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ORIGINAL ARTICLE

Medical Education, COVID-19 and E-Learning

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ABSTRACT

Background: COVID-19 not only jeopardized the health, economy but also the education. Medical education is the worst affected area. Shift from traditional learning to online teaching brings forth new kind of complexity in teaching and learning behavior. Student's attitude towards digital world, availability of resource, their capacity to use and learn from online teaching, institutional conversion and adoption of online method of teaching and their impact all are expected concerns. This study is the reflection of female medical student's status and perception during Covid 19 pandemic.

Objective: To assess the affect of covid-19 pandemic on medical education among female medical students.

Study Design:

Place and Duration of Study: Department of Ophthalmology, Pak Red Crescent Medical & Dental College Kasur from 1st January 2021 to 31st August 2021.

Methodology: Questionnaire was generated based on student's interview, feedback and literature review. Question was of yes/no type. Impact of Covid19 was assessed, working potential, future planning, availability of resources, role of institution, knowledge, attitude and mental and physical well being. Questionnaire was distributed and collected after 24 hours, majority responders were female.

Results: There were 29 students with average age of 21.3±2 years, who responded to the survey, among them only 2 were males. 86.2% claimed negative impact of Covid-19. 34.5% had mild, 37.9% moderate and 24.1% had severe anxiety. Only eight (27.6%) students worked as frontline worker or volunteer during pandemic with highest rate (66.7%) among final year or house officers. Majority (93.0%) were aware of the COVID-19 infection and its consequences. Social media was the major source of information for 79.3% followed by WHO web site, faculty lectures, government health advisors and conference/symposia at campus. A good number (65.5%) were willing to work as frontline worker, 58.6% had their families no objection on their working as frontline workers.13.8% did not have digital devices. 58.6% were satisfied with internet function.

Conclusion: Majority student's physical and mental wellbeing affected by Covid. Most were aware of Covid and its consequences. Institution need to integrate online teaching method into traditional way of learning. More resources should be directed for education and provision of facility.

Keywords: COVID-19, Education, Learning, Anxiety , Female students, Digital devices

INTRODUCTION

Education is an important tool to shine the face of human evolution. Any circumstances can roughen this shine. In this decade COVID-19 pandemic has cursed the world. COVID-19(C-19) has disturbed all kind of human activities. Its repercussions are vast and have especially felt in economics, health and education fields. Health education is one of the most affected activity. It affects not only the learning opportunities but also the health of medical students.[1,2]

To continue the health education and training, Governments and Institutions have adopted different ways of continuous education.[1] The latest IT growth has made long distances education possible. Different names has been used like E-learning, online education and distance learning etc. Online education is define as use of any kind of IT equipment like computers, internet, software like Google class, zoom etc in delivering educational material or lectures.[3]

Online learning can be of two kinds, Asynchronous and synchronous. Without interactive activity is Asynchronous and with, is synchronous.[2] In pandemic lockdown, all educational activities in PRMDC were shifted towards online mode of distance learning. All lectures were delivered by internet using Zoom software.

This study is conducted by creating a questionnaire which is based on student feedback and reviewing the available literature. Questions are kept very simple of yes and no type which address the student knowledge about C-19, its affect on learning and health, availability of high speed connection, affect , stress and difficulties faced during pandemic and knowledge about their subject and carrier. CAD-7 is used to assess anxiety level among students.

MATERIALS AND METHODS

Questionnaire was developed by interviewing, feedback and reviewed the literature. Questions were kept simple and yes/no type to prevent confusion. Questions were addressing the query about students/H.Ss frontline status and influences in performing this role. They were asked about their E-learning experience, digital facility access, their health status, their attitude, external interference, their interest and economic impact of Covid on their ability to pay fee.

Questionnaire was given to the students from first year MBBS to internees. Twenty nine students were selected. Questionnaire was collected one to 24 hours. It was done to that they respond independently and not influenced by external factors like other student's responses and our presence.

Data was entered and analyzed by using SPSS 20. Data for three scores were compared between three groups by year of medical education and anxiety status through GAD by using one way ANOVA. Data for different questions under general information, Covid, e-learning and effect of Covid on social, physical and educational wellbeing of student were presented by using frequency and percentages and were compared between three groups by years of medical education by using likelihood ratio test. P-value ≤0.05 was considered statistically significant and between 0.05 and 0.10 as point of interest.

RESULTS

The average age of 21.3±2 years, who responded to the survey, among them only 2 were males. There were 10 (34.5%) each of 1st and 4th year, 3(10.3%) of 2nd and 3rd year students, 1 from 5th year and 2 were the house officers. Only eight (27.6%) students worked as frontline worker or volunteer during pandemic with highest rate

(66.7%) among final year or house officers. Majority (93.0%) were aware of the COVID-19 infection and its consequences. Social media was the major source of information for 79.3% followed by WHO web site, faculty lectures, government health advisors and conference/symposia at campus. A good number (65.5%) were willing to work as frontline worker, 58.6% had their families no objection on their working as frontline workers (Table 1).

Four (13.8%) did not have any digital device which was enabled to run new digital e-learning software, 2 had excess to 3G service and rest had 4G or land line. Almost one fourth of the students were of the view that it was not easy to handle e-learning tools, were not happy with content and operations and internet speed and accessibility of graphics. Only 58.6% were satisfied with internet functions and speeds, 39.7% felt increase of interaction with teachers and friends, 48.3% feel it is a motivational way of learning and 44.8% responded that their learning experience and performance are effectively increased through e-learning. Utility of content and operations, accessibility of graphic contents, and increased interaction were the three factors found different among three groups of educational level with p-values 0.080, 0.077 and 0.062 respectively (Table 2).

Among study participants 86.2% claimed that their working potential was affected by COVID-19, 58.6% felt that in a way it helped to decide their specialty in future as a medical professional, 69.0% were satisfied by the information about Covid passed on by faculty members, 65.5% were concerned that they can get infected and 62.1% reported difficulty for their family to carry on paying for their education due to COVID-19. Early year students were 100.0% satisfied with the way government has handled the COVID-19, while 61.5% of mid years and 33.3% of final year/HO showed their satisfaction. This difference among three groups was found significant with p-value 0.004 (Table 3).

When asked about the effects of pandemic on their social and physical life, 93.1% found their physical activities restricted, 96.6% feel like a home sit bird, 65.5% gained weight while 24.1% felt a negative impact on their social well-being. Of these participants 79.3% reported anxiety during the pandemic which was prevalent in 100.0% of early year students, 61.5% of mid-year and 66.7% of professional years had anxiety and this difference was significantly different with p-value 0.015 (Table 4).

When detail examination of anxiety levels during pandemic was performed through GAD, it was observed that only one participant had normal GAD score, 10(34.5%) had mild anxiety, 11(37.9%) had moderate while 7(24.1%) had severe anxiety during the pandemic (Fig. 1).

The overall average score for Knowledge, aptitude and practices regarding e-learning were 3.34±1.15 out of 5, 5.38±2.48 out of 10 and 2.97±1.12 respectively. They were neither significantly different among three groups by education nor for anxiety status by GAD (Table 5).

Finally a binary logistic regression model was applied to see the effect of covid, e-learning, knowledge, attitude and practice regarding COVID and e-learning, educational years, gender and health status on anxiety level of the students by taking severe anxiety as the outcome. It was observed that the model at 4th step showed 79.3% accuracy in prediction with 90.9% in those with no severe anxiety and 42.9% of those with severe anxiety. The only significant predictor was attitude score >4.5 with an adjusted odds ratio of 0.066(0.004 – 0.995) when adjusted for e-learning, Covid, Health status, general score, and practice. The other considerable factor was the general score >4.5 with a p-value 0.108 and adjusted odds ratio 9.058(0.617-133.051) (Table 6).

When liner regression was applied with similar intent it was observed that the Age, e-learning score, attitude and educational years had a significant effect on anxiety score with p-values 0.001, 0.035, 0.020 and 0.002 respectively. The anxiety score was expected to increase by each year age on average with 4.14, decrease by 0.706 with increase in each score of e–learning, increase by 0.96 with every increase in attitude score and a very high decrease of 11.6 with every two years educational level increment (Table 7).

Table 1: Role of the medical students in pandemic as per year of education

Question	Education of Years								P value
	1st & 2nd		3rd & 4th		Final + HO		Total		
	No.	%	No.	%	No.	%	No.	%	
Are you a front line worker or volunteer during pandemic lockdown	2	15.4	4	30.8	2	66.7	8	27.6	0.209
Learning opportunities has enhanced by working as front line worker	5	38.5	4	30.8	2	66.7	11	37.9	0.521
Institution may ask to work in wards to ease frontline colleagues	6	46.2	5	38.5	2	66.7	13	44.8	0.669
Your family allows you to work as frontline worker despite increased chance of infection	9	69.2	6	46.2	2	66.7	17	58.6	0.467
Would you like to take frontline worker role	6	46.2	11	84.6	2	66.7	19	65.5	0.109
Do you know about covid-19 infection & its consequences	12	92.3	12	92.3	3	100.0	27	93.1	0.797
Main source of knowledge about covid-19 infection tick all									
Social media	12	92.3	10	76.9	1	33.3	23	79.3	0.098
WHO web site	5	38.5	5	38.5	-	-	10	34.5	0.257
Faculty lectures	4	60.8	2	15.4	1	33.3	7	24.1	0.599
Govt. health advisors	5	38.5	2	15.4	-	-	7	24.1	0.168
Conference symposia at your campus	4	30.8	1	7.7	1	33.3	6	20.7	0.266

Table 2: Availability and Utilisation of E-Learning facilites with respect to education

Question	Education of Year								P value
	1st & 2nd		3rd & 4th		Final + HO		Total		
	No.	%	No.	%	No.	%	No.	%	
Do you own a digital device (mobile, tab, etc) which can run new digital e-learning software (multimedia, zoom, etc)	11	84.	12	92.3	2	66.7	25	86.2	0.539
Do you have internet access									
4 G	12	92.3	11	84.6	1	33.3	24	82.8	0.099
Landline	1	7.7	2	15.4	2	66.7	5	17.2	0.099
(3 G)	1	7.7	1	7.7	-	-	2	6.9	0.797
Are you confident in operating digital systems	11	84.6	12	92.3	2	66.7	25	86.2	0.539
It is easy to handle e-learning tools	10	76.9	10	76.9	2	66.7	22	75.9	0.930
E-learning contents and operations are very useful in learning	11	84.6	7	53.8	3	100	21	72.4	0.080
Internet speed give access to all graphical contents	9	69.2	12	92.3	1	33.3	22	75.9	0.077
I am satisfied with internet functions and speed	6	46.2	10	76.9	1	33.3	17	58.6	0.171
E-learning helps me to a compliance myself in digital world	10	76.9	10	76.9	3	100	23	79.3	0.477
E-learning has increased my interaction with my teachers & friends	7	53.8	2	15.4	2	66.7	11	37.9	0.062
E-learning is a motivational way of learning	7	53.8	5	38.5	2	66.7	14	48.3	0.582

Learning experience and performance are effectively increased by e-learning	8	61.5	4	30.8	1	33.3	13	44.8	0.259
Do you use internet to download medical content/books/ lectures from other source than faculty lectures	11	84.6	11	84.6	3	100	25	86.2	0.624
Method of your preferred choice	10	76.9	12	92.3	3	100	25	86.2	0.337
your maximum online time has used in									
Socializing	10	76.9	6	46.2	2	66.7	18	62.1	0.261
(Education)	7	53.8	9	69.2	1	33.3	17	58.6	0.467
Browsing	6	46.2	4	30.8	0	0	10	34.5	0.185
net-flex	4	30.8	3	23.1	0	0	7	24.1	0.375
Tele-learning???	1	7.7	0	0	0	0	1	3.4	0.439

Table 3: Effects of Covid-19 on Student's Education

Question	Education of Year								P value
	1st & 2nd		3rd & 4th		Final + HO		Total		
	No.	%	No.	%	No.	%	No.	%	
Did covid-19 affected your working potential	11	84.6	11	84.6	3	100	25	86.2	0.624
Covid-19 effected your career selection for future specialty	8	61.5	8	61.5	1	33.3	17	58.6	0.647
I am satisfied with response of my faculty/ institution in providing information about covid-19	9	69.2	10	76.9	1	33.3	20	69.0	0.366
I am more concerned about getting infected	9	69.2	7	53.8	3	100	19	65.5	0.185
Govt. health authorities are doing well in controlling the covid-19 wave	13	100	8	61.5	1	33.3	22	75.9	0.004
Covid-19 affected my family sources to pay for my medical education	9	69.2	7	53.8	2	66.7	18	62.1	0.710

Table 4: Effects of Covid-19 on student's physical and social life

Question	Education of Year								P value
	1st & 2nd		3rd & 4th		Final + HO		Total		
	No.	%	No.	%	No.	%	No.	%	
During pandemic my physical activities were restricted	13	100	12	92.3	2	66.7	27	93.1	0.158
Pandemic makes me more anxious	13	100	8	61.5	2	66.7	23	79.3	0.015
Pandemic makes me home sit bird	13	100	12	92.3	3	100	28	96.6	0.439
I gained weight during pandemic	10	76.9	7	53.8	2	66.7	19	65.5	0.460
My social wellbeing was at lowest	4	30.8	2	15.4	1	33.3	7	24.1	0.599

Table 5: Knowledge attitude and practices regarding e-learning by anxiety status and year of medical education

Variable		Knowledge	Practice	Attitude
GAD	Normal	2.00±0.0	3.00±0.0	3.00±0.0
	Mild Anxiety	3.60±1.43	2.80±1.40	5.30±2.16
	Moderate Anxiety	3.27±0.79	3.00±1.18	5.91±2.34
	Severe Anxiety	3.29±1.38	3.14±0.68	5.00±3.32
	P-value	0.628	0.684	0.946
Education Year	First & Second year	3.62±0.87	2.85±1.28	5.69±2.36
	Third & Fourth year	3.31±1.32	3.23±0.93	5.23±2.42
	Final + HO	2.33±1.53	2.33±1.15	4.67±4.04
	P-value	0.237	0.791	0.413

Table 6: Binary logistic regression model to evaluate the effect of Covid, e-learning, knowledge, attitude and practices regarding Covid and e-learning on anxiety status of the medical students

Variable	B	P-value	Adjusted Odds ratio	95% CI for Adj. Odds ratio	
				Lower	Upper
E-learning > 11.5	-0.945	0.414	0.389	0.040	3.756
Aptitude > 4.5	-2.723	0.050	0.066	0.004	0.995
COV > 3.5	-0.858	0.549	0.424	0.026	6.992
HS >2.5	0.867	0.534	2.381	0.155	36.620
Gen > 4.5	2.204	0.108	9.058	0.617	133.051
Practice > 2.5	1.916	0.255	6.796	0.251	184.294
Constant	-2.338	0.466	0.096		
Prediction of binary logistic regression model					
Observed		Predicted			
		Severe anxiety		Percentage Correct	
		No	Yes		
Severe anxiety	No	20	2	90.9	
	Yes	4	3	42.9	
Overall Percentage				70.3	

Table 7: Linear regression model with identified significant factors contributing towards anxiety in medical students and house officers

	Unstandardized Coefficients		T	P value
	B	Std. Error		
(Constant)	-54.67	18.92	-2.889	0.008
Age	4.14	1.11	3.718	0.001
E-learning	-0.71	0.32	-2.238	0.035
Attitude	0.96	0.38	2.495	0.020
Education level	-11.60	3.30	-3.520	0.002

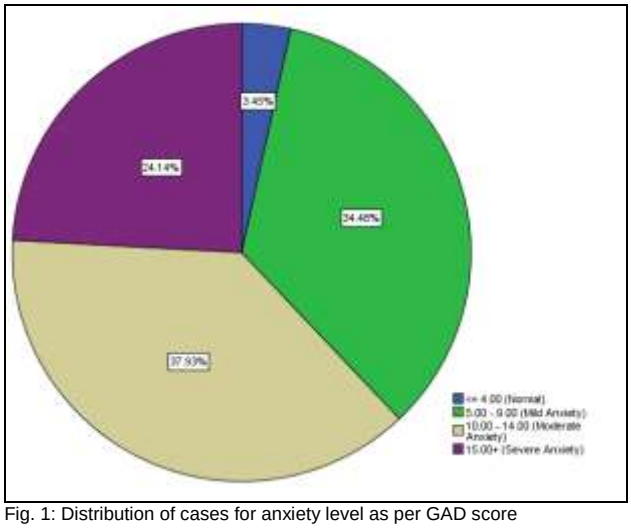

Fig. 1: Distribution of cases for anxiety level as per GAD score

DISCUSSION

In our study, level of interest of medical students working as frontline worker is less in preclinical years then clinical years. Majority of students know about COVID-19 and its consequences. The reluctancy among students is due to danger of getting infected. Jehoon et al[4] showed the same results and talked about getting infection. Hill et al[5] showed same response from students. Getting infection and lack of personal protective equipment were two main factors for reluctant behavior of students.

The study shows relative lack of motivation engaging in educational activities. This brings up with less meaning-full learning experiences. In preclinical years this affect is more than clinical years. Reasons behind this are difficulty in operating digital system which is obvious in student's responses, internet speed and finally external interferences at the place of installed internet devices at home. Al-Balas et al[6] reported un-satisfaction of students with e learning and talk about infrastructure, digital quality and students factors for unsatisfactory response. These results are similar to our study.

Majority of students considered Covid-19 had negatively impacted their learning and physical activities. They restricted at home which not only affected their health but also social life. They spent more time on social media then in learning activities. All knowledge is from social media. Strict quarantine restricted students at home, decrease in personal interaction, change and decrease participation in sports activities, increase in eating behavior all lead to sedentary life style which affect their physical health and wellness. Nikolis et al[7] noted same behavior of students.

There is strong co-relation between COVID environment and mental well being. Anxiety and depression were both prevalent in early year then clinical years group. Increase in knowledge had positive effect on anxiety. This factor can be explained by students had more time to think and plan their future. Increase information about carrier and subject improve mental well being.

Dhahri et al[8] observed the same results on final year students. But our study observed higher depression and anxiety in preclinical years then final year students. This difference is due to the increase in knowledge and change in attitude which is more positive and focused in clinical years then preclinical years. Xiong et al[9] found no co-relation between knowledge and mental well being.

Bamber et al[10] did search on mindfulness exercise and impact on anxiety and depression in students. They found decrease in anxiety and depression. Among students such exercises should be encouraged.

Short comings: This data was collected from one medical college and majority of responder were female students. It is not represented of all students but only the females.

CONCLUSION

COVID 19 impact of medical students especially in female affected their physical and mental well being. Student's sedentary life style is the reason behind such results. Their source of knowledge was more from social media less from on line lectures. Mindful exercises can bring down the anxiety. Lack of practice compromised students learning experiences. Institution need to integrate new online lecture setup in traditional way of learning and educational system.

REFERENCES

1. Baqir SM. Online medical education and examinations during covid-19: perspectives of a teaching associate. J Coll Physicians Surg Pak 2021.
2. Papapanou M, Routsi E, Tsamakis K, et al Medical education challenges and innovations during COVID-19 pandemic. Postgrad Med J 2021.
3. Izet Masic. E-Learning as new method of medical education. Acta Inform Med 2008; 16(2): 102–17.
4. Hong J, Jung I, Park M, Kim K, Yeo S, Lee J, et al. Attitude of medical students about their role and social accountability in the COVID-19 pandemic. Front Psychiatry 2021.
5. Hill M, et al. Willingness to Work amongst Australian Frontline Healthcare Workers during Australia's First Wave of Covid-19 Community Transmission. Disaster Med Public Health Prep 2021; 9;1-7.
6. Al-Balas M, et al. Distance learning in clinical medical education amid COVID-19 pandemic in Jordan: current situation, challenges, and perspectives. BMC Med Educ 2020; 20**:** 341.
7. Nikolis L, et al. Medical student wellness in the United States during the COVID-19 pandemic: a nationwide survey. BMC Med Educ 2021; 21(401).
8. Dhahri AA, et al. The psychological impact of COVID-19 on medical education of final year students in Pakistan: A cross-sectional study. Ann Med Surg 2020; 60: 445-50
9. Xiong P, et al. Factors Influencing Mental Health Among Chinese Medical and Non-medical Students in the Early Stage of the COVID-19 Pandemic. Front Public Health 202.
10. Bamber MD, et al. Mindfulness-based meditation to decrease stress and anxiety in college students: A narrative synthesis of the research. Educ Res Rev 2016; 32: 1-32.