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Frequency of depression among mental health patients in the POST-COVID-19 ERA.

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ABSTRACT… Objective: To determine the frequency of depression and anxiety in COVID-19-positive people. **Study Design:** Cross Sectional study. **Setting:** Qateef Hospital Kingdom of Saudia Arabia. **Period:** 25th April, 2021 to 18th May, 2021. **Material & Methods:** 450 participants were enrolled in this study. Both genders were included who had COVID positive but suffering from depression and anxiety were included in this study. In this study all participants were completed questionnaires describing their social and demographic status, as well as PHQ-9 for depression and GAD-7 for anxiety. To analyze the continuous and categorical data the SPSS version 20 was used. **Results:** Over four hundred and fifty subjects participated in this cross-sectional study with the age of 49.91±12.2 years**.** In addition, according to the findings when the PHQ-9 scoring is significant in old age people whereas the GAD-7 is significantly found in young age. **Conclusion:** The study found the evidence about the probable psychologic difficulties associated with this pandemic and underline the necessity for PHQ-9 and GAD-7 for assessing mental health. The findings of this research provide light on the emotional condition of post-COVID-19 patients and indicate the necessity for depression and anxiety treatment by a psychiatrist. This research will focus in the future on how strongly depression and anxiety in the participants predict mental disorders following COVID-19.

Key words: Anxiety, COVID-19, Depression, GAD-7, PHQ-9.

INTRODUCTION

The World Health Organization (WHO) has stated a pandemic in response to the fast global spread of the new coronavirus disease of 2019 (COVID-19). Today, as the COVID-19 epidemic stretches the social isolation, self-isolation, and the shutdown of social and educational institutions to minimize the spread of the disease.[1] Meta-analysis reported the depressed symptoms and suicidal thoughts, highlighting the already-present public health concern over the high incidence of mental health difficulties among participants.[2] Furthermore, many peoples suffering from mental health problems during quarantine or after COVID positive that need psychiatric help.[3] The psychological effects of pandemics, such as maladaptive behavior, mental distress, and defensive responses, must be taken into consideration for this at-risk population. Particular emphasis must be paid to the problem of psychological suffering among future doctors.[4,5] Reduced academic performance and professional growth, reduced attention, focus, and working memory, higher dropout risk, and worse quality of life are only some of the negative outcomes associated with depression and anxiety that have an impact on patient care.[6,7]

The Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder scale-7 (GAD-7) are often used for self-report assessments of major depressive disorder (MDD) and generalized anxiety disorder (GAD).[8] They were developed so that a differential diagnosis could be made between generalized anxiety disorder and major depressive disorder by measuring the intensity of depressed and anxious symptoms. These markers are often used in primary and secondary care as well as in large-scale epidemiological investigations.[9] Prevalence of neuropsychiatric symptoms (e.g., weariness, depression) among persons who have contracted COVID-19 suggests

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that the virus has an impact on the CNS (e.g., neurotropism of SARS-CoV-2, hyperinflammatory state and hypercoagulability after infection).[10] There has been considerable usage of the PHQ-9 and GAD-7 in studies of COVID-19 as well. Most of the major longitudinal studies conducted on the UK employees both of these tools as primary markers of population mental health and changes over time.[8] Estimated prevalence rates of depression and generalized anxiety disorder vary throughout nations, and early on in the pandemic younger persons exhibited considerably higher PHQ-9 and GAD-7 scores. The term "measurement invariance" is often used to refer to this presumption. Even though the PHQ-9 and GAD-7 have been widely used, noted that their measurement invariance has not been well investigated.[8] Finding no significant differences in the behavior of the scale variables across groups defined by gender, patient type, and language background, researchers used data from a pan-European (8-country) sample of patients with traumatic brain injury to evaluate three different methods of assessing invariance.[11] The frequency of depression and anxiety post-COVID disease has significantly increased both internationally and locally.

Anxiety and depression have been shown to be quite common in the Pakistani community in a number of prior research. However, it is not well studied on the impact of COVID-19 positive patient and post effects on mental health. To study the psychological effects of COVID-19 so that effective mitigation techniques may be devised, since there is no evidence to indicate that the impact of post COVID depression and associated disorders like anxiety.[12,13,14] To better understand the frequency of depression and anxiety in those who were COVID-19 positive the PHQ-9 and GAD-7 scale were used to assess the state of mental health.

Mental instability including stress, worry, and depression can also alter blood sugar. Psychological stress can increase blood sugar by releasing cortisol. Lockdown tactics during the COVID-19 epidemic can cause weight gain and inactivity. These alterations can make blood sugar regulation problematic. Mental health patients may also disregard diabetic care practices including checking blood sugar levels, eating well, and taking medications, which can cause blood sugar fluctuations. Many researches have linked diabetes to COVID-19, underlining the necessity of blood sugar management and emotional well-being during this epidemic. These studies indicate that diabetics with higher HbA1c or poor glycemic control are more likely to have catastrophic COVID-19 results. Rational and effective solutions are needed to control blood sugar and emotions in depressed diabetics. These techniques may include encouraging regular physical activity, even at home, a balanced diet, medication intake, and psychological assistance through telemedicine or online therapy.

Therefore, Glycemic management can lower COVID-19 problems and comorbidities in diabetics, according to research. Improved emotional well-being with cognitive-behavioral therapy, stress management, and social support improves glycemic control in diabetics. Thus, rapid lifestyle changes, mental instability, and other variables caused blood sugar fluctuations in diabetics during the COVID-19 epidemic. To reduce the likelihood of severe COVID-19 outcomes, diabetes and mental well-being must be managed using evidence-based interventions. Ultimately, this study investigated effective methods for controlling blood sugar levels and managing emotions in depressed diabetes patients during the global COVID-19 pandemic. The study examines the relationship between age, BMI, and depression and anxiety scores. The study seeks to link these parameters to sadness. This goal addresses a major mental health research issue associated with depression that is influenced by demographic and physiological factors, according to many research. We can better comprehend the complex relationship between age, BMI, and depression and uncover depression risk factors by studying the correlation.

MATERIAL & METHODS

Study Design

This survey-based study was conducted between April 2021 to May 2022. A total of 450

adult who were COVID positive recruited from Qateef Hospital Kingdom of Saudia Arabia. The researchers utilized a convenient sampling technique was administered using questionnaire.

Inclusion and Exclusion Criteria

The study used inclusion and exclusion criteria to recruit qualified participants. Participants were informed of the study's goal and might leave if they felt uncomfortable. The study eliminated severe instances and extremely stressed patients to focus on a specific population. People having a history of anxiety, depression, or stress were also removed to prevent distorting the results. The study received ethical approval to protect participants' rights and defined ethical research norms. This verified the investigation was ethical. 450 COVID-19-positive people were recruited from a hospital. The researchers used easy sampling to pick participants based on availability and willingness. The selected participants were given a questionnaire to collect study data. These measures ensured the research findings' reliability and validity and followed ethical norms in the investigation.

This data was collected according to the National Institute for Health and Care Excellence (NICE) as "post-COVID-19 syndrome", which describes the symptoms have emerged or persisted for more than twelve weeks after infection with SARS-CoV-2. After 12 weeks, most individuals who had COVID-19 acutely no longer have any noticeable symptoms. The recruitment of the participants was done after taking consent from them. Respondents were asked age, gender, and demographic details in psychiatric clinic. And then confirmed the time of at least 12 weeks gone when they were COVID positive, but they were negative at the time of enrollment in the study. However, the depression and anxiety they suffered first time after COVID. So, all participants had first appointment with no previous psychoactive medication, and not they had ever received psychological or psychiatric treatment. The entire survey could be finished in under 10 minutes.

Psychiatric clinic patients are vulnerable, thus study involving them requires written agreement and ERB approval. Each participant gave a written agreement, and the study was approved by an Ethics Review Board (ERB) to ensure ethical standards. Secure procedures were used to store and protect participant data. To prevent illegal access, encrypted computers or password-protected databases were used. Data should also be stored according to data protection laws to guarantee confidentiality. Names and social security numbers were changed with codes or pseudonyms for anonymity. Data was de-identified to protect participant privacy. Participants were given numbers or codes instead of names during data collection. Data was accurate and consistent as training research assistants who collected data assured uniformity in method and question interpretation. To establish interpreter reliability, different raters can independently examine and rate the same data to achieve agreement levels. The researchers collected data via a questionnaire. This study required written agreement from participants and Ethics Review Board approval. Ethical standards were followed throughout the investigation, including written consent, ERB clearance, data storage, anonymity, and data dependability. Data were collected by qualified research assistants using defined techniques to reduce bias and error.

Anxiety and Depression Scale

The Generalized Anxiety Disorder (GAD)-7 and the nine-item version of the Patient Health Questionnaire (PHQ) depression scales were used to measure the mental health. The PHQ-9 and GAD-7 mental health questionnaires' internal consistency was measured using Cronbach's Alpha. Cronbach's Alpha measures scale or questionnaire reliability and internal consistency. Depressive symptoms were assessed using Likert-scale items from 0 to 27 for the PHQ-9 questionnaire. This scale's depression measurement reliability was calculated using Cronbach's Alpha. A high Cronbach's Alpha coefficient suggests that questionnaire items measure the same construct due to interior consistency. The GAD-7 anxiety scale's Cronbach's Alpha coefficient was developed to measure its seven questions' internal consistency in measuring anxiety. This scale's Likert-scale

rating varied from 0-4, signifying anxiety severity. The PHQ-9 and GAD-7 scales' Cronbach's Alpha coefficients showed their mental health surveys' reliability and internal consistency. High Cronbach's Alpha scores show questionnaire reliability and internal consistency, indicating accurate construct measurement.

The Patient Health Questionnaire-9 (PHQ-9) was a self-report assessment of depressive symptoms. Its Likert-scale items ranged from 0 to 27, with 0 representing no depression, 5 representing mild depression, 10 representing moderate depression, 15 representing moderately severe depression, and 20 representing severe depression. The GAD-7 anxiety scale is comprised of seven questions, with 0-4 representing minor anxiety, 5-9 representing mild anxiety, 10-14 representing moderate anxiety, and more than 15 representing severe fears.

Statistical Analysis

In order to conduct the statistical analysis, data entry was performed using SPSS. Both qualitative and quantitative data were subjected to the process of calculating descriptive statistics (mean, standard deviation, percentage, and frequency). The Pearson's correlation analysis was carried out in order to establish the degree of relationship between variables and a p-value of 0.05 or less was chosen as the statistical significance.

RESULTS

Over four hundred and fifty subjects participated in this cross-sectional study with the age of 49.91±12.2 years. There was a total of 84 (18.7%) married, 366 (81.3%) non married, 264 (58.7%) low income society, 150 (33.3%) middle income society and 36 (8.0%) from high income society. Out of which 162 (36.0%) were Sindhi, 51 (11.3%) were Urdu speaking, 198 (44.0%) were Pathan, 21 (4.7%) were Punjabi, 18 (4%) were Balochi. Table-I shows that gender distribution of 450 individuals who had depression and anxiety after COVID; all individuals were COVID positive in the past. In this study all tested positive for COVID-19 in few months before. But at the time of enrollment in the study they all were negative. Of the total number of participants who tested positive and now suffering from depression were 248 female (55.1%) and 202 male (44.9%) enrolled in the study. 102 (22.7%) patient who took antianxiety, 75 (16.7%) anticonvulsant, 129 (28.7%) antidepression, 126 (28%) were taking antipsychotics and the 18 (4%) were prescribed SSRI. However, there is no gender based significant difference between depressed and anxiety scores. Although in our study the frequency of enrolled female was high as compared to male.

Table-I displays the laboratory findings with GAD-7 and PHQ-9 scoring based on BMI. The criteria for BMI was selected as per Asian distribution of BMI. <18.5 kg/m^2: underweight, 18.5-24.9: normal weight, 25-29.9 kg/m^2: overweight, >30 kg/m^2: obese. The PHQ-9 is significantly different according to BMI classification. It was clearly observed that the highest PHQ-9 scoring was found in normal weight individuals. However, there is no significant difference GAD-7 and other biochemical parameters including lipid profile and glucose.

Data is presented as frequency (n) and percentage (%). Chi-square test was used to calculate the level of significance. $p<0.05$ was taken as significant.

Not only that, but when PHQ-9 and GAD-7 were corelated with age and BMI. The constant r2 was 0.093 and 0.291 when PHQ-9 was correlated with age and BMI respectively. Both correlations were significant. However, there is negative significant correlation of age and GAD-7 (r2= -0.107) presents in Table-II. In addition the, according to the findings when the PHQ-9 scoring is significant in old age people whereas the GAD-7 is significantly found in young age.

Data is presented as frequency (n) and percentage (%). Person's correlation test was used to calculate the level of significance. $p<0.05$ was taken as significant.

Group Distribution		Mean	Std. Deviation	P-value
Total Lipids (mg/dl)	<18.5	183.30	35.741	0.820
	18.5-24.9	174.52	36.207	
	25-29.9	175.12	35.268	
	>30	210.83	32.805	
TG (mg/dl)	<18.5	194.37	107.066	0.621
	18.5-24.9	176.62	97.339	
	25-29.9	188.46	108.615	
	>30	227.50	140.305	
HDL (mg/dl)	<18.5	45.96	14.497	0.265
	18.5-24.9	44.72	12.027	
	25-29.9	40.88	7.496	
	>30	49.50	7.944	
LDL (mg/dl)	<18.5	114.82	27.835	0.342
	18.5-24.9	109.10	28.553	
	25-29.9	108.88	28.607	
	>30	127.50	23.347	
VLDL (mg/dl)	<18.5	38.89	21.413	0.619
	18.5-24.9	35.33	19.427	
	25-29.9	37.62	21.639	
	>30	45.50	27.991	
GLUCOSE (mg/dl)	<18.5	114.21	68.113	0.961
	18.5-24.9	108.87	53.603	
	25-29.9	110.88	63.331	
	>30	104.83	33.006	
Scoring PHQ-9	<18.5	9.11	5.528	.000
	18.5-24.9	14.74	5.543	
	25-29.9	13.96	7.062	
	>30	13.67	7.118	
Scoring GAD-7	<18.5	8.23	6.325	.973
	18.5-24.9	8.31	6.675	
	25-29.9	8.35	6.788	
	>30	7.00	6.986	

Table-I. Group distribution based on BMI categories

Correlation	Person's Test	
	r2	P-Value
PHQ-9 x Age	0.093	0.05*
PHQ-9 x BMI	0.291	0.00*
GAD-7 x Age	-0.107	0.023*
GAD-7 x BMI	0.005	0.917

Table-II. Correlation of depression and anxiety scoring with age and BMI

DISCUSSION

The PHQ-9 and GAD-7 scoring systems are being used in this study as one of the approaches that will be utilized to investigate anxiety and depression. Despite the fact that this public health emergency is expected to have a significant impact on all healthcare providers, Abdallah et al. presents research on mental health in relation to the COVID-19 pandemic.[15] In this study, we aimed to determine the prevalence of clinically significant anxiety and depression, as well as the variables that may contribute to the occurrence of anxiety and depression. Additionally, we determined the variables that may contribute to the occurrence of clinically significant anxiety and depression. In addition, the findings of this study determined the age, body mass index (BMI), and gender-specific reference data, such as the PHQ-9 and GAD-7.

In addition, variables such as abrupt changes in lifestyle, mental instability, and other conditions may lead to blood sugar variations in diabetes individuals. Given the correlation between diabetes and COVID-19, it is crucial to investigate how to control the blood sugar and emotions of depressed patients rationally and efficiently in the midst of the worldwide pandemic crisis posed by COVID-19.[15] To address this issue, the study included participated in a questionnaire survey to compare their blood sugar, blood lipids, body weight, etc. Out of which the total lipids and low-density lipoprotein were significantly increased in male patients and, but no significant difference was found in other variable based on gender comparison. However, diabetic individuals experiencing changes in blood sugar levels during the COVID-19 outbreak may be affected by a number of variables. Patients with diabetes in Shanghai are encouraged to stay in their homes in order to reduce their risk of contracting new cases of coronary pneumonia; in addition, endocrinologists use media outlets like television, the internet, and WeChat public accounts to educate patients about nutrition, exercise, and stress management.[16] This study finds that male patient with increased total lipids and LDL quality of life has progressively regained to pre-pandemic levels because the new crown pneumonia epidemic was brought under control during this time.

To maintain the fraction of persons who exhibit mild, moderate, severe, or extreme levels of sadness and anxiety the PHQ-9 or GAD-7 is used to assess the prevalence of depression and anxiety in the general population or within specific groups[17], previous research have demonstrated varied rates of incidence for each symptom category. The only symptoms such sadness, isolation and despair often recorded are those deemed clinically important.[18]

In light of the fact that the COVID-19 pandemic and its effects are not well studied, it could be instructive to compare this frequency to that of other COVID-19-affected populations located all over the globe.[18] Previous research has shown that COVID-19 shows detrimental impacts on people's mental health which may be used as a point of reference for comparison with the findings of other population- or community-based studies of mental health. It could also be used to comparing the psychological state of populations during other types of crises, such as those caused by epidemics, natural disasters, or even war.[19] According to Hassan et al, the public health and policy implications of scale PHQ-9 and GAD-7 data are significant. Irritability, loss of sleep, and poor appetite are the risk factors that may involve in the post COVID effect to generate the sign and symptom of depression and anxiety.[20] The physician prescribed the antidepressants, antipsychotics, SSRIs for the patient's treatment. With these results the psychiatrist and public health professionals now become more knowledgeable for meeting people where they are in terms of care. In the review of Gabriele et al, the COVID-19 pandemic has had a major effect on the world's population's mental health and productivity at work. It has been reported based on population data that depression and anxiety affect up to 44% of people in developing countries, whereas a survey of medical students in Europe and USA found prevalence as high as 66.5 percent. The vast majority of research has consistently located the prevalence of depression within this range (18–48%), almost 44% had symptoms ranging from mild to severe anxiety. Ozdin and Bayrak Ozdin et al found a similar frequency of 45% in Turkey with regards to anxiety-related symptoms; however, both Spain and China reported lower levels of anxiety, at roughly 21% and 22%, respectively. The employment of different grading scales as well as cultural and ethnic differences may be to criticize for this discrepancy in frequency. Additionally, symptoms may present differently among countries due to variations in the pandemic's progression.[21]

Our study found a statistically significant correlation between younger participants in GAD-7 and older participants in PHQ-9. The findings of An, Ying et al., who also discovered a correlation between younger age and psychologic symptoms, are consistent with our findings. Hormonal changes associated with ageing, decreased opportunities for outdoor activity, and more exposure to social media-related disinformation might all contribute to a rise in symptoms. When looking at evaluations of depression and anxiety, there was no difference between the sexes, although women were more likely to have depression and anxiety symptoms. This might be because studies have shown that women's neurological responses to stress are unique. Possible contributing factors include higher stress levels among men due to their disproportionate responsibilities.[23,24] About 83% of people in the other study had personal experience with someone who had been infected with the novel COVID-19 virus, which has been linked to an increase in depression and anxiety. It's disturbing to see people in the community suffering on a regular basis because of COVID-19. Anxiety symptoms are more common among people with chronic diseases and unpleasant symptoms, according to research. This may be because of the prevalence of the disease and the difficulty in obtaining professional medical advice and care.[25,26]

LIMITATIONS

The study sample was limited to specific age group and disregarded school-aged children and people over 75. The findings cannot be generalized to these age groups, which could yield insights into early symptom detection and the effects on susceptible populations. Also, the study used convenience sampling, which may bias and reduce sample representativeness.

The participants were chosen based on their availability or accessibility, which may have limited the study's diversity of opinions and experiences. Moreover, the study acknowledged data gathering limitations. The study's findings may have been hampered by not gathering a wide range of psychosocial variables, which affect mental health outcomes.

Despite the constraint, the study's sample size of 450 individuals is large enough to analyze. A higher sample size boosts statistical power and study dependability. Additionally, the study had a high response rate, showing participant involvement and dedication. High response rates improve the possibility that the findings truly reflect target demographic perspectives and experiences. Finally, the study examined post-COVID effects, which shed light on the pandemic's long-term repercussions. This inclusion helps comprehend mental health's larger effects and shapes health and education programs for health science students. Thus, the study's sample size is limited by the removal of school-aged children and people over 75, convenience sampling, and insufficient psychological data. The study's sample size, high response rate, and post-COVID effects improve its understanding of health sciences students' mental health.

Our study had a small sample size and only one hospital, but we were able to determine its external validity for health science majors. The relevance and applicability of our research findings to similar demographics and circumstances was explored. We compared our participants to comparable health sciences students based on demographics, curriculum, and surroundings. We also compared our findings to other studies and literature for maximum generalizability. This method showed that our research adds to future health and education aspects of safeguarding health science students' mental wellness.

CONCLUSION

The results of this study shed light on the emotional state of post-COVID-19 highlighting the need of psychiatrist for the depression and anxiety. The study found that 36.0% of the participants who had depression and anxiety after COVID-19 were Sindhi, followed by 44.0% who were Pathan, indicating a higher prevalence of these mental health conditions in these ethnic groups. Among the participants, 55.1% of the females and 44.9% of the males enrolled in the study tested positive for COVID-19 in the past and were now suffering from depression, suggesting a higher susceptibility of females to developing depression after experiencing COVID-19. Also, the study revealed a significant association between BMI classification and depression, with the highest PHQ-9 scores observed in individuals with normal weight, highlighting the need for targeted interventions and support for this particular group. The emotional well-being is directly impacted by the global COVID-19 quarantine. Our findings add to the existing body of information on the likely psychologic problems related to this pandemic and highlight the need of PHQ-9 and GAD-7 for the scoring the mental health state. Future this study concentrated on how strongly depression and anxiety in the participants predicts psychiatric issues after COVID-19 and which treatment prescribed to enhance their psychological well-being.

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