision making. This is in contradiction to the study by Moyo M et al. where pleasure was one of the least ranked values in clinical decision making [4].

Our study showed that spirituality and authority ere the second most commonly ranked values in clinical decision making. The study by Moyo M et al. showed that medical students ranked spirituality on the top [4]. Many other studies have reported that spirituality affects the decisions made by health care providers [7-9]. In our study spirituality was linked to different decision factors depending upon the clinical scenario which shows that spirituality influences the clinical decision making in a multi-dimensional way.

We also observed that authority was the second most common along with spirituality that influenced the clinical decision making by the medical students. This might be because of the authoritative role which the society gives to the doctors. Most of the people like and trust doctors to make clinical decisions on their behalf. This is the same reason most of the students did not consider patient perspective as an import decision factor in clinical decision making because most of the doctors by default assume an imposing role in providing treatment options to their patients. However, this trend is changing now with increasing awareness of treatment options available now. We also found that the students who ranked authority higher compromised on patient safety as compared to those who did not rank authority higher.

In all of the scenarios given, the students considered patient safety and symptoms and treatment efficacy as the most important decision factors. This is because of the increased stress laid upon patient safety in medical education [10-12]. They considered service cost less important. However, service cost plays an important role in deciding treatment options both by the patient and doctors especially in a public sector hospital.

The students who ranked equality higher also considered patient safely less frequently which shows that promoting same treatment options for all the patients can compromise on patient safety. We also found that the students who ranked professionalism higher considered self-awareness more frequently

which shows that greater self-awareness has been linked to more professional behavior.

E. Conclusions

Medical values play a pivotal role in clinical decision making for health care professionals. Shared decision making is the new approach in modern medicine. Proper training should be given to young budding doctors for this.

Authors' Contributions

Mehwish Kaneez conceived the idea , designed the analysis and contributed to the final manuuscript preparation. Noman Ahmed Chaudhary contributed in data analysis and paper writing,Syed Muhammad Jawad Zaidi and Hamza Waqar Bhatti contributed in data collection, paper writing and preparation of the final manuscript.

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The Covid-19 and Its Impact on Public's Mental Health

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ABSTRACT

Background: the outbreak of the COVID-19 in the 21st century and its spreading around the globe is badly impacting on the mental health of public on a large scale. Although all resources and psychological support provided to the people to reduce the risk of spreading of the corona virus by the government but still people are afraid, conscious, confused, anxious and stressed. METHODS: An online questionnaire was used as a research source to gathered data from different people with different mind sets including student community working men, workingwomen and the unemployed and common people of our society. It was a cross sectional study conducted Dec 20. The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) was used with few more questions. The demographic data is reported on the basis of percentage of public's responses. RESULTS: Total 302 participants responded with mean age (30.21±4.21) out of which 80.1%were students 7.6% were working men, 10% were working women and 2.3% were un-employed and 24.6% were males and 72.1% were females. With the mean scoring (45.77±9.96) of WEMWBS and with this the responses reported that 54.2% claimed that they rarely lost any of their friends and family member.31.6% were in fear of losing their close ones. 18.6% were often worried about the fear of not having food in days ahead.15% people claimed that they are losing interest in people. 11% rarely thought about suicide attempts. 22.9% were rarely frightened from the corona virus. CONCLUSION: COVID-19 affected mental health of public very badly and it is almost same in all countries. People are facing mental health issues due to the pandemic all over the world.

Keywords: *Covid-19, mental health and public, anxiety, stress, fear*

A. Introduction

It is claimed that the pandemic has had a negative impact on mental health. Everyone had faced a great change in their lives. The stress level and fear were on its peak among the public. Each and every one was in the state of fear. The factors such as financial crisis, shortage of food, fear of death, social interaction, social anxiety, fear of virus, lockdown and un-employment were the main issues of stress, anxiety and fear among people.

1. Covid-19 Outbreak

The initial outbreak was reported in December, 2019 in Wuhan, China. However, in the following month (January) thousands of people in China, including many provinces (such as Hubei, Zhejiang, Guangdong, Henan, Hunan, etc.) and cities (Beijing and Shanghai) were attacked by the rampant spreading of the disease. Furthermore, the disease traveled to other countries. Mostly countries had been gone through the pandemic.

2. Mental Breakdown

Pandemic was the not that big reason as the isolation was. Isolation or lockdown was the big reason for mental breakdown. Even some of the people die because of fear. With this lockdown made people helpless. It is well known that pandemics pose a threat to mental health.

3. Lockdown Side Effects

Mostly people lost their jobs due to pandemic. Due to lockdown many kids lost their interest in studies. Schools, colleges and universities were closed due to which many students had faced educational problems. So many people had faced financial crisis and lack of food. Financial problem was one of the main issues of mental breakdown and depression among people.

B. Impact Of Covid-19 On Mental Health

The COVID-19 pandemic presents a triple global public mental health challenge: to prevent an associated increase in mental disorders and a reduction in mental wellbeing across populations to protect people with a mental disorder from COVID-19, and the associated consequences, given their increased vulnerability and to provide appropriate public mental health interventions to health professionals and careers. This challenge is compounded by the inadequate population coverage of evidence-based public mental health interventions before COVID-19, even in high-income countries. Since the

start of the COVID-19 pandemic, the provision of some of these mental health interventions has become more limited by quarantine and lockdown measures. Interventions to prevent, treat, and mitigate the effects of COVID-19 are likely to adversely affect mental health, particularly in those with or at a higher risk of mental disorder.

C. Results

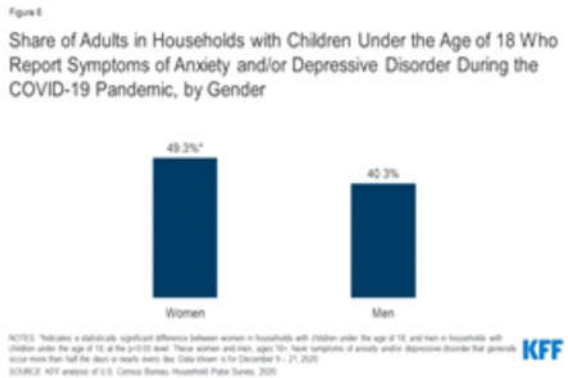

Figure 1. Covid outbreak

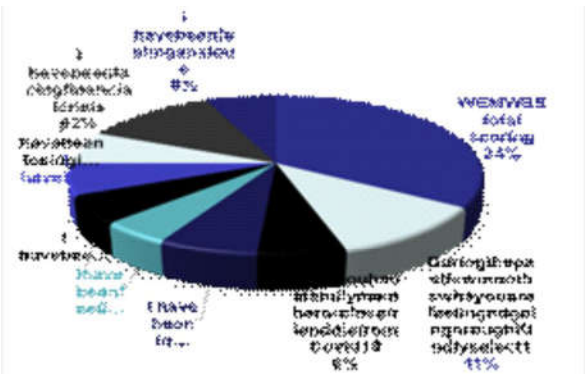

Figure 2. Mental health and un-employment

Table 1. Lockdown side effects

	None of the time		Rarely		Some of the time		Often		All of the time	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency(n)	Percentage (%)
[illegible]	[illegible]	[illegible]								
During the past few months how have you been feeling and going through Individual	101	33.6	65	21.6	68	20.2	31	10.3	16	5.3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
I have been in fear of losing my friends and family	61	20.3	49	16.3	95	31.6	52	17.3	44	14.6
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
I have been feeling confused	51	16.9	50	16.6	92	30.6	68	22.6	37	12.3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
I have been losing interest in people	58	19.3	47	15.6	89	29.6	62	20.6	45	15.0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
I have been feeling anxious	57	18.9	53	17.6	83	27.6	70	23.3	38	12.6
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
I have been feeling suicidal	191	63.5	331	11.0	41	13.6	32	10.6	4	1.3

D. Discussions

The research on "The Covid-19 and its impact on public's mental health" will let more people think about the impact of covid on mental health. Every pandemic left serious impact on people minds. The mental health and mental peace are very important for any person. The economic and social disruption caused by the pandemic is devastating. Millions of people are at risk of falling into extreme poverty while the number of undernourished people is increasing and currently estimated at nearly 690 million, could increase by up to 132 million by the end of the year.

Covid-19 has had an impact on social mobility whereby schools are no longer able to provide free school meals for children from low-income families, social isolation and school dropout rates. It has also had a significant impact on childcare cost for families with young children. Additionally, there exists a wide disparity amongst populations with a higher income who are able to access technology that can ensure education continues digitally during social isolation. All these are the reasons of anxiety and depression amongst nation during the pandemic. Although all resources and psychological support provided to the people to reduce the risk of spreading of the corona virus by the government but still people are afraid, conscious, confused, anxious and stressed.

During the pandemic, concerns about mental health and substance use have grown, including concerns about suicidal ideation. In January, 2021 41%

of adults reported symptoms of anxiety or depressive disorder. Suicide rates have long been on the rise and may worsen due to pandemic. Pandemic related lockdown was also the big reason of anxiety, stress and depression.

Another research with 683 US adolescents carried out 2 weeks post lockdown showed that engagement in social distancing was not significantly associated with their mental health. However, specific motivations for social distancing were related to different mental problems. Youth whose motivation was to prevent illness or avoid judgements reported greater anxiety symptoms. Those who engaged in social distancing because a friend told them had more depressive symptoms.

A US study investigated more than 10 million Google searches and assessed the changes in mental health search queries after stay-at-home measures. Topics related to anxiety, negative thoughts, sleep disturbances, and suicidal ideation increased dramatically before stay-at-home orders with a levelling of the curve after implementation. A British online qualitative study with 27 participants assessed five focus groups during the early stages of the social distancing measures (5–12 days post lockdown). The isolation resulted in significant negative impacts on mental health and well-being within a short time of policy implementation, mainly in those with low-paid or precarious employment. Reduced social interaction, economic losses, and routine changes led to psychological and emotional impact, as demotivation, loss of meaning and decreased self-worth.

This COVID-19 pandemic seems to have brought our frenzied speed of modern society to a grinding halt and has literally crushed the wings of unlimited social interaction. Under these social restrictions, individuals are forced to reconcile with this terrifying reality of isolation which can contribute to domestic inter-personal violence and boredom. Similar trends of increase in isolation and loneliness have been noticed among emergency workers and quarantined population in Wuhan, China. This has increased the prevalence of depression, anxiety, post-traumatic stress disorders and insomnia in the population. But neither life nor the society had probably readied us for this task. The concept of boredom and loneliness leads to anger, frustration on the authorities and can lead for many to defy the quarantine restrictions, which can cause dire public health consequences. Emotional unpreparedness for such biological disasters has detrimental effects, as this situation is unprecedented in all measures. It also makes us take a step back and question: is social distancing only for a specific social class; as millions of migrant laborer's, homeless individuals and daily wage workers stay stranded in their workplaces, railway and bus stations and factories with overcrowding and poor hygiene. Isolation or loneliness for them is thus different. It is being away from their origins,

their families and being deprived of basic human rights and self-dignity. Segregation from self-identity can also form the basis for loneliness, just that it reflects differently in different socio-economic strata. It is again ironic, how the construct of loneliness varies based on the social strata giving rise to dimensional psycho-social needs.

In addition to loss of Basic Psychological Needs, other research has indicated that loneliness and social isolation have negative consequences for residents' overall health and well-being [9, 10, 28]. Besides the ban on family visits, health professionals such as physicians, psychologists, physiotherapists, and service providers such as hairdressers, were no longer able to enter NHs. Except from one NH, group-based and social activities were no longer organized, and meals that were previously shared together, were now consumed alone in residents' rooms. All these safety measures increased residents' social isolation and loneliness. Similar observations have been described in other countries such as Germany [29]. It is, therefore, not surprising that the impoverished environment and the lack of regular social, cognitive and physical stimulation had an enormous impact on residents and their well-being. Residents described feelings of depression, hopelessness, uselessness, and sadness; some even expressed a wish to die. Those who felt infantilized or deprived of information became frustrated or even angry, resulting in resistance to the lockdown measures

E. Conclusions

COVID-19 affected mental health of public very badly and it is almost same in all countries. People are facing mental health issues due to the pandemic all over the world. The covid-19 pandemic presents a triple global public mental health challenge. During pandemic stress anxiety suicidal thoughts among the public was very common. Fear of lack of food, shortage of money, un-employment made people more stressed and made their lives miserable. This covid-19 will leave a very bad impact on people's life style and its fear and consequences will stay forever in people's mind.

Acknowledgments

I collected the data by using Google forms as a source. 302 people participated including students, employed, un-employed both helped me to conduct this research.

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The Description of Screen Time and Dry Eye Symptoms in Students during the COVID-19 Pandemic

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ABSTRACT

Background: the amount of screen time in individuals is increasing each day especially during this pandemic. Excessive screen time may result in the decreased number of eye blinks, evaporation of tears, and subsequently to dry eye disease. Objective: to obtain descriptions of the duration of screen time and dry eye symptoms in medical students during pandemic. Material and methods: this is a descriptive research. The research subjects were medical students of UIN Alauddin Makassar. The data were collected through a questionnaire containing subjects activities using gadgets per day and the Ocular Surface Disease Index (OSDI) to assess dry eye symptoms. Result: most of the subjects are 18 years old and female. The subjects average of screen time for online class is 10.3 hours per day, the other activity average screen time is 9.2 hours per day and the average total of screen time is 15.8 hours per day. In this study 11 subjects (9.48%) experienced mild dry eye symptoms, 24 subjects (20.69%) experienced moderate dry eye symptoms, and 80 subjects (68.97%) experienced severe dry eye symptoms. Conclusion: it was found that the average screen time of the subjects was 15.8 hours and according to the OSDI index, most subjects (67%) experienced severe dry eye symptoms.

Keywords: *Screen time, dry eye, pandemic*

A. Introduction

The number of computer users and display devices with a monitor (screen) is increasing. In Indonesia there are 143 million internet users, making Indonesia one of the top 5 internet users in the world. The majority of internet users are teenagers and young people, although internet use has also increased in adults.[1]

Excessive screen time may result in the decrease number of eye blinks, causing imperfect blinking, evaporation of tears, and ultimately leading to Dry Eye Syndrome (DES).[2] From the research results, it was found that children who frequently use smartphones are usually prone to dry eye, this is caused by the blink reflex when using a video display terminal, including a smartphone to be reduced, as a result there is an increase in exposure to the ocular surface and eventually it can cause dry eye complaints.[3]

Allah SWT emphasizes the importance of time and the greatness of its value, as implied in the Qur'an Surah Al-Lail / 92: 1-2, Al-Fajr / 89: 1-2, Adh-Dhuha / 93: 1-2, and Al -'Ashr / 103: 1-2. Therefore, we are aware of the importance of time management for a Muslim. Before understanding time management, first so that we can really understand the essence of time, namely: time flies, it is impossible to return the most expensive treasure. Based on this, wise expressions emerge, such as "time was like a sword / knife". A sword / knife is very useful if you are good at using it, on the contrary it will endanger not only others, but also yourself, if you are not good at using it.[4]

During this pandemic, the use of gadgets as learning media has increased screen time among students, who are the biggest gadget users. Therefore, the author intends to know the description of screen time and DES events in students, especially medical students of UIN Alauddin, Makassar.

B. Subjects and Methods

This research is a quantitative research with a descriptive and cross sectional. It was conducted in the Medical Education Study Program and the Physician Profession Study Program at UIN Alauddin Makassar and RSUD Haji Makassar in December 2020.

The study population was all students of the Medical Education Study Program and the Physician Profession Study Program at UIN Alauddin Makassar who were undergoing online learning. The sample is part of the overall object under study and is considered to represent the entire population. The inclusion criteria were students of the Medical Education Study Program and

the Medical Physician Profession Study Program of UIN Alauddin Makassar who were undergoing online learning and were willing to be research subjects. Exclusion criteria were incomplete questionnaire filling, history of eye surgery, abnormal palpebral anatomy, and history of systemic disease. The research data was taken using a questionnaire and a daily log on the research subjects via google form.

Research subjects (students who were selected and met the inclusion and exclusion criteria) read and agreed to the informed consent to fill out the OSDI questionnaire that had been prepared via online. The results of the OSDI score will be divided into 4 categories, namely normal, mild dry eye, moderate dry eye, and severe dry eye. The results of the total screen time will be divided into 2 categories, < 8 hours and ≥ 8 hours. The difference between the group with a screen time of < 8 hours and the group with a screen time of ≥ 8 hours were analysed using Mann-Whitney U Test. The statistical analyses were performed using Microsoft Excel 2016 and SPSS version 23.

C. Results

The research was conducted in December 2020. Researchers took data through a questionnaire that was filled out online by medical students of UIN Alauddin Makassar. A total of 116 students became the sample of this study. The questionnaire contains the activity in front of the screen per day and the OSDI index. The collected data were then processed using Microsoft Excel 2016 and SPSS version 23 in accordance with the research objectives and presented in table form as follows.

1. Sample Characteristics

Univariate analysis was performed to determine the distribution of characteristics of the sample studied. The characteristics studied included age, gender, screen time for online lectures, screen time other than online lectures, total screen time, use of contact lenses, use of a fan or air conditioner (AC), and duration not in front of a computer screen / cellphone.

Table 1. Characteristic distributions of research samples

Sample Characteristics	Results
Age	
17 years	4 (3.45%)
18 years	37 (31.90%)
19 years	24 (20.69%)
20 years	30 (25.86%)
21 years	8 (6.90%)
22 years	11 (9.48%)
23 years	2 (1.72%)

Sex	
Male	21 (18.10%)
Female	95 (81.90%)
Screen time	
Online class	10.3 hours
Other than online class	9.2 hours
Total	15.8 hours
Use of Contact Lenses	13 (11%)
Use of Fan/AC	14.1 hours
Non-Screen Duration	4.5 hours

Table 1 shows the characteristics of the research sample in the form of age, gender, screen time for online lectures, screen time other than online lectures, total screen time, use of contact lenses, use of fans or air conditioners (AC), and non-screen duration. Based on age, most respondents were 18 years old, namely 37 people (31.90%). Based on gender, the majority of respondents were female, namely 95 people (81.90%). The average screen time for online class was about 10.3 hours per day, the average screen time for other than online class was 5.5 hours per day, and the total screen time was obtained an average of 15.8 hours per day. 11 people (11%) wear contact lenses. An average use of the fan / AC was 14.1 hours per day is obtained. The average non-screen duration was 4.5 hours per day.

2. Dry Eye Symptoms Using the OSDI Index

Univariate analysis was performed to determine the distribution of dry eye symptoms in the sample studied using the OSDI index. Dry eye symptoms are classified into mild, moderate, and severe.

Table 2. The distribution of dry eye symptoms using the OSDI index

Dry eye symptoms	Results
Normal	1 (0.86%)
Mild dry eye	11 (9.48%)
Moderate dry eye	24 (20.69%)
Severe dry eye	80 (68.97%)

Table 2 shows the distribution of Dry Eye symptoms using the OSDI index in the study sample. It was found that most respondents suffered from severe dry eye symptoms, namely 80 people (68.97%). Respondents suffering from moderate dry eye symptoms were 24 people (20.69%). Respondents who suffered from mild dry eye symptoms were 11 people (9.48%). Meanwhile, normal respondents were 1 person (0.86%).

3. Distribution of Dry Eye Symptoms by Sex

Univariate analysis was performed to determine the distribution of dry eye symptoms based on the sex of the sample.

Table 3. Distribution of dry eye symptoms by sex

Dry eye symptoms	Male	Female
Normal	0 (0.00%)	1 (1.05%)
Mild dry eye	1 (4.76%)	10 (10.53%)
Moderate dry eye	4 (19.05%)	20 (21.05%)
Severe dry eye	16 (76.19%)	64 (67.37%)
Total	21 (100.00%)	95 (100.00%)

Table 3 shows the distribution of Dry Eye symptoms based on gender. In the normal category, it was found that 1 person (100%) was female. In the category of mild dry eye symptoms, 10 people (90.91%) were female and 1 person (9.09%) male. In the moderate dry eye symptom category, it was found that 20 people (83.33%) were female and 4 (16.67%) male. In the category of severe dry eye symptoms, it was found that 64 people (80.00%) were female and 16 people (20.00%) were male.

4. Distribution of Dry Eye Symptoms by Screen Time

Univariate analysis was performed to determine the distribution of dry eye symptoms based on the duration of the sample screen time. Screen time is divided into < 8 hours and ≥ 8 hours.

Table 4. Distribution of dry eye symptoms based on screen time

Dry eye symptoms	< 8 hours	>= 8 hours	P Value
Normal	0 (0.00%)	1 (0.88%)	0.822
Mild dry eye	0 (0.00%)	11 (9.65%)	
Moderate dry eye	0 (0.00%)	24 (21.05%)	
Severe dry eye	2 (100.00%)	78 (68.42%)	
Total	2 (100.00%)	114 (100.00%)	

Table 4 shows the distribution of dry eye symptoms according to screen time. In the normal category, there was 1 person (0.88%) with a screen time of ≥ 8 hours and none (0.00%) with a screen time < 8 hours. In the mild dry eye category, 11 people (9.65%) had screen time ≥ 8 hours and none (0.00%) with a screen time < 8 hours. In the moderate dry eye category, there were 24

people (21.05%) with a screen time ≥ 8 hours and none (0.00%) with a screen time < 8 hours. In the severe dry eye category, there were 78 people (68.42%) with a screen time of ≥ 8 hours and 2 (100.00%) at a screen time < 8 hours. The P value of 0.822 indicates that there is no significant relationship between the group with a screen time of < 8 hours and the group with a screen time of ≥ 8 hours.

D. Discussions

The questionnaire data was collected on 116 students as research subjects. Based on age, the results of this study showed that most respondents were 18 years old, namely 37 people (31.90%). The incidence of dry eye increases with age due to decreased function of the lacrimal gland[5], but in this study we cannot conclude that there is a relationship between age and the incidence of dry eye due to the adjacent population. In the younger age group, it was reported that the incidence of dry eye increased due to the duration of the screen time which decreased the blink rate and increased the evaporation of the tear film.[3]

This study found mild and moderate DES symptoms that were more frequent in women than men, but symptoms of severe DES were more common in men. Several studies have reported different results, where the presentation of women is greater than that of men. The prevalence of DES was greater in women (16.7%) than men (11.4%)[6], other studies by Syawal et in Makassar also reported that dry eye was more common in women than men with a ratio of 2: 1.[7] A population study in Sumatra reported a prevalence of DES in males of 32.7% and 22.8% in females.[8] Sex differences can cause differences at the molecular level to the physiological level that can be observed, in terms of the production of water layers eye, tear stability, number of blinks, even ocular immune function that can trigger DES.[9] Hormonal differences between men and women, including levels of sex hormones (androgens and estrogens), as well as hormonal cycles in women (menstruation, pregnancy, menopause) affect ocular structure and function. Lower levels of androgens in women have also been associated with DES.[10] One of the risk factors of dry eye syndrome is female sex, it is thought to be due to the role of hormones in the stability of the tear film.[11]

The results showed that the average duration of the screen time was very high, which was about 15.8 hours per day. A survey by the Indonesian Internet Service Providers Association (APJII) found that on average internet users in Indonesia (35.3%) access the internet for 1 hour per day, around 9% or 20 million people use the internet excessively (3% use 7-9 hours, and 6%

use > 9 hours).[12] Based on the age of internet users, most users in Indonesia are 18-25 years old, which is equivalent to almost half of total internet users in Indonesia. In a study involving 259 smartphone users aged 19-25 years in Jakarta, 28% used the internet < 6 hours, while 72% used the internet > 6 hours per day.[1] Research on medical students in other countries shows that the majority of students (65%) spend 45 hours / week using the internet, the largest percentage is for the purpose of sending messages via email (36.6%), followed by academics (35.2%), pleasure (19.2%), and social networks (10%). [13] The higher screen time in this study is likely due to the online learning system during the pandemic, which encouraged students to spend much more time using computers or other gadgets.

In this study, the screen time was divided into 2 groups, namely < 8 hours and ≥ 8 hours based on research by Mehra, et al who reported screen time > 8 hours associated with dry eye symptoms.[14] The results of the study using the OSDI questionnaire showed that students with screen time <8 hours experienced severe DES symptoms, while the duration of the screen time ≥8 hours showed varied results, ranging from normal, mild, moderate, to severe. Studies by Moon et al concluded that the increased use of visual screen-based technology may be a risk factor for dry eye.[3,15]

Several studies have shown that the presence of symptoms is sufficient to diagnose a dry eye because no single test is specific for an absolute diagnosis of dry eye. However, on the other hand, symptoms alone are not sufficient for the diagnosis of dry eye because many ocular surface abnormalities and tear disorders show the same symptoms as those concluded by Khanal, et al.[16] In this study, the DES sign was not examined, which is a limitation of this study.

Phadatare and Messmer in 2015 put forward the theory that the occurrence of dry eye on smartphone use can be triggered by the activity of the eye staring long at the screen, thereby reducing the blink rate (blink rate), and increasing the length of exposure to the ocular surface, which can lead to instability of the tear film that can cause dry eye complaints.[17,18] A similar point was stated by Moon et al which stated that the reduced frequency of blinking rates during prolonged smartphone use can lead to faster evaporation of the tear film, which may then lead to dry eye.[19]

In this study, there were several limitations, namely limited information about other factors that are likely to affect the results of the study, such as smoking habits, disease history and others. Another limitation is that the type of research is descriptive and cross sectional and the absence of a control group, so that the relationship between screen time duration and DES symptoms and

signs cannot be evaluated. The number of samples that differed greatly between groups with screen time duration < 8 hours and screen time duration ≥ 8 hours was also a limitation of this study.

E. Conclusions

From the results of the study, it can be concluded that the average duration of screen time in medical students of UIN Alauddin Makassar is 15.3 hours per day and the subjective examination of DES with the OSDI questionnaire shows that most medical students of UIN Alauddin Makassar experience severe dry eye symptoms. Furthermore, the researchers recommend that students reduce the duration of screen time, starting from non-academic activities, as well as conduct regular DES examinations or when DES symptoms occur. Further studies are needed to evaluate the relationship of screen time duration and dry eye syndrome.

Authors' Contributions

GY: Analysis and interpretation of data, draft manuscript.

UR: Conception and design, draft manuscript, supervision.

MYI: Data acquisition, technical support.

AMFA: Data acquisition, technical support.

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