

THE ASSOCIATION BETWEEN DISTANCE LEARNING AND OCCURRENCE OF DEPRESSION AND ANXIETY: A CROSS-SECTIONAL STUDY AMONG MALE AND FEMALE MEDICAL STUDENTS AT UMM AL-QURA UNIVERSITY

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ABSTRACT

The study objective was to explore the association between distance learning and depression and anxiety among medical students at umm Al-Qura University, Makkah, Saudi Arabia.

A cross-sectional study was conducted to assess the relationship between distance learning and depression and anxiety. A questionnaire was used at Umm Al-Qura University targeting 302 volunteers from medical students to collect the data. Students who were anxious or depressed for other causes were not included. The data was analyzed by Chi-square test.

Number of students who had anxiety and/or depression due to distance learning was low ($p > 0.05$) compared to other groups without anxiety and/or depression. 175 (56.2%) students stated that they had this feeling before applying distance learning. It was found highly significant with gender comparison (p -value: 0.008). Out of 65 respondents aged 19-20, 51 (78.5 %) indicated distance learning as a strong predictor of reduced GPA in this age group (p -value: 0.01). Distance learning was a significant predictor of lower GPAs among students in this academic year. The students of age group (21-22) were the most affected group having feeling that they got affected by the COVID-19 pandemic. Out of 243, (77.9%) of participants were females, 151 (48.4%) of them said COVID-19 impacted their ability to learn/study, whereas a total of 59 (18.9%) participants were from the second academic year. 48(15.4%) of them said that COVID-19 impacted their ability to learn/study. It is noticed that the age group (19-20) in the second year was the most affected according to age and academic year.

While distant education has little to no effect on students' mental health, there were enough number of students who attributed their depression and anxiety to distance education. However, the important factors that might have influenced the results are a lack of medical study experience, a lack of understanding of distance learning, and a lack of an appropriate learning environment.

Keywords: Distance learning; Lockdown; Medical students; COVID-19; Saudi Arabia; Depression; anxiety

INTRODUCTION

Distance learning is a studying method in which broadcast lectures are conducted by correspondence, without school or college attendance. Some higher education institutions that do not offer distance learning find it difficult to navigate the steps needed to provide such courses and programs (Fidalgo *et al.*, 2020). The worldwide web has provided access to information and the distribution of educational content to a large part of the world's population and has helped bring distance education (DE) to the digital era. DE has become increasingly popular in many universities around the world (Chavez *et al.*, 2021). However, many universities still do not offer this opportunity because they are not part of their institutional culture. As higher education becomes more widespread, countries and institutions of higher education that do not offer higher education courses will need to consider this option to retain and expand their student populations (WHO, 2020). The DE has excellent advantages such as saving time, creating a focused environment, and exploring further individual interests. The significant disadvantages are consuming time to socialize and play, resulting in various psychological disorders such as depression and anxiety (Zhai and Du, 2020).

After the discovery of the first case of COVID-19 in March 2020, Saudi Arabia and almost all countries put lockdown strategies to settle social distance by insurance of home quarantine in order to decrease the rate of disease spread until the discovery of a suitable vaccine or treatment approved by the global health community (Dong *et al.*, 2020). Countries cancelled all campus events such as workshops, conferences, sports within universities, and other activities. Universities have moved quickly to change various courses and programs from face-to-face to online learning (Kawano and Kakehashi, 2015). Various studies revealed that many different mental disorders issues such

as anxiety, stress, fear, and depression were increased during the ongoing COVID-19 pandemic (Gritsenko *et al.*, 2020).

Anxiety is considered one of the basic emotions that can be defined as uncertainty and excessive fear; it usually occurs due to the thought of continuous self-esteem throughout life, and it may block the process of ordinary thought. Anxiety can be classified according to its duration. Patients suffering from anxiety usually avoid interaction with material and favour a passive approach. Depression is a mood or emotional condition characterized by feelings of low self-esteem or guilt and reduced ability to enjoy life. A person suffering from depression usually suffers from several symptoms such as feelings of sadness, frustration, and increased self-esteem, reduced ability to enjoy everyday activities, slow energy, anorexia, and insomnia (Bao *et al.*, 2019).

Previous studies in the literature revealed an inverse relationship between student achievement and anxiety or depression, and there is an inverse correlation between depression and the awareness of actual intellectual and emotional results in online learning education (Choi *et al.*, 2017).

The prevalence of mental health issues such as anxiety and depression has been studied among Chinese academic students in China and its relationship with social media (Gao *et al.*, 2020). The research findings indicated a significant incidence of mental health issues which were positively associated with frequent social media exposure (SME) during the COVID-19 outbreak. The results revealed a high prevalence of anxiety and depression, which positively correlated with a high frequency of SMEs during the COVID-19 outbreak (Gao *et al.*, 2020). Effect of e-learning crack-up was assessed in Bangladesh that happened during the COVID-19 pandemic on psychological distress and fear of academic year loss among college students and to assess the impact of student's fear of academic year loss on student's psychological distress (Hasan and Bao, 2020). This study confirmed that ineffective e-learning and fear of academic year loss could cause psychological distress among college students.

A cross-sectional study was carried out to assess online learning advantages and disadvantages in Jordan; maintaining social distance was the most significant advantage of e-learning (Al-Balas *et al.*, 2020). The most significant drawbacks were a substandard technological setup and a lack of direct interaction. In terms of student preferences, 75% of students were dissatisfied with their experience.

Perceived stress level among students during COVID-19 was investigated in a study and it was found that during the outbreak in Saudi Arabia, there was a moderate to high-stress level among students; most participants were female (74.7%) and secondary school (79.8%) students (Al-Ateeq *et al.*, 2020). A Study conducted among Bangladeshi university students during the COVID-19 pandemic, demonstrated empirically that a significant proportion of Bangladeshi university students have experienced depression and anxiety symptoms throughout the current pandemic (Islam *et al.*, 2020). Financial insecurity has been linked to increased depression and anxiety among university students along with academic and professional insecurity (Islam *et al.*, 2020).

Another study was done to explore anxiety factors among students of distance learning in context to Allama Iqbal Open University in Pakistan where it was noticed that students felt more anxiety in the distance learning approach and they were unable to discuss or share problems with instructors daily due to distance (Ajmal and Ahmad, 2019). The objective of the study was to search out anxiety factors among distance learners. A group of students studying in distance institutions faced a lot of problems and anxiety factors. Findings revealed a significant difference between male and female university students regarding anxiety and performance. Compared to female students, male students felt slightly high anxiety levels due to different anxiety factors under study (Ajmal and Ahmad, 2019).

A cohort study depending on cluster sampling investigated the course grades and practical exam grades to measure student achievement and compared the performances of the synchronous distance education and traditional students (Goldsmith *et al.*, 2009). Academic performance did not vary statistically between the synchronous distant education and conventional cohorts in any of the 13-course grades or eight practical/lab grades assessed. These results suggest that the academic achievement of physician assistant students was not dependent upon whether they received their curricular content via synchronous distance education or standard delivery (Goldsmith *et al.*, 2009).

It was reported that anxiety leads to lower educational scoring, as anxiety in distance learning education harms life experience and expectation as a result (Gibbs and Habeshaw, 1992). Distance learners tend to fear failure, but on the contrary, can have high expectations, even unrealistic of themselves. They may have had negative experiences in education and assumed that distance learning may provide a non-enabling learning environment similar to many schools (Gibbs and Habeshaw, 1992).

In view of conflicting reports and investigations, it was necessary to have an idea about the influence of distance learning that may cause any psychological/ behavioural problems in Saudi Arabia. Hence, we planned to conduct the current study for exploring the association between distance learning and depression and anxiety among male and female medical students at umm Al-Qura University.

Subjects and Methods

The present cross-sectional study was conducted from August 23, 2021 to December 23, 2021 at Umm Al-Qura University. Students' consent / willingness for participating in the study was obtained. Those students who were found anxious or depressed due to reasons other than distance learning were excluded. The target sample size was 302 participants.

The statistics were gathered through an online survey accessible to all medical students at Umm Al-Qura University. The questionnaire consisted of four sections: participant's sociodemographic background, depression scale, anxiety scale, and distance learning as a cause of depression and anxiety.

Various questions in the questionnaire provided information i) whether the depression and /or anxiety were a brand new and as a result of distance learning? ii) whether the feeling of having depression and /or anxiety was present before the application of distance learning? iii) whether a decrease in academic activity/ record or GPA was noticed during distant learning? iv) whether COVID-19 concerns affected the ability to learn/ study?

Data was entered, compiled, and analysed using SPSS software (version 24). The Chi-square test was mainly used for statistical analysis.

RESULTS

Study conducted in the present report comprised several questions given in a questionnaire. The results for various questions for the participating students compiled in the questionnaire data of the participating students are shown below in Table 1. The first question in the questionnaire was:

1. Do you think this depression and/or anxiety is a brand new and as result of distance learning?

A total of 312 participants were analysed (Table 1). Ninety-nine students (31.6%) said that their depression and anxiety were related to distance learning divided into 31 students (47.7%) of age group 19-20, 34 students (27.0%) of age group 21-22, and 34 students (28.1%) of age group 23-25. On the other hand, there were 213 students (68.4%) who said it is not related while dividing into 34 students (52.3%) from the 19-20 age group, 92 students (73.0%) from the 21-22 age group, and 87 students (71.9%) from 23-25 age group. It is noticeable that the number of students who have anxiety and/or depression due to distance learning is low compared to other groups.

Out of 312 participants, 69 (22.1%) were male, 19 (6.1%) of them related their depression and anxiety to distance learning. However, the other 55 (16.0%) said it was not related to distance learning. 243 (77.9%) of participants were female, 163 (52.2%) of them related neither depression nor anxiety to distance learning. 80 (25.6%) of them related depression and anxiety to distance learning.

A total of 59 (18.9%) participants were from the second academic year. 32 (10.3%) imputed their depression and anxiety to distance learning, and 27 (8.7%) did not impute it to it. 54 (17.3%) were from the third academic year divided into 13 (4.2%) who related the depression and anxiety to distance learning and 41 (13.1%) who said it was not related. 75 (24.0%) were from the fourth academic year. 21 (6.7%) of them imputed their depression and anxiety to distance learning, but 54 (17.3%) did not impute it to distance learning. 40 (12.8%) of participants were from the fifth academic year. 10 (3.2%) of them related depression and anxiety to distance learning, and 30 (9.6%) did not relate it to distance learning. 84 (26.9%) of participants were from the sixth academic year. 23 (7.4%) imputed their depression and anxiety to distance learning, but 61 (19.6%) did not.

The second question was:

2. Did you have this feeling before the application of distance learning?

A total of 312 participants were analysed (Table 1). 175 (56.2%) students stated that they had this feeling before applying distance learning. Divided into 29 (9.3%) students of age group 19-20, 79 (25.3%) students of age group 21-22 and 67 (21.5%) students of age group 23-25. On the other hand, 137 (43.8%) students said they did not have this feeling before applying distance learning. Divided into 36 (11.5%) students of age group 19-20, 47 (15.1%) of age group 21-22 and 54 (17.3%) of age group 23-25.

The p-value: 0.008 was found for gender comparison, that indicated highly significant results. Out of the 312 students who participated in the study, 175 (56.2%) students stated that they had this feeling before applying distance learning. 146 (46.8%) were females, and 29 (9.3%) were males. With a total of 69 (22.1%) male student participants, 58% (40) of them had said that they did not have this feeling before the application of distance learning. Meanwhile, out of the 243 (77.9%) females, 39.9% (97) of them stated they did not have this feeling before applying distance learning.

A high significance with the academic year (p-value: 0.001) was found. 42.4% (25) of the second academic year students who participated had chosen the “yes” option. They had this feeling before applying distance learning. 57.6% (34), i.e., most of them had chosen “no”. on the other hand. Most of the 4th and the sixth academic year students chose the “yes” option stating that they had this feeling before the application of distance learning 76.0% (57), and 56.0% (47), respectively.

The third question was:

Table 1. Results of various questions in the questionnaire (questions A, B, C and D; N=312).

Questions*	YES %	NO %
A	31.6	68.4
B	56.2	43.8
C	42.8	57.2
D	62.3	37.7

*A= Do you think this depression and/or anxiety is a brand new and as result of distance learning?

B= Did you have this feeling before the application of distance learning?

C= Have you noticed a decrease in your academic activity or GPA in distant learning?

D= Do you think that COVID-19 concerns impact your ability to learn/study?

3. Have you noticed a decrease in your academic activity or GPA in distant learning?

According to age, highly significant results were obtained for the effect of distance learning on the GPA (Table 1). Out of 65 respondents aged 19-20, 51 (78.5 %) chose yes, and 14 (21.5%) chose no, indicating that distance learning was a strong predictor of reduced GPA in this age group. At the age of 21-22, 126 respondents said yes (40.5 %), whereas 75 (59.5 %) chose no, indicating that distance learning had a moderate effect on the GPA in this age range. At age 23-25 of the 121 respondents, 32 (26.4 %) chose yes, while 89 (73.6 %) chose no, indicating that distance learning had little effect on this age group's GPA.

The p-value was 0.01 for gender, demonstrated that distance learning had a very significant effect on GPA. This implies that out of 243 female respondents, 95 (39.1%) picked yes, while 148 (60.9%) chose no, demonstrating that distant education had minimal influence on female respondents. Out of 69 male respondents, 39 (56.5%) selected yes, while 30 (43.5%) selected no, showing that distance learning had a modest influence on male respondents' GPA.

According to the academic year, the distance learning highly significantly affects the GPA. By which, of the 59 total respondents in the second year, 47 (79.7%) picked yes, while only 12 (20.3%) selected no, suggesting that distance learning was a significant predictor of lower GPAs among students in this academic year. Among 54 third-year students, 26 (48.1%) responded yes, while 28 (51.9%) opted no, indicating that remote education had a negligible effect among students in this academic year. Among the 75 fourth-year students who responded, 32 (42.8%) selected yes, while 43 (57.2%) selected no, indicating that remote education had little impact on this academic year's students. With a total of 40 respondents from fifth-year students, 12 (30%) picked yes, while 28 (70%) chose no, showing that distance learning had minimal influence on this academic year's students. Among the 84 sixth-year students who responded, 17 (20.2%) selected yes, while 67 (79.8%) selected no, showing that distance learning had minimal impact on this academic year's students.

Overall, 134 (42.8%) said yes, and 178 (57.2%) chose no, indicating that distance learning had a moderate effect on the GPA overall.

The next question was:

4. Do you think that COVID-19 concerns impact your ability to learn/study?

A total of 312 participants were analysed (Table 1). 195 students (62.3%) were those having feeling that they got affected by the pandemic. Divided into 51 students (16.3%) of age group 19-20, 75 students (24.0%) of age group 21-22 and 69 students (22.1%) of age group 23-25. On other hand there were 117 students (37.7%) divided into 14 students (4.5%) from 19-20 age group, 51 students (16.3%) from 21-22 age group and 52 students (16.7%) from 23-25 age group.

It was noticed that 195 out of 312 students found that they were affected by the pandemic compared to other groups. The students of age group (21-22) were the most affected group. Out of 312 participants, 69 (22.1%) were male, 44(22.6%) of them said COVID-19 impacts their ability to learn/study, the other 25 (21.4%) said COVID-19 did not impact their ability to learn/study. 243 (77.9%) of participants were females, 151 (48.4%) of them said COVID-19 impact their ability to learn/study; meanwhile, 92 (29.5%) said COVID-19 did not impact their ability to learn/study.

A total of 59 (18.9%) participants were from the second academic year. 48(15.4%) said COVID-19 impacted their ability to learn/study, whereas 11 (3.5%) said COVID-19 did not impact their ability to learn/study. 54(17.3%) were from third academic year, 18 (5.8%) said that COVID-19 did not impact their ability to learn/study. 36 (11.5) said that COVID-19 impacted their ability to learn/study. 75 (24.0%) were from the fourth academic year. 43(13.8%) said that COVID-19 impacted their ability to learn/study, but 32 (10.3%) said COVID-19 did not impact their ability to learn/study. 40 (12.8%) of participants were from the fifth academic year. 26 (8.3%) of them said COVID-19 impacted their ability to learn/study, and 14 (4.5%) said COVID-19 did not impact their ability to learn/study. 84 (26.9%) of participants were from the sixth academic year. 42(13.5%) said COVID-19 impacted their ability to learn/study, and 42 (13.5%) did not.

DISCUSSION

Influence of anxiety and depression on distance learning investigated in the present report seems quite similar as noticed in another study (Gibbs and Habeshaw, 1992). The present study shows that most of the students who did not relate their anxiety and depression to distance learning were from age group 21-22 and above, and the students who related their depression and anxiety to distance learning were from age group 19-20. Those students were in high school before the pandemic; thus, they related their depression and anxiety to distance learning. Comparing studying in high school, which is easier than university, especially medical college, is one of the hardest specialties in university. One main reason behind anxiety and depression to distance learning especially in those of age group 19-20 revealed in the present report partly seems also due to the most significant drawbacks mentioned as substandard technological setup and a lack of direct interaction, where a majority of students were found dissatisfied with their experience (A-Balas *et al.*, 2020).

One part of the results shows that 57% of the students in the second academic year did not have these same feelings before the transmission of distance education, which in turn shows that the difference in the method of education, especially in the primary years, had a role in influencing their psychological state, provides evidence for a previous report (Choi *et al.*, 2017). On the other hand, students in the fourth and sixth academic year 76.0% (57) and 56.0% (47) respectively had these feelings of depression, which may be due to the difficulty of studying and not due to the difference in the method of education. We found that distance learning did not impact most of the participant's feelings (56.1%), except for the 19-20 age group, 55.4% of them had stated that they experienced different feelings after applying distance learning; it could be multifactorial as their young age and as they are at their first year in medical college, which would put them in a different environment and a different level of learning challenges, as depression and anxiety itself is related inversely to the online learning education (Choi *et al.*, 2017).

Depending on the results, it was found that 58% of the male students did not have this feeling before applying the distance study, which indicates that the change in the method of education had a significant impact on the students. On the other hand, 60% of the female students had this feeling before applying for the distance study, which indicates that depression and anxiety in females are not linked to distance learning. This is evident in another report where male students compared to female students felt slightly high anxiety levels due to different anxiety factors under study (Ajmal and Ahmad, 2019).

According to age and academic year, most students impacted by distance learning are between the ages of 19 and 20 in their second year of medical school, the other age and academic year groups have little to no change in their GPA. Thus, we may conclude that among those aged 19-20 or in their second year of medical school, the underlying cause is distance learning and alterations in the study approach as they just came from the pre-medical year. According to males and females, GPA was less affected among females while modest effect among males, that might be explained by an earlier report (Ajmal and Ahmad, 2019), explaining the influence of anxiety due to various anxiety factors.

The most affected group age by the COVID-19 pandemic was between 21 and 22 years old (24.0%), due to the great change taking place in their lives at this stage, the challenges they face, the lack of experience in studying medicine, the lack of clarity about the mechanism of distance learning, as well as the lack of an appropriate environment for learning. Similar results were obtained in another study where COVID-19 pandemic demonstrated a significant proportion of university students having depression and anxiety symptoms throughout the pandemic

(Islam *et al.*, 2020). Financial insecurity has been linked to increased depression and anxiety among university students along with academic and professional insecurity (Islam *et al.*, 2020). It is noticed that the second year was affected by the COVID-19 pandemic due to the change in the school system and the difference in the amount of scientific material, while the sixth year is the least affected by this pandemic due to their adequate understanding of the study system and their adaptation to studying medicine in general.

The present study reveals that 243 (77.9%) of participants were females, and 151 (77.4%) of them were more affected than males by the Covid-19 pandemic, because women have other responsibilities, such as caring for the home, some of these women may be mothers and have children that must be taken care of, also because women are more susceptible to anxiety and depression, which contributed to their impact on this pandemic more.

This part of the results is evident in a report where a moderate to high-stress level during COVID-19 pandemic among Saudi students was noticed, and most of the participants having high stress were female (74.7%) and secondary school (79.8%) students (Al-Ateeq *et al.*, 2020).

There is a potential cross-sectional study similar to the present work (Qanash *et al.*, 2020), that was conducted in the western region of the Kingdom of Saudi Arabia and aimed to assess the psychological impact of the COVID pandemic on health science students in the Kingdom of Saudi Arabia and to determine the students' perception of the distance learning process since the imposition of the curfew. The results showed that the younger age and female gender were more psychologically affected, and the students who did not suffer from depression and anxiety were more likely to prefer distance learning, while the students who suffered from anxiety and depression did not agree with that (Qanash *et al.*, 2020).

Limitations in the current study mainly include a small sample size especially for male participants in the present study. Hence, further well controlled studies using large sample size might clarify the precise association between distance learning and depression and anxiety in subjects with various age groups.

Conclusion

The forced transition to a distance learning format has become a new challenge for medical students. It is found that there is no or little association between distance learning and the occurrence of depression and anxiety. It is noticed that the age group 19-20 years in the second year were the most affected according to age and academic year. Summarizing all together, and based on the current results, distance learning had little to no effect on students' mental status. However, there are enough number of students who relate their depression and anxiety to distance learning. Thus, we cannot neglect students who were affected.

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