Original Article

Virtual Teaching During the COVID-19 Pandemic and the Psychosocial Well-Being of Medical Students at College of Medicine, Jeddah

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ABSTRACT

Objective: To determine the psychosocial well-being of pandemic hit medical students in Saudi Arabia and get an insight into their experience on virtual learning during the pandemic.

Study Design: Observational / cross sectional study

Place and Duration of Study: This study was conducted at the College of Medicine (COM) (KSAU-HS), Jeddah campus from Oct 21 till Oct 22.

Materials and Methods: A total of 844 medical students were included in the study. A sample size of 265 was calculated. Convenience sampling technique was used. An online self-reported questionnaire was adopted from previously published studies to investigate the study objectives. Descriptive statistics were used to describe patients' demographic characteristics. Categorical data were reported as percentages (frequencies). The statistical analyses were carried out using S.P.S.S. (version 27).

Results: More than one third of the study population reported difficulty falling asleep (43.1%), waking up in the middle of night or early morning (32.8%) and anxiety. While only a small proportion (8 %)reported severe anxiety. Ability to record the meeting, access to online material and learning on your own pace were identified as few of the main advantages of virtual classes. While technical problems remained, the main challenge followed by missing human interaction and warmth. Most of the students considered face to face sessions to be highly effective for clinical teaching

Conclusion: As a result of the pandemic, virtual meetings continued to maintain the cycle of educational activities. The majority of the medical students reported mild to moderate anxiety. Face-to-face teaching was considered an effective tool for enhancing knowledge and a preferred method, particularly when teaching clinical skills. Moreover, they reported that face-to-face sessions were associated with a greater sense of well-being among students

Key Words: Virtual learning, COVID 19, Anxiety, Medical Students, Saudi Arabia

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INTRODUCTION

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As a result of the COVID 19 pandemic, normal life had come to a halt worldwide. The fear of catching this virus had resulted in a great deal of distress for people of all walks of life, in terms of their emotions, economics, and psychosocial welfare. It was found to have a significant impact on the health of older people and those who suffer from comorbid conditions (1). World Health Organization (WHO) declared COVID-19 a pandemic that threatened human health and wellbeing around the globe (2). In view of the

associated morbidities and deaths reported around the globe, several measures were taken to contain the spread of the virus. There are several precautionary measures that Saudi Arabia took; For instance, it closed mosques, imposed curfews, scheduled special grocery store hours, and allowing limited number of customers to enter shops, malls and food courts. Furthermore, all educational establishments were instructed to move to virtual teaching in order to protect the health.

Humans strive, survive, learn, and flourish through experience and interaction. In all age groups, COVID-induced isolation has resulted in elevated levels of anxiety and depression (3). Anxiety can adversely affect academic performance. (4). Several studies reported that lack of sleep to be associated with poor academic performance (5). The pandemic related enforced isolation had negatively affected the mental well-being of students at large.

Even though the use of virtual learning has demonstrated easy accessibility and flexibility, there is a lack of direct interaction and instant feedback between learners and instructors, particularly in the medical field. Since medical teaching requires clinical and practical experience, its effectiveness and applicability might be limited, resulting in a more difficult learning process. Interaction is an integral part of the learning process and is considered a source of motivation and engagement (6). Moreover, students may feel socially isolated and less engaged due to a lack of face-to-face contact, which may exacerbate their anxiety (3). According to another article, lack of proper communication, elevated levels of anxiety, and stress are all internal factors that can affect students' motivation and hinder the learning process [(7).]

Studies assessing the psychosocial well-being and sleep quality of medical students during the pandemic are limited. Aside from a lack of studies locally, we were unable to find any data that could be compared based on gender or level of study in medical school. This study intended to gain insight into the students' experience with virtual teaching and to assess their psychosocial well-being.

MATERIALS AND METHODS

This was an observational cross-sectional study conducted at the College of Medicine, King Saud Bin Abdul -Aziz University for Health Sciences– Jeddah, Saudi Arabia.

An online validated questionnaire through Microsoft forms was used to collect data.

Sampling Strategy: Non-probability convenience sampling technique was used. The study sample was invited using a survey link. All participants voluntarily participated in the study and were thus considered exempt from written informed consent.

Study subjects were medical students (year 3 to year 6). A recommended sample size of 265 medical students was computed by using Rao soft Online Sample Size Calculator while considering 5%, margin of error and 95%. confidence interval.

Statistical analysis: Descriptive statistics were used to describe patients' demographic characteristics. Categorical data were reported as percentages (frequencies). The statistical analyses were carried out using S.P.S.S. (version 27)

RESULTS

Demographic characteristics: The total number of study population was 844 , including 504 Male and 340 Female medical students. Though a sample size of 265 was calculated, a total of 299 students participated in this study. A total of 299 students participated in this study.

Table No.1: Participants demographic characteristics.

Variable	Frequency	Percentage
Age (mean (SD)) years		
Gender		
Males	155	51.8%
Year of medical school		
Third year	70	23.4%
Fourth year	83	27.8%
Fifth year	73	24.4%
Sixth year	73	24.4%
Have you ever participated in any type of E-Learning "before" the pandemic?		
Yes	161	53.8%

Sleep quality profile: The prevalence of sleep quality is shown in Table 2. The participants were asked to provide a profile of their sleep quality. There were 43.1% of participants who reported that they cannot fall asleep within 20 minutes more than once a week. In addition, 32.8% of the study sample reported waking up in the middle of the night or early in the morning more than once per week.

As shown in Table 4, the prevalence of anxiety (cases with severe anxiety were defined as those with a total score of 15 or more) among participants in the study was 8% (n = 24). Mild, moderate, and severe anxiety were represented by 41.5%, 13%, and 8%, respectively. The prevalence of anxiety among the study population is shown in Table 5 based on demographic characteristics.

Using logistic regression, we identified the following group as being at a higher risk of anxiety, and there were no significant differences among different student characteristics in the likelihood of developing severe anxiety.

Experience with E-Learning: Table 7 illustrates the advantages and disadvantages of E-Learning from the perspective of medical students. It is interesting to note that 72% of participants cited the possibility of recording meetings as one of the benefits of E-Learning, followed by access to online materials (60%), and learning at your own pace (56%). A majority of the

study participants agreed that technical problems are the biggest disadvantages of E-Learning (66.2%), followed by reduced interaction with the teacher by 50%, and lack of self-discipline by 47.2%.

Effectiveness of E-Learning versus traditional learning: Table 8 compares the effectiveness of E-Learning and traditional learning; however, the study members agree that face-to-face learning increases clinical skills by 70.6% (effective and extremely effective) and knowledge by 48.8% (effective and highly effective). On the other hand, 54.8% of students agree and strongly disagree at traditional learning contributes to clinical training.

Perception about E-Learning: The following table reveals the perceptions of the study sample regarding E-Learning. Online learning was negatively affecting the study sample's psychosocial well-being (37.5%; agree and strongly agree), social isolation during the COVID crisis (37%; agree and strongly agree), and anxiety due to virtual learning (28%; agree and strongly agree).

Table No.2: Participants responses regarding sleep quality items

Variable	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
A. Cannot get to sleep within 20 minutes	37.5%	19.4%	20.4%	22.7%
B. Wake up in the middle of the night or early morning	44.5%	22.7%	16.7%	16.1%
C. Have to get up to use the bathroom	52.2%	26.4%	14.7%	6.7%
D. Cannot breathe comfortably	69.2%	16.1%	6.4%	8.4%
E. Cough or snore loudly	71.2%	14.0%	8.7%	6.0%
F. Feel too cold	55.2%	21.1%	14.4%	9.4%
G. Feel too hot	59.5%	21.4%	14.0%	5.0%
H. Have bad dreams	51.8%	28.1%	14.0%	6.0%
I. Have pain	63.9%	18.7%	11.0%	6.4%
During the past month of virtual learning in COVID pandemic, how often have you taken medicine (prescribed or "over the counter") to help you sleep?	69.9%	16.7%	7.4%	6.0%
During the past month of virtual learning in COVID pandemic, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?	57.9%	23.1%	13.4%	5.7%
During the past month of virtual learning in COVID pandemic, how much of a problem has it been for you to keep up enthusiasm to get things done?	27.8%	37.1%	23.1%	12.0%

Table No.3: Participants responses regarding anxiety scale.

Variable	Not at all	Several days	More than half of the days	Nearly every day
1. Feeling nervous, anxious, or on edge	36.1%	39.8%	12.7%	11.4%
2. Not being able to stop or control worrying	37.5%	37.8%	15.7%	9.0%
3. Worrying too much about different things	32.1%	36.8%	17.4%	13.7%
4. Trouble relaxing	37.8%	37.8%	15.1%	9.4%
5. Being so restless that it is hard to sit still	53.2%	27.1%	14.4%	5.4%
6. Becoming easily annoyed or irritable	39.5%	39.5%	15.7%	5.4%
7. Feeling afraid, as if something awful might happen	51.5%	30.4%	11.7%	6.4%

Table No.4:Prevlaence of anxiety stratified by severity.

Degree of anxiety	Frequency	Percentage
Mild anxiety (score 5 to 9)	124	41.5%
Moderate anxiety (score 10-14)	39	13.0%
Severe anxiety (score 15-21)	24	8.0%

Table No.5: Mean anxiety score stratified by demographic characteristics.

Variable	Mean anxiety score (Standard deviation)	P-value
Gender		
Males	5.9 (5.1)	0.113
Females	6.8 (4.9)	
Year of medical school		
Third year	6.6 (5.6)	0.958
Fourth year	6.2 (4.3)	
Fifth year	6.4 (5.1)	
Sixth year	6.3 (5.2)	
Have you ever participated in any type of E-Learning "before" the pandemic?		
No	6.6 (5.5)	0.432
Yes	6.2 (4.6)	

Table No.6: Binary logistic regression analysis

Variable	Odds ratio of developing severe anxiety (95% confidence interval)	P-value
Gender		
Males (Reference group)	1.00	0.540
Females	1.30 (0.56-3.00)	
Year of medical school		
Third year (Reference group)	1.00	
Fourth year	0.50 (0.16-1.50)	0.214
Fifth year	0.60 (0.20-1.81)	0.361
Sixth year	1.30 (0.52-3.28)	0.573
Have you ever participated in any type of E-Learning "before" the pandemic?		
No (Reference group)	1.00	0.100
Yes	0.49 (0.21-1.15)	

Table No.7: Advantages and disadvantages of E-Learning from students perspective.

Variable	**Frequency**	**Percentage**
Advantages of E-Learning		
Access to online materials	180	60.2%
Learning on your own pace	167	55.9%
Classes interactivity	70	23.4%
Ability to record a meeting	216	72.2%
Comfortable surrounding	146	48.8%
Ability to stay at home	214	71.6%
Disadvantages of E-Learning		
Reduced interaction with the teacher	151	50.5%
Technical problems	198	66.2%
Lack of interactions with patients	17	5.7%
Lack of interaction with students	135	45.2%
Poor learning conditions at home	90	30.1%
Lack of self-discipline	141	47.2%
Social isolation	91	30.4%

Table No.8: Effectiveness of E-Learning versus traditional learning.

Variable		Extremely ineffective	Ineffective	Neutral	Effective	Extremely effective
Rate the effectiveness of E-Learning in terms of	1. Increasing knowledge	9.0%	13.4%	35.8%	22.4%	19.4%
	2. Increasing clinical skills	26.4%	28.4%	35.5%	7.4%	2.3%
	3. Increasing psychosocial wellbeing	10.7%	12.7%	45.8%	19.4%	11.4%

Rate the effectiveness of face to face traditional learning in terms of	1. Increasing knowledge	3.0%	9.7%	38.5%	25.1%	23.7%
	2. Increasing clinical skills	1.7%	3.3%	24.4%	20.1%	50.5%
	3. Increasing psychosocial wellbeing	5.0%	10.4%	42.1%	24.7%	17.7%
Describe your activity during E-Learning		8.0%	15.7%	43.5%	19.7%	13.0%
Describe your activity during traditional face-to-face learning		4.0%	12.0%	45.2%	23.7%	15.1%

Table No.9: Perception about E-Learning

Variable	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Do you think that E-Learning classes during the pandemic is enjoyable?	14.7%	16.7%	31.8%	20.4%	16.4%
Do you think that the lack of social interactions has had a negative impact on your psychosocial well-being?	11.4%	15.4%	35.8%	21.4%	16.1%
Did you feel socially isolated during the COVID-19 lockdown?	8.4%	17.1%	36.8%	20.4%	17.4%
Do you feel socially isolated during the virtual learning curriculum?	12.0%	15.4%	38.8%	19.7%	14.0%
Do you feel anxious due to the COVID-19 pandemic?	17.7%	20.7%	32.1%	15.1%	14.4%
Do you feel anxious due to the virtual learning curriculum?	19.1%	18.1%	34.4%	20.1%	8.4%

DISCUSSION

Shifting to virtual classrooms led to a 360-degree change in paradigm of human interaction that has caused several effects on both learners and educators. Our study aimed to determine the psychosocial well-being of medical students and to get an insight into their experience of virtual learning during the pandemic.

There is no doubt that medicine is a highly demanding field, with medical students subjected to high levels of stress, which can adversely affect their sleep patterns. It is extremely important to maintain a regular sleep pattern and to have a high quality of sleep in order to function normally. In essence, it is a defense mechanism that ensures that our body has a chance to recover and rest.

Our finding on sleep patterns suggests that more than one third of the respondents had a problem going to sleep. They reported waking up in the middle of the night or early morning. More than half of them said that they cannot get to sleep within 20 minutes more than once a week. While one third of them reported they had trouble maintaining enthusiasm, in order to accomplish their goals. This corresponds to a study carried out during the Italian pandemic, which found that medical students who slept less and had a high sitting time had less energy to perform activities [(8).] It was also reported in an Indian study during the pandemic that sleep disruption, anxiety, and somatization were prevalent among students and workers [(9).] An interesting study conducted in the Kingdom of Saudi Arabia suggested poor sleep quality among medical students. They reported poor sleep to be associated with higher academic performance and depression [(10).]

Home confinement during the pandemic with uncertainty and fear of the unknown had hit the world hard [(9).] Pandemic related restrictions led to restricted activities, resulting in sedentary behavior. Sedentary behavior has been found to be associated with increase in Anxiety [(11).] A Spanish study conducted during the pandemic reported sleep disturbance and effect on mental well-being on those who were physically active pre COVID while no changes were reported in those who had a sedentary lifestyle even before the outbreak.[(12).] By using the GAD questionnaire, it was found that most of the students had mild to moderate anxiety during the pandemic. Our findings correspond to a study from Malaysia, where they found out about 30% have experienced anxiety ranging from minimal to severe, with the female gender being more affected than male [(13).] Though in our study we didn't find any statistically significant difference based on gender or level of study as supported by another study from Pakistan. [(14).] Another study done in Egypt reported, high degrees of depression, anxiety, and stress respectively to be 74.5%, 47.1%, and 40.5% [(15).] This is quiet higher than the numbers depicted in our study where just a small proportion reported severe anxiety.

Social interaction has a significant effect on mental health. Shah and his colleagues showed that COVID-19 has impact on the mental health of children and adolescents. They stated that the transition to online learning significantly impacted the mental health by feeling of isolation [(16).] In contrast our study showed that only one-third of the students reported that virtual learning caused them to feel isolated and had a negative impact on their well-being. It is possible that the contrary results could be explained by a difference in

the target population, which greatly impacted the results.

Another objective of our study was to hear from the students about their experience on virtual learning Our findings showed that 36.8% of all participants found virtual learning to be enjoyable. This resonates well with medical schools locally and globally. For example, our colleagues in Unaizah College of Medicine stated that although there were some challenges, all pre-clinical medical students reported satisfaction and well acceptance to the online teaching [17]. Another study that was conducted in Kazakhstan reported improved mental health during virtual teaching [18] Unlike our findings, a study at nursing school found their female students to be having higher anxiety. [19] Online teaching's main advantage was the ability to record meetings and lectures, while technical problems were identified as the main disadvantage. The challenges identified in this study partly corresponds to a study from Saudi Arabia where technical issues, institutional style barriers, person behavioral character, and the lack of gestures were identified as the main challenges. [17].

As suggested in this study, the effectiveness of online learning greatly depends on the type of skill being taught. For example, when online learning was used for theoretical course materials, the majority of students reported satisfaction, but when it comes to teaching clinical skills, almost all students preferred regular classes. When we compare our paper with another research done locally on the population similar to ours, we found similar results [17].

Locally, several other studies were done to point out the efficacy of online learning. A survey targeting students at Saudi Arabia's university suggested that the lack of social interaction and slow internet connections were factors affecting comfortable and successful learning, however; most students were contented with the learning management systems. That study motivates higher educational organizations to create digital learning materials in future [20].

The implication of combining both types of learning can yield better outcomes regarding mental health. This suggestion is supported by a study in which hybrid learning was done in an ICU surgery elective course. The results showed both higher satisfaction and higher post-test scores [21].

As we learn through experience, we need to consider feedback as guide for future planning. The international experience on online learning should not go into vain but should be used for future planning and devising a hybrid system of education where due respect should be given to virtual teaching based on stakeholders needs.

CONCLUSION

Studying at medical school has been reported stressful by medical students around the globe even before the pandemic. The majority of the participants in this study reported mild or low levels of anxiety. No statistically significant difference was found on the basis of level of study or gender. For the purpose of teaching clinical skills, regular face-to-face classes were preferred. The ability to record classes, followed by the luxury of staying home and easy accessibility to online materials were identified as the major advantages of virtual leaning; while technical issues followed by lack of interaction were identified as few of the main drawbacks.

Limitations and Recommendations:

This is a single center study thus the results are not generalizable. Neither did we have Pre-COVID data to compare the sleep pattern and anxiety among the same cohort. Further research with detailed qualitative component would give a deeper insight into student's experience during virtual teaching. Detailed Feedback from around the globe with students from different ethnic backgrounds could be taken as a guide to integrate virtual learning as an adjuvant to face to face teaching.

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