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The Psychological and Academic Impact of COVID-19 among Students of College of Medicine in Saudi Arabia 2020-2021

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ABSTRACT

Background: *The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an emerging infection causing a widely spread pandemic of Coronavirus disease 2019 (COVID-19). The continuous spread of COVID-19, strict isolation measure, delays in starting colleges, attending offline classes, facing challenges to conduct high school grades for medical students across the country is expected to influence the psychological health and academic yielding of the students of colleges of medicine in Saudi Arabia.*

Objectives: *This study aims to assess the psychological and academic impact of COVID-19 among the students of colleges of medicine in Saudi Arabia.*

Methodology: *This cross-sectional study conducted from October 2020-March 2021 in which a survey conducted among medical students from 10 colleges of medicine in Saudi Arabia. An online questionnaire was conducted using social media platforms, including WhatsApp and Twitter, as well as email. The survey requested demographic and socioeconomic information, in addition to 4-point Likert Scale to assess the psychological and academic impact.*

Results: *There were 661 responses in total. Most of the participants were female 51% (n=332), from Majmaah University 20.6% (n=134), and from the sixth year 26.3% (n=171). Majority of the participants were between the ages of 18 and 23 years 59.6% (n=388). The prevalence of COVID-19 among the participants was only 11.06% (n=72). During the height of the pandemic, 39.6% of the participants (n=258) stated that their GPA had risen. The extent of psychological distress was calculated using a 4-point Likert Scale, and the majority of the students (n=328) had moderate psychological distress. Similarly, most of the students had moderate academic impact 34.87% (n=227) due to COVID-19. There were a significant association between the degree of psychological distress and gender with male students reporting more mild 7.2% and moderate distress 23% while female students reported more moderately severe 20.1% and the severe distress 4.3%. In addition, there were an association between the level of stress and the academic performance.*

Conclusion: *The result suggest that the COVID-19 has a moderate psychological distress and also moderate academic impact among students of colleges of medicine in Saudi Arabia.*

Key words: COVID-19, SARS-CoV-2, Psychological health, Emerging infection

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INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) is a zoonotic infectious disease caused by the new strain of coronavirus called Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The coronaviruses are a large family of viruses that can cause disease in animals as well as in humans. Many health experts believe that the new strain of coronavirus likely originated in animals like bats or pangolins. The first transmission to humans was in the Chinese city, Wuhan at the end of December 2019 and since then, the virus has mostly spread through person-to-person contact. The virus spread from the infected person to another person through close contact within around 6 feet without protection. In addition, it can spread through air droplets from the infected persons when they cough, sneeze and talk. These droplets can also land on nearby surfaces or objects. Other people can pick up the virus by touching these surfaces or objects, and then the infection is likely to occur if the person touches their nose, eyes, or mouth. The common symptoms of COVID-19 include fever, cough, and shortness of breath and sometimes develops into pneumonia. It may cause severe complications in persons with immunodeficiency, the elderly and persons with chronic diseases such as cancer, diabetes and lung diseases. Worldwide, Until 20th November 2020, the total number of the confirmed cases is 57,385,576. The total recoveries are 39,864,209 (69.5%). And the total deaths are 1,368,551 (2.4%). In Saudi Arabia, the total confirmed cases are 354,813. 342,404 (96.5%) are the total recoveries. 5745 (1.6%) are the total deaths. The active cases till now are 6664 (1.9%.) From these 793 (0.2%) are critical case that are treated in ICU [1].

Objectives

- To study the psychological-Academic Impact of COVID-19 among students of college of medicine in Saudi Arabia 2020-2021.
- To determine background information of students of college of medicine in Saudi Arabia 2020-2021.
- To assess the psychological impact of COVID-19 among students of college of medicine in Saudi Arabia 2020-2021.
- To assess academic impact of COVID-19 among students of college of medicine in Saudi Arabia 2020-2021.

METHODOLOGY

Study design

Descriptive cross-sectional institutional based study.

Study area

There were 24 public colleges of medicine of females and males in Saudi Arabia distributed in all regions of kingdom, in Riyadh region there 4 colleges of medicine, in middle region 4, in Eastern province 2, in western region 5, in northern region 4, and in southern region 5. the first college of Medicine was a medical college of King Saud University and established in Riyadh region in 1967. Studying medicine in Saudi Arabia requires 7 years, 6 years in college and 1 year which is called internship will be in hospital. Furthermore, after graduating students become general practitioners and there is Saudi board to those who want to get specific specialty.

Study population

The target population of this study were Male and Female students of college of medicine in Saudi Arabia to identify Psychological-Academic Impact of COVID-19 among them. In the year 2018/2019 the number of students of college of medicine in the Kingdom of Saudi Arabia was more than 20,000 students.

Inclusion criteria: Males and Females students of Colleges of Medicine, Saudi Arabia.

Exclusion criteria: Students of college of medicine who was not studying in the 10 colleges that has been mentioned.

Sampling

Sample size: Equation calculation.

The sample size was calculated by using the following formula:

$$n = \frac{Z^2\, p\,(1-p)}{d^2} \rightarrow n = \frac{(1.96)^2\,(0.5(1-0.5))}{(0.5)^2} = 384.16$$

The calculated sample size is 768.32, and it is increased to 800.

The number of clusters was calculated by using the following formula:

$$n = \frac{(NZ^2\, P(1-P))}{(Nd^2+Z^2\, P(1-P))}$$

$$n = \frac{24*(1.96)^2 * 0.5\,(1-0.5)}{24\,*(0.005)^2 + (1.96)^2\,(0.5(1-0.5))}$$

$$n = 22.6$$

So, the study performed among 24 colleges of medicine but due to the financial and time issues there were 10 colleges out of 24 colleges chosen and each college represent a cluster.

Sample design: Cluster sampling.

- In the study the selected number of 10 clusters:
- Imam Abdulrahman Bin Faisal University, Dammam
- Umm Al-Qura University College of Medicine and Medical Sciences, Makkah
- College of Medicine, Shaqra University
- University of Hail College of Medicine
- King Saud bin Abdulaziz University for Health Sciences, Riyadh
- King Saud University College of Medicine, Riyadh
- Majmaah University College of medicine, Riyadh
- Qassim University College of Medicine, Buraidah
- King Abdulaziz University Faculty of Medicine, Jeddah
- College of medicine, Al-Ahsa

The 10 clusters selected by a simple random sample from a list of all colleges.

Data collection: Pre-tested, pre-coded, questionnaire were used to collect data. The questionnaire was containing socio-demographic data and data of psychological and academic impact of COVID-19 among students of college of medicine in KSA. The questionnaire was filled by female and male students of college of medicine in all academic levels including those who are in the internship year. Online version was used.

Data management and analysis: Data was analyzed by computerized program, Statistical Package for the Social Sciences (SPSS) version 23.

Ethical consideration: Informed consent was obtained from all participants who were enrolled in the study, Confidentiality, respect and dignity were maintained throughout the research process. An ethical approval from university ethical committee was taken.

LITERATURE REVIEW

COVID-19 is an infectious disease caused by a newly discovered coronavirus. Most people infected with COVID-19 will have mild to moderate symptoms and will recover without any special treatment. It is spread primarily by droplets produced by infected people coughing, sneezing, or exhaling. These droplets are too large to float in the air and fall to the ground or other surfaces. Other people may get COVID-19 by inhaling the virus when in close proximity to someone who has it, or by touching a contaminated surface and then touching their eyes, nose, or mouth. The virus was first detected in Hubei Province in December 2019, when a cluster of viral pneumonia cases was identified. The cause of the pneumonia has been established as a new coronavirus. The virus spread across China, causing an outbreak. With tens of thousands of coronavirus cases recorded across China, Chinese health officials took the unusual step of putting nearly 60 million people under quarantine. Despite large quarantines, the virus spread beyond China's borders and into other countries. On January 30, 2020, the United States announced the first recorded case of person-to-person transmission. Despite all the precautions, there were more confirmed COVID-19 cases outside of China than within China by February 26, 2020. The World Health Organization (WHO) announced a global pandemic on March 11, 2020 [2].

On 2 March 2020, the Ministry of Health announced the first case in Saudi Arabia, and in the months that followed, the kingdom had the highest number of confirmed cases among Arab countries. On March 21, the kingdom declared that all domestic and international travel will be suspended, with domestic travel resuming on May 21. The number of regular reported cases dropped significantly after curfews and lockdowns were imposed on many administrative track levels, and by June 21, all curfews had been lifted through a three-phase program enacted throughout the region, with the exception of Mecca. By mid-July, there were more regular recoveries than cases in the kingdom. Just 10,000 socially isolated pilgrims were able to participate in the annual pilgrimage, which took place in the last week of July and the first week of August 2020. The emergence of COVID-19 has triggered an ongoing public health crisis around the world. It has an effect not only on people's health but also on how they learn, function, and live. Among the many significant challenges confronted during COVID-19, the most significant is the effect on education.

Many countries have had to close schools in order to stop the virus from spreading, which has resulted in a significant decrease in the virus's spread. The development of online learning platforms to help teachers, students, and their families has become almost universal in response to school closures. Students, on the other hand, do not all have equal access to information and communication technology. The closing of schools in response to the COVID-19 pandemic has brought to light a number of issues affecting educational access as well as broader socio-economic issues such as a lack of access to technology or quick, reliable internet access, particularly among students who live in rural areas or come from low-income families. Working parents, on the other hand, are more likely to miss work when schools are closed to care for their children, which has a negative effect on productivity. Many tests were automatically canceled during the first semester of the pandemic, and some were deferred to the next semester. Furthermore, some colleges choose not to include grades from courses that students have already completed in their Grade Point Avrage (GPA). COVID-19's effect on academic credibility has been observed all over the world. An increase in cheating, academic file sharing, and exam cheating, for example, have been described as major issues. Since the beginning of COVID-19 in March, cheating has become much easier for students due to the fact that learning is now done remotely.

Other than the academic effects of COVID-19, it has a profound psychological distress which is rapidly occurred worldwide. As the coronavirus pandemic spreads around the globe, it is causing widespread anxiety, worry, and concern among the general public, as well as specific groups such as older people, caregivers, and people with underlying health conditions. During early periods of the pandemic, the biggest psychological effect in terms of public mental wellbeing has been increased stress or anxiety levels. However, the psychological impact of quarantine related to COVID-19 infection has been additionally documented which has many effects on many people's normal activities, habits, or livelihoods, alienation, depression, unhealthy alcohol and drug use, and self-harm or suicidal behavior were expected to increase. There is a study conducted in New York City to understand the psychological effects of COVID-19 on the medical students and to identify the risk factors that are associated with higher distress and the protective factors which are associated with resilient trajectories. This study included 200 students eligible for a Major Depression (MD) across all class years who have completed a self-report survey. The survey contains questions regarding volunteerism, the level of exposure and impact of COVID-19, and the burden of psychological symptoms. Also, the Generalized Anxiety Disorder-7 scale (GAD-7) and modified versions of the Patient Health Questionnaire-9 (PHQ-9) and Post-Traumatic Stress Disorder (PTSD)-Checklist were used as endpoints. Most of the participants were between the age 25 and 29 years old (69%) while only 31% were between 18 and 24 years old. Among the students who did volunteer (n=164) had higher ratings of depressive and anxious symptoms [3].

Differences also seen by class year for PTSD and depressive symptoms, with third-year students (n=63) in number having significantly lower PTSD scores than first-year students (n=44) and students in their PhD years (n=10). Students in their PhD years also had significantly higher PTSD scores than fourth-year students (n = 38). Third-year students also had significantly lower depressive symptoms than first-year students. Gender differences were also existing in which females (n = 111, 56%) had significantly higher ratings of

both depressive and anxious symptoms compared to males (n = 85, 43%). In addition, a multicenter quantitative study done to study the effects of the COVID-19 pandemic on medical students. The COVID-19 pandemic disrupted the United States (US) medical education system with the necessary, yet unprecedented Association of American Medical Colleges (AAMC) national recommendation to pause all student clinical rotations with in-person patient care. This study is a quantitative analysis investigating the educational and psychological effects of the pandemic on US medical students and their reactions to the AAMC recommendation in order to inform medical education policy.

Seven hundred forty-one (29.5%) students responded. Nearly all students (93.7%) were not involved in clinical rotations with in-person patient contact at the time the study was conducted. Reactions to being removed were mixed, with 75.8% feeling this was appropriate, 34.7% guilty, 33.5% disappointed, and 27.0% relieved. Most students (74.7%) agreed the pandemic had significantly disrupted their medical education and believed they should continue with normal clinical rotations during this pandemic (61.3%). When asked if they would accept the risk of infection with COVID-19 if they returned to the clinical setting, 83.4% agreed. Students reported the pandemic had moderate effects on their stress and anxiety levels with 84.1% of respondents feeling at least somewhat anxious. Adequate personal protective equipment (PPE) (53.5%) was the most important factor to feel safe returning to clinical rotations, followed by adequate testing for infection (19.3%) and antibody testing (16.2%). The COVID-19 pandemic disrupted the education of US medical students in their clinical training years. The majority of students wanted to return to clinical rotations and were willing to accept the risk of COVID-19 infection. Students were most concerned with having enough PPE if allowed to return to clinical activities.

Another cross-sectional conducted in United State to evaluate the prevalence of anxiety and depression among medical students during COVID-19 pandemic and it was from April 13, 2020 to April 28. The total number of Students who participated in this survey was 1,428, the prevalence of anxiety and depression among students was 30.60% and 24.3%. In GAD score It was higher in females and preclinical students. Another cross-sectional study was conducted in Australia to assess the impact of COVID-19 on medical student mental well-being, assess concerns and determine activities used by students to help with the situation. The data collected through online survey containing questions focused on the concerns and the impact of COVID-19. The Kessler-10 (K10) measured psychological distress. Total participants were 297 students with a 37.5% response rate. The mean K10 score was 20.6 which indicate moderate psychological distress. No significant differences were reported in K10 mean between students of different years of the medical course. 68% of the students reported deterioration in mental well-being since the onset of the COVID-19 pandemic. The main negative impacts of the pandemic were on studies and stress levels, also on the social connectedness. In addition, there were concerns regarding the uncertainty about returning to normal and graduation. Common activities were using video chats, social media, exercise and hobbies [4].

In conclusion, the effect of COVID-19 pandemic on the mental well-being of the students, has led to legitimate concerns related to their studies and progress through the medical course. In order to ensure that academic goals are achieved, we hope to minimize these disruptions, and reassure and support students. There is a prospective, observational, multicenter study was conducted to assess the effects of the COVID-19 pandemic on medical students and interim foundation year doctors across the United Kingdom (UK), and the support that they received and sought. There were 2075 individuals participated in the survey from 33 medical schools. There was a significant decrease in participants' mood during the pandemic as compared to their mood before the pandemic ($p<0.0001$) and 931 participants wanted more support from their university.

Furthermore, a study done in Turkey aimed to investigate the psychological impact of the COVID-19 pandemic on medical students. This study aimed to investigate the knowledge of medical students about COVID-19, the effects of the traumatic situation they experienced, the stress they perceived and the factors affecting them. In addition, we aimed to learn the thoughts of the students about the virus due to the uncertainties.The total number of participants was 275 students. No student was infected with COVID-19 at the time of the survey. The presence of chronic disease in the participants was found to be a factor that increased anxiety ($p = 0.01$). Majority of participants (60.40%) stated that they agree with COVID-19 is a biological weapon. The mean scores of women 's total PSS and IES-R were higher than men. It was found that the families of the students had a lower monthly income than the minimum monthly wage is increasing the anxiety about getting COVID-19 infection and perceived stress. One-third of the students reported that sleep and appetite were impaired than the before pandemic. The announcements and website of Ministry of Health and the social media was the main source of information of the participants. It was found that medical students were highly worried about being infected with COVID-19. The scores obtained from the pre-clinic students' anxiety to become infected with COVID-19, Perceived Stress Scale (PSS) and Impact of Event Scale Revised (IES-R) total scores were found to be significantly higher than their clinical students.

In addition to another study that was also conducted in Turkey to explore the impact of the COVID-19 pandemic on medical students, to assess their anxiety level, and their main anxiety sources related to this pandemic. A Google Form include the Beck Anxiety Inventory and sociodemographic questions, perceived level of knowledge about the epidemic, self-risk perceptions of COVID-19 and their anxiety levels about some other topics related to COVID-19 was distributed to medical

students using the virtual snowball sampling method. There were 3105 participated medical students with a mean age of 22.37 ± 2.46, among them, only 32% defined their knowledge about the precautions that should be taken during COVID-19 pandemic. Significant anxiety prevalence was 23.2% were the students being anxious about the continuing spread of COVID-19 in Turkey and/or acquiring COVID-19.

A cross-sectional study conducted in Japan to evaluate the factors associated with psychological distress among medical students during quarantine from March through May 2020. Total number of participants was 571.163 respondents (28.5%) scored ≥ 5 on the K-6 scale, indicating a significant degree of psychological distress. Multiple regression analysis focusing on students with a K-6 score ≥ 5 revealed that higher scores on General Self-Efficacy Scale (RSES) correlated with lower levels of psychological distress. By contrast, those with higher Rosenberg Self- Assessment Scale (GSES) scores also scored higher for indicators of psychological distress. Another cross-sectional study was also conducted in Japan to provide details on how medical students have been affected by the pandemic. A total of 717 medical students participated in the web-based surveys, that include questions about how the participants' mental status had changed from before to after the Japanese nationwide state of emergency (SOE). Out of 717 medical students, 473 (66.0%) participated in the study. There were 29.8% (141/473) of the students reported concerns about the shift toward online education. The subjective mental health status of the participants significantly worsened after the SOE was lifted (P<0.001).

A cross sectional study also done to study the psychological impact of COVID-19 on medical education of final year students in Pakistan has resulted in a strong impact on students' wellbeing, with associated uncertainty about the future. Majority of participants (n = 1753/2661, 65.9%) were female. Despite timely closure of institutes, delay in the start of the online teaching (beta coefficient 0.08, P-value 0.02) was significantly correlated with the depressive symptoms. A significant percentage of students (n = 1594, 59.9%) wanted a delay in exit exams due to intimidation. A similar proportion of students also lost confidence to be a competent doctor in future which was positively associated with male gender (beta coefficient 0.21, P-value < 0.001). The study shows that COVID-19 pandemic has brought significant psychological influence on the medical education of final year students. Despite a stressful crisis, final year medical and dental students are still willing to serve the community. In addition to supporting their emotions and psychological wellbeing, stress counselling, and transforming current medical curricula is crucial to pursue ceaseless medical education and to become a safe future doctor [5].

In addition, a cross-sectional study was conducted among medical students from more than 13 medical schools in Libya. This survey aimed to provide an overview of the situation experienced by medical students during the COVID-19 pandemic, and to determine the knowledge, attitudes, and practices of medical students regarding electronic medical education. A paper-based and online questionnaire was conducted through social media and email. The questionnaire includes questions about the demographic and socioeconomic information, medical educational status during the pandemic, information regarding the online learning and electronic devices as well as assessments of mental health, and the knowledge, attitudes and practices about e-learning. The total participants were 3,348. Most of the participant respondents (64.7%) disagreed that e-learning could be implemented easily in Libya as compared with 54.1% of the respondents who agreed that interactive discussion is achievable by means of e-learning. However, 54.8% disagreed that e-learning could be used for clinical aspects as compared to only 21.1% who agreed with this statement and 24% who were neutral.

65% of the participants reported using the internet for participating in study groups and discussions, while only 27.7% had participated in online medical educational programs during the COVID-19 pandemic. Finally, there should be support for providing solutions to reduce this disruption like virtual clinical experience and online training. These measures could then be followed by hands-on experience that is provided in a safe environment. A cross-sectional study was conducted in May 2020 to evaluate anxiety and depression disorders among medical students during COVID-19 pandemic by using GAD-7 questionnaire for anxiety and PHQ-9 questionnaire for depression. There were 340 (97.98%) participated students. Results indicate a positive significant relationship between females and social distancing and GAD-7 as well as PHQ-9. A prospective descriptive study conducted on undergraduate medical students from three of the top medical schools in the Republic of Sudan, all of which are recognized by the WHO. The study aimed to identify the effect of the COVID-19 outbreak on the psychological and academic status of medical students in Sudan. Data were collected between June and July 2020 using multiple conventional methods on an online-based pre-tested & validated 45 items questionnaire.

Also, a cross-sectional survey was distributed to Health Science Student for the period between April 2020 to June 2020. Aim of this study to assess Psychological Effects of COVID-19 among students. A total of 721 students completed the survey with the majority being females. 25% of students had experienced anxiety, while 35% had depression. Prevalence of anxiety and depression were noted in over 6% of the participants. Younger age and female gender were more affected psychologically. Locally, a cross-sectional design to assess the general population's psychological impact on the COVID-19 pandemic at the time of curfew and lockdown in the kingdom of Saudi Arabia, through online-based questionnaire distributed through social media apps, like WhatsApp and Twitter. The surveys collected data about several aspects of participant sociodemographic, knowledge, concerns, psychological impact, and mental

health status. The psychological impact and mental health status were assessed using the Impact of IES-R, and the Depression, Anxiety, and Stress Scale (DASS-21). Total respondents were 1160 of the general public of Saudi Arabia. Moderate or severe psychological impact of the outbreak reported in 23.6% of the participants, and moderate to severe depressive, anxiety, and stress symptoms reported in 22.3%.

Females reported IES-R (B: 5.46, 95% CI: 3.61 to 7.31) and DASS subscales B coefficient ranged from 1.65 to 2.63, along with high-school students, people working in the medical field, and poor self-reported health status was significantly associated with a high level of IES-R and DASS scales ($p<0.05$). Experiencing breathing difficulty and dizziness showed a stronger association with higher IES-R and DASS subscales than other somatic symptoms such as headache and fever. ($p<0.001$). The participants who practiced specific preventative measures such as hand washing and social distancing, showed a protective effect against the psychological effects of COVID-19, stress, anxiety, and depression symptoms. Also, social distancing appeared to be protective on stress and anxiety subscales (B: -1.49, 95% CI: -2.79 to -0.19) ,(B: -1.53, 95% CI: -2.50 to -0.57), respectively; and hand hygiene on depression subscale (B: -2.43, 95% CI: -4.44 to -0.42). Finally, during early stage of the COVID-19 pandemic in Saudi Arabia, the results showed that moderate to severe psychological impact of the COVID-19 pandemic was experienced by about one-fourth of the sampled general population. On other hand, specific protective measures appeared to have a protective effect on the individual's mental health.

Regarding the medical students, a study done in Riyadh, Saudi Arabia at the College of Medicine (COM) of Alfaisal University through emailed survey, aimed to analyze the impact of the COVID-19 pandemic on online education. Total respondents is 208, 54.8% of the respondents were females, and 66.8% were medical students; 14.9% were master's students, and 18.3% were faculty members. 41.8% of the respondents reported having little or no online teaching/learning experience before the pandemic. In addition, 62.5% of the participants preferred integration of both online and face-to-face instructions. There were many challengesreported that are related to communication with (59%), student assessment (57.5%), use of technology tools (56.5%), online experience (55%), pandemic-related anxiety or stress (48%), time management (35%), and technophobia (17%). Despite these challenges, most of the respondents (70.7%) believed that the COVID-19 pandemic has increased their level of confidence in the effectiveness of online medical education. So, 76% of participants are prepared to blend the online experience that they got during the COVID-19 pandemic into their practice. In conclusion, the impact of the COVID-19 pandemic on online medical education is largely positive.

RESULTS-DESCRIPTIVE

Table1: Demographic characteristics of students of colleges of medicine in Saudi Arabia 2020-2021.

Variables	n=651	Percent
	Age	
>23	263	40.4
18-23	388	59.6
	Gender	
Male	319	49
Female	332	51
	Marital status	
Married	54	8.3
Single	597	91.7
	Place of residence	
Central region	179	27.5
Eastern region	119	18.3
Northern region	38	5.8
Southern region	137	21
Western region	178	27.3
	Family size	
02-Apr	83	12.7
04-Aug	360	55.3

>8	208	32
Father education		
Bachelor	247	37.9
High school	141	21.7
Primary school	67	10.3
Secondary school	84	12.9
Mother education		
Bachelor	251	38.6
High school	141	21.7
Primary school	104	16
Secondary school	59	9.1
Monthly income (SAR)		
5000-10000	173	26.6
<5000	104	16
>10000	374	57.5

This study done among 651 participants. Table 1 shows that most of the participants were in the age between 18-23 (n=388, 59.6%) while only 40% were in the age >23 (n=263) out of these 651 participants, there was a (319, 49%) male and (332, 51%) female. and (54, 8.3%) of them was married while (597, 91.7%) was single. In this study, there is (179,27.5) responses from the central region, (119, 18.3%) from eastern region, (38, 5.8%) northern region, (137, 21.0%) southern region and (178, 27.3%) from western region. The family size for the participants of a 2-4 in (83, 12.7%), 4-8 in (360, 55.3%) and >8 in (208, 32.0%). For the father education, (247, 37.9%) of them had bachelor's degree, (141, 21.7%) had of them finished the high school, (67, 10.3%) finished the primary school, (84, 12.9%) had finished secondary school. For the mother education (251, 36.6%) of them had bachelor's degree, (141, 21.7%) had of them finished the high school, (104, 16.0%) finished the primary school, (59, 9.1%) had finished secondary school. The monthly income for (173, 26.6%) of participants was between 5000-10000, (104, 16.0%) was <5000 and (374, 57.5%) was >10000.

Table2: University Name of Students of Colleges of Medicine in KSA 2020-2021.

Variables	N=651	Percent
College of medicine, Al-Ahsa	50	7.7
College of Medicine, Shaqra University	6	0.9
Imam Abdulrahman Bin Faisal University, Dammam	32	4.9
King Abdulaziz University Faculty of Medicine, Jeddah	34	5.2
King Saud bin Abdulaziz University for Health Sciences, Riyadh	15	2.3
King Saud University College of Medicine, Riyadh	12	1.8
Majmaah University College of medicine, Riyadh	134	20.6
Qassim University College of Medicine, Buraidah	10	1.5
Umm Al-Qura University College of Medicine and Medical Sciences, Makkah	125	19.2
University of Hail College of Medicine	7	1.1
Total	651	100

Table 2 show the colleges of the participants where 20.6% (n=134) of them were from Majmaah University College of medicine, 19.2% (n=125) were from Umm Al-Qura University College of Medicine and Medical sciences, 7.7% (n=50) were from College of medicine, Al-Ahsa. Also, 5.2% (n=34) were from King Abdulaziz University Faculty of medicine, Jeddah, 4.9% (n=32) were from Imam Abdulrahman Bin Faisal University, Dammam. In addition, only 2.3% (n=15) were from King Saud Bin Abdulaziz University for Health Sciences, Riyadh and

1.8% (n=12) were from King Saud College of Medicine, Riyadh. The least number of the participants were from Qassim University College of Medicine, Buraidah 1.5% (n=10) followed by University of Hail College of medicine 1.1% (n=7) and College of Medicine, Shaqra 0.9 (n=6). Most of the participants were from other colleges account for 34.7% (n=226).

Table 3: Level by Years of Students of Colleges of Medicine in KSA 2020-2021.

Variables	n=651	Percent
First year	35	5.4
Second year	44	6.8
Third year	75	11.5
Fourth year	158	24.3
Fifth year	168	25.8
Sixth year	171	26.3
Total	651	100

The level of the participants was determined in Table 3, showing that, most of the participants were in the sixth year (n=171, 26.3%) followed by the fifth year (n=168, 25.8), (n=158, 24.3) were in the fourth year. Also, the participants in the third year were (n=75, 11.5%) and only (n=44, 6.8%) were in the second year. The least number of participants were in their first year (n=35, 5.4%).

Table4: Current GPA of Students of Colleges of Medicine in KSA 2020-2021.

Variables	n=651	Percent
<3.5	113	17.4
3.5-3.99	207	31.8
4.0-4.49	161	24.7
4.5-5.0	170	26.1
Total	651	100

The current GPA was asked. (Table 4) showing that, most of the participants 31.8% (n=207) have GPA=3.5-3.99. And the participants who have GPA= 4.5-5.0 were 26.1% (n=170). GPA=4.0-4.49, account for 24.7% (n=161) of the participants. Only 17.4% (n=113) have current GPA <3.5.

Table5: The effect of COVID-19 pandemic on GPA of students of colleges of medicine in KSA 2020-2021.

Variables	n=651	Percent
The GPA decreased	161	24.7
The GPA increased	258	39.6
No change in the GPA	232	35.6
Total	651	100

Another question was asked to determine whether the GPA affected by COVID-19 pandemic. (Table 5) showing that most of the participants 39.6% (n=258) said that their GPA has increased, whereas only 24.7% (n=161) said that their GPA has decreased and 35.6% (n=232) said there is no change in the GPA.

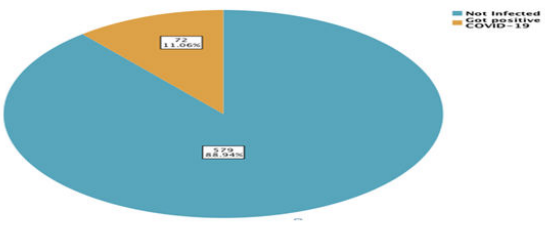

Figure 1: Prevalence of COVID-19 among students of colleges of medicine in KSA 2020-2021.

The prevalence of COVID-19 among students of colleges of medicine in Saudi Arabis is 11.1% (n=72). On the other hand, 88.9% (n=579) of students who did not infected with COVID-19 Figure 1.

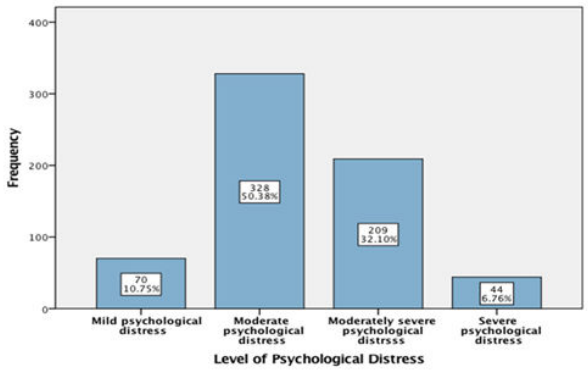

Figure 2: The level of psychological distress due to COVID-19 among students of colleges of medicine in KSA 2020-2021.

The level of psychological distress was determined by 4-points Likert scale and Figure 2 demonstrate that. Most of the participants 50.38% (n=328) had moderate psychological distress, 32.10% (n=209) had moderately severe psychological distress, followed by 10.75% (n=70) of the participants had mild psychological distress and only 6.4% (n=44) had severe psychological distress.

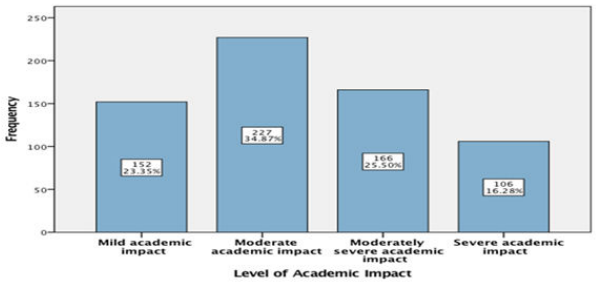

Figure 3: Level of academic impact of COVID-19 among students of colleges of medicine in KSA 2020-2021.

In addition, the level of academic impact was determined using 4-points Likert Scale and the result was, 120 (18.43%) of students has severely academic impact, 166 (25.5%) of students has moderately sever academic impact, 227 (34.87%) of students has moderate academic impact and 138 (21.20%) of students has mild academic impact Figure 3.

Table 6: 4-points Likert Scale of Psychological Distress Due To COVID-19 Among Students of Colleges of Medicine in KSA 2020-2021.

	Strongly disagree	disagree	Agree	Strongly agree
Most afraid of COVID-19.	-160	-219	-199	-73
	24.60%	33.60%	30.60%	11.20%
It is uncomfortable to think about COVID-19.	-174	-242	-167	-68
	26.70%	37.20%	25.70%	10.40%
Afraid of losing my life because of COVID-19.	-223	-206	-134	-88
	34.30%	31.60%	20.60%	13.50%
Watching news and stories about COVID-19 on social media causes nervousness or anxiety.	-224	-202	-157	-68
	34.40%	31.00%	24.10%	10.40%
It is difficult to sleep because getting COVID-19 is worrisome.	-431	-136	-51	-33
	66.20%	20.90%	7.80%	5.10%
Thinking about COVID-19 increases the heart rate.	-414	-144	-58	-35
	63.60%	22.10%	8.90%	5.40%

The majority of participants strongly disagree that they are afraid of COVID-19, with 24.6% (n=160) strongly disagreeing and 11.2% (n=73) strongly agreeing. Only 10.4 % (n=68) of the participants strongly agree that thinking about COVID-19 makes them uncomfortable whereas 26.7% (n=174) of the participants disagree. 34.3% (n=223) strongly disagree that they are afraid of losing their life because of COVID-19 and 20.6% (n=134) agree with that statement. Also, 34.4 percent (n=224) deny that watching COVID-19 news and stories on social media inducesnervousness or anxiety, although 24.1% (n=157) agree. Most of the students deny that they had trouble falling asleep because getting COVID-19 is worrisome with 66.2% (n=431) disagreeing and 5.1%(n=33) agreeing. Large number of the students strongly disagree that the thinking about COVID-19 increases their heart rate 63.6% (n=414) while only 5.4% (n=35) are strongly agree with that statement.

Table7: 4-points Likert Scale of Academic Impact of COVID-19 among Students of Colleges of Medicine in KSA 2020-2021.

	Strongly disagree	Disagree	Agree	Strongly agree
I have noticed deterioration in my work performance/studying.	-215	-203	-146	-87
	33%	31%	22.40%	13.40%
I am appropriately concentrating on my studies	-115	-256	-187	-93
	17.70%	39.30%	28.70%	14.30%
My studying hours are increased.	-161	-246	-145	-99
	24.70%	37.80%	22.30%	15.20%
My studying hours are decreased.	-229	-222	-125	-75
	35.20%	34.10%	19.20%	11.50%
I always prepare for my online classes.	-198	-242	-155	(560
	30.40%	37.20%	23.80%	8.60%
I always listen attentively to the online lecture.	-192	-241	-165	-53
	29.50%	37%	25.30%	8.10%
I always participate actively during online classes/ discussions.	-202	-233	-169	-47
	31%	35.80%	26%	7.20%
I am always able to access to reliable internet connection.	-128	-206	-197	-120
	19.70%	31.60%	30.30%	18.40%

13.4% of students noticed deterioration in the work performance/studying while 33% of students did not noticed deterioration in the work performance/studying. 14.3% did not face any difficulty in concentration while 17% of students were facing difficulties in concentration during their studies. 15.2% of students noticed that their studying hours was increased while 24.7% of students noticed that their studying hours was not increased. 11.5% of students noticed that their studying hours was decreased while 35.2% of students noticed that their studying hours did not decreased. 8.6% were prepare for online classes while 30.4% of students were not prepare for online classes. 8.1% were listen attentively to the online lecture while 29.5% were not listen attentively to the online lecture. 7.2% of students were participate actively during online classes/ discussions while 31% of students were not participate actively during online classes/ discussions. 18.4% of students were able to access to reliable internet connection while 19.7% of students were not able to access to reliable internet connection.

Table 8: Association Between the Level of Psychological Distress and The Gender of Students of Collages of Medicine in KSA 2020-2021.

			Level of Psychological Distress					Total
			Mild psychological distress	Moderate psychological distress	Moderately severe psychological distress	Severe psychological distress	P value	
Gender	Female	Count	23	150	131	28	P<0.001	332
		Expected Count	35.7	167.3	106.6	22.4		332
		% of Total	3.50%	23.00%	20.10%	4.30%		51.00%
	Male	Count	47	178	78	16		319
		Expected Count	34.3	160.7	102.4	21.6		319
		% of Total	7.20%	27.30%	12.00%	2.50%		49.00%
Total		Count	70	328	209	44	651	
		Expected Count	70	328	209	44	651	
		% of Total	10.80%	50.40%	32.10%	6.80%	100.00%	

Significant association was observed between the level of psychological distress and gender, p<0.001. showing that mild psychological distress was prevalent the most among male students 47 (7.2%). Moderate psychological distress was more prevalent among male 150 (23.0%). In contrast, moderately severe psychological distress was

more prevalent among female students. 131(20.1%) and also the severe psychological distress was prevalent the most among female students 28 (4.3%).

Table9: Association between stress and regions among students of colleges of medicine in KSA 2020-2021.

Regions		Stress			
		Mild	Severe	P-value	Total
Eastern region	Count	12	9	P=0.182	21
Northern region	Count	5	2		7
Southern region	Count	17	2		19
Western region	Count	15	11		26
Central region	Count	21	14		35

In this statistical results p value is more than 0.05. So, there is no association between stress and region.

DISCUSSION

The total number of participants was 651 and most of them were in the age between 18-23 (n=388, 59.6%) while only 40% were in the age >23 (n=263) out of these 651 participants, there was a (n=319, 49%) male and (n=332, 51%) female. The least number of participants were in their first year (n=35, 5.4%). Also, 20.6% (n=134) of participants were from Majmaah University College of medicine, 19.2% (n=125) were from Umm Al-Qura University College of Medicine and Medical sciences, 7.7% (n=50) were from College of medicine, Al-Ahsa. Also, 5.2% (n=34) were from King Abdulaziz University Faculty of medicine, Jeddah, 4.9% (n=32) were from Imam Abdulrahman Bin Faisal University, Dammam. In addition, only 2.3% (n=15) were from King Saud Bin Abdulaziz University for Health Sciences, Riyadh and 1.8% (n=12) were from King Saud College of Medicine, Riyadh. The least number of the participants were from Qassim University College of Medicine, Buraidah 1.5% (n=10) followed by University of Hail College of medicine 1.1% (n=7) and College of Medicine, Shaqra 0.9 (n=6). In this study, the GPA of the most of participants 39.6% (n=258) was increased while 24.7% (n=161) of participants their GPA was decreased and only 35.6% (n=232) their GPA didn't change.

In addition, the level of psychological distress was determined by 4-points Likert scale. Most of the participants 50.38% (n=328) had moderate psychological distress, 32.10% (n=209) had moderately severe psychological distress, followed by 10.75% (n=70) of the participants had mild psychological distress and only 6.4% (n=44) had severe psychological distress. The majority of participants strongly disagree that they are afraid of COVID-19, with 24.6% (n=160) strongly disagreeing and 11.2% (n=73) strongly agreeing. Only 10.4 % (n=68) of the participants strongly agree that thinking about COVID-19 makes them uncomfortable whereas 26.7% (n=174) of the participants disagree. 34.3% (n=223) strongly disagree that they are afraid of losing their life because of COVID-19 and 20.6% (n=134) agree with that statement. Also, 34.4 percent (n=224) deny that watching COVID-19 news and stories on social media induces nervousness or anxiety, although 24.1% (n=157) agree. Most of the students deny that they had trouble falling asleep because getting COVID-19 is worrisome with 66.2% (n=431) disagreeing and 5.1% (n=33) agreeing. Large number of the students strongly disagree that the thinking about COVID-19 increases their heart rate 63.6% (n=414) while only 5.4% (n=35) are strongly agree with that statement.

Similar study conducted in United State to evaluate the prevalence of anxiety and depression among medical students during COVID-19 pandemic and it was from April 13,2020 to April 28. The total number of students who participated in this survey was 1,428, the prevalence of anxiety and depression among students was 30.60% and 24.3%. In GAD SCORE It was higher in females and preclinical students. The result same with other results of a study conducted in the kingdom of Saudi Arabia to assess the general population's psychological impact on the COVID-19 pandemic at the time of curfew and lockdown. The psychological impact and mental health status were assessed using the Impact of Event Scale-Revised (IES-R), and the Depression, Anxiety, and Stress Scale (DASS-21). Total respondents were 1160 of the general public of Saudi Arabia. Moderate or severe psychological impact of the outbreak reported in 23.6% of the participants, and moderate to severe depressive, anxiety, and stress symptoms reported in 22.3%.

Regarding to the academic impact, it was determined using 4-points Likert Scale and the result was, 120 (18.43%) of students has severely academic impact, 166 (25.5%) of students has moderately sever academic impact, 227 (34.87%) of students has moderate academic impact and 138 (21.20%) of students has mild academic impact. Furthermore, there is 13.4% of students reported that their study performance was deteriorated and 33% of students did not notice deterioration in their study performance. 14.3% did not face any difficulty in concentration while 17% of students were facing difficulties in concentration during their studies. 15.2% of students noticed that their studying hours was increased while 24.7% of students noticed that their studying hours was not increased. 11.5% of students noticed that their studying hours was decreased while 35.2% of students noticed that their studying hours did not decreased. 8.6% were prepare for online

classes while 30.4% of students were not prepare for online classes. 8.1% were listen attentively to the online lecture while 29.5% were not listen attentively to the online lecture. 7.2% of students were participate actively during online classes/ discussions while 31% of students were not participate actively during online classes/ discussions. 18.4% of students were able to access to reliable internet connection while 19.7% of students were not able to access to reliable internet connection.

Another cross-sectional study was also conducted in Japan to provide details on how medical students have been affected by the pandemic. A total of 717 medical students participated in the web-based survey, which includes questions about how the participants' mental status had changed from before to after the Japanese nationwide state of emergency (SOE). Out of 717 medical students, 473 (66.0%) participated in the study. There were 29.8% (141/473) of the students reported concerns about the shift toward online education. The subjective mental health status of the participants significantly worsened after the SOE was lifted (P<.001). In contrast with other study done in Riyadh, Saudi Arabia at the College of Medicine (COM) of Alfaisal University aimed to analyze the impact of the COVID-19 pandemic on online education. Total respondents is 208, 66.8% were medical students. 41.8% of the respondents reported having little or no online teaching/learning experience before the pandemic. In addition, 62.5% of the participants preferred integration of both online and face-to-face instructions. There were many challenges reported that are related to communication with (59%), student assessment (57.5%), use of technology tools (56.5%), online experience (55%), pandemic-related anxiety or stress (48%), time management (35%), and technophobia (17%). Despite these challenges, most of the respondents (70.7%) believed that the COVID-19 pandemic has increased their level of confidence in the effectiveness of online medical education.

In this study showed that moderate psychological distress was more prevalent among male (23.0%). In contrast, moderately severe psychological distress was more prevalent among female students. (20.1%). In addition, this study showed that there is an association between the stress and the academic performance of the students. Lastly, the study showed no relationship between stress and the university or the region.

CONCLUSION

In this study, the results of the psychological and academic impact of COVID-19 among students of colleges of medicine in Saudi Arabia and showed that 50.38% of participants had moderate psychological distress and 6.4% had severe psychological distress. Furthermore, majority of participants strongly disagree that they are afraid of COVID-19 and only 10.4% of participants strongly agree that thinking about COVID-19 make them uncomfortable. Regarding to the academic impact 34.87% of students has moderate academic impact and 21.20% of students has mild academic impact. In addition, 33% of students did not noticed deterioration in the work performance while 13.4% of students noticed deterioration in the work performance. Also, this study showed that moderate psychological distress was more prevalent among male (23.0%). In contrast, moderately severe psychological distress was more prevalent among female students (20.1%). There is no relationship between stress and university or region.

RECOMMENDATIONS

- To conduct other researches to study more impacts of COVID-19.
- To make a psychological counseling for the students to help them reduce stress.
- To reduce online classes and make it more active and motivated.

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