

# Comparative Study of the Psychological Impact of Corona on Psychiatric Trainees & Chest Trainees in Sudan

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## Abstract

**Background:** Since December 2019, people have experienced a real change in their lifestyles and ways of living with the onset of the SARS-COVID 19 virus, which caused the Corona disease pandemic, which is the biggest health threat facing the world, and one of the main aspects in which there are conflicting observations and reactions is related to the mental health of individuals, especially workers who, in some way, shape, or form, found themselves in the frontlines caring for patients during the worldwide spread of the epidemic. These are individuals who sacrificed everything to face a pandemic of an illness we knew very little about when it first started.

**Objective:** To study psychological impact of COVID – 19 on Psychiatry Trainees & Chest Trainees in Sudan 2020.

**Methodology:** A cross-sectional study was conducted among 145 medical representatives, 74 of whom were representatives of psychiatry and 71 of them representatives of respiratory system trainees with the Sudanese Council of Medical Specialties by completing an electronic questionnaire containing demographics in addition to the general anxiety scale GAD7, patient health scale 9 PHQ9 and the Impact of Event scale IES-R. All of these scales were used to assess anxiety, depression and post-traumatic stress disorder, respectively, following this, statistical analysis (SPSS v.23) was used to analyze the data, and the chi-square test was used to determine statistical significance. **Results:** From 145 doctors, the number of participants from psychiatry was 74 (51%) and the number of respiratory representatives was 71 (49%), the number of participants in the age group 20-30 years reached 59 (40.7%), and from 31 to 40 years 84 (57.9%) and those 40 years and over reached 2 (1.4%), and 79 (54.5%) of the people were males. 66 (45.5%) of women were married, 56 (38.6%) and unmarried 56 (61.4%), the number of those who did not have one child was 18 (12.4%), those who had two children 17 (11.7%), and those who had more than two children 18 (12.4%). Of those, (9%) suffer from mild depression, and (43.4%) have moderate depression and of them suffer from severe depression. While the symptoms of depression did not appear on (8.3%) in general, the highest among the representatives of the respiratory system, in the rates of anxiety, it became clear that about (13.8%) did not suffer from anxiety, while (46.9%) suffered from simple anxiety and it became clear that (29.7%) suffered from moderate anxiety While (9.7%) suffered from severe anxiety, it was noted that anxiety rates are higher in men.

**Conclusion:** This study concluded that the high rates of depression and anxiety among the general health practitioners included in the study. The study identified several important factors associated with the development of depression, anxiety, and PTSD (respiratory deputies at a higher level). Gender-related factors included; age; and social status; having children; and their number; and type of specialization. **Recommendations:** The study recommends the establishment of more specialized centers for psychological support and the provision of psychological services in general, and the practitioners covered by the study in particular.

**Keywords:** COVID-19; coronavirus; psychological impact of COVID-19; psychiatric impact of COVID-19; Psychiatric Trainees; Pulmonology Trainees

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## 1.1: Introduction

Since December 2019 there has been an outbreak of pneumonia of unknown etiology that was first imported in Wuhan Hubei province in China. (1) following the outbreak a novel corona virus (SARS-Co2) was identified causative virus for the pandemic in China and other part of the world by the World Health Organization (WHO) it is reported that the number of infected patient is more than 302459 with 208112deaths worldwide as29 April20209(<http://www.who.int>) they reported COVID19 more serious than SARS (2) and was declared as public health emergency of international concern by (WHO) Strict rang of preventive measures were urgent adopted including complete social distancing, contact tracing, early identification using national and regional criteria beside isolation of suspected and diagnosed

cases(<http://www.who.int>). In Sudan on Friday 13<sup>th</sup> March, 2020 reported its first confirmed corona virus case of a man who died on the following week Thursday 19<sup>th</sup> March, 2020 and had visited the United Arab Emirates in the first week of March. (3)

The corona virus spread in Sudan (Sudan Ministry of Health) confirmed 10922 cases at the end of June 2020 with 630 deaths (3) at the end of March2020. The Sovereignty Council Of Sudan stopped visa issuance and flight services to 8 countries over fear of COVID19 outbreak (<http://www.presidency.gov.sd>\eng) (4)

Pandemic infectious disease not only life threatening to human, but greatly impose psychological trauma to all people. Therefore, it is of significant importance to study psychological impact Of COVID19 (5)

Psychiatry Trainees & Chest Trainees as part of Medical staff have been found to be more psychologically traumatized and experience higher levels of stress, depression, and anxiety (6)

This study was designed to examine and compare psychological impact of COVID – 19 on Psychiatry Trainees & Chest Trainees in Sudan 2020

## 1.2 Problem Statement

Psychiatry Trainees & Chest Trainees as part of Medical staff have been found to be more psychologically transmitted and experience higher level of stress, depression and anxiety (7) this can be explained by the expected anxiety and fear of being infected due to their risk of exposures and worse is there worries of infection transmission to their families.

## 1.3 Justification /Rationale:

Review of literature that a limited number of studies have been done on psychological impact of COVID – 19 on psychiatry trainees and other health professionals.

According to our research, there are currently no published studies that compare psychological impact of corona virus on Psychiatry Trainees & Chest Trainees.

## 1.4 Objective:

General objective:

- i. To study psychological impact of COVID – 19 on Psychiatry Trainees & Chest Trainees in Sudan 2020

Specific objectives:

- i. To determine the anxiety impact of COVID – 19 on Psychiatry Trainees & Chest Trainees.
- ii. To identify the depression impact with COVID – 19 on Psychiatry Trainees & Chest Trainees.
- iii. To assess other possible psychological impacts of COVID -19 (life, fear, stress) on Psychiatry Trainees & Chest Trainees.
- iv. To compare psychological impact of corona virus on Psychiatry Trainees & Chest Trainees.

## 1.4 Literature Review

### 1.4.1 What's COVID-19?

COVID-19 is an infectious disease caused by a newly discovered strain of the coronavirus. The strains we know of, excluding the COVID-19 strain, are as follows:

- 1) HCoV-229E
- 2) HCoV-OC43
- 3) SARS-CoV
- 4) HCoVNL63
- 5) HCoV-HKU1
- 6) MERS-CoV

The majority of people infected with the virus will undergo mild to moderate respiratory illness, older people as well as those with underlying medical issues (e.g.: IHD, DM, asthma, cancer, etc.) are more likely to develop severe illness (2).

### 1.4.2 PREVIANCE OF COVID-19

The World Health Organization (WHO) reported that the number of infected patients is more than 302,459 with a rather staggering figure of 208,112 deaths worldwide as of 29 April 2020 (<http://www.who.int>)

### 1.4.3 Mode of Transmission:

It is believed that COVID-19 spreads primarily through close contact from person to person. including between people who are physically near each other (within about 6 feet). People who are infected, but are asymptomatic still possess the ability to spread the virus to others. Cases of multiple infections with COVID-19 have been reported but are rare, despite newer data suggesting them increasing in number. We are still learning about how the virus spreads and the severity of illness causes. COVID-19 spreads very easily from person to person. How easily a virus spreads from person to person can vary. The virus that causes COVID-19 appears to spread more efficiently than influenza but not as efficiently as measles, which is among the most contagious viruses known to affect people. COVID-19 most commonly spreads during close contact. People who are within 6 feet of a person with COVID-19 or have direct contact with that person have been found to be at greatest risk of infection. When people with COVID-19 produce air droplets, these droplets can range in size from larger droplets (some of which are visible) to others smaller in size. Small droplets can also form particles when they dry very quickly in the airstream. Infections primarily occur via exposure to respiratory droplets when a person is in close contact with someone who has COVID-19. Respiratory droplets cause infection via inhalation or deposition on mucous membranes. Inhalation of these droplets, as expected, decreases with distance. Larger droplets fall out of the air due to gravity. Smaller droplets and particles spread apart in the air. Also logically, time plays a crucial role in the likelihood of contraction of COVID-19 via inhalation of said droplets (i.e. if the droplets were exhaled one second ago, they are far more likely to cause infection when opposed to droplets exhaled 24 hours ago).

Some infections can be spread by exposure to virus in small droplets and particles that can linger in the air for minutes to hours. These viruses may be able to infect people who are further than 6 feet away from the person who is infected or after that person has left the space. This kind of spread is referred to as airborne transmission and is an important way that infections like tuberculosis, measles, and chicken pox are spread. There is evidence that under certain conditions, people with COVID-19 seem to have infected others who were more than 6 feet away. These transmissions occurred within enclosed spaces that had inadequate ventilation. Sometimes the infected person was breathing heavily, for example while singing or exercising. -Under these circumstances, scientists believe that the amount of infectious smaller droplet and particles produced by the people with COVID-19 became concentrated enough to spread the virus to other people. The people who were infected were in the same space during the same time or shortly after the person with COVID-19 had left. Available data indicate that it is much more common for the virus that causes COVID-19 to spread through close contact with a person who has COVID-19 than through airborne transmission. [8]. COVID-19 spreads less commonly through contact with contaminated surfaces. Respiratory droplets can also land on surfaces and objects. It is possible that a person could get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or eyes. Spread from touching surfaces is not thought to be a common way that COVID-19 spreads. It appears that the virus that causes COVID-19 can spread from people to animals in some situations. CDC is aware of a small number of pets worldwide, including cats and dogs, reported to be infected with the virus that causes COVID-19, mostly after close contact with people with COVID-19. For the time being, the risk of COVID-19 spreading from animals to people is considered relatively low.

#### 1.5.4 Clinical Features

People with COVID-19 have had a wide range of symptoms reported – ranging from mild symptoms to severe illness. Symptoms may appear 2-14 days after exposure to the virus. People with these symptoms may have COVID-19:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

Signs of an emergency:

- Trouble breathing
- Persistent pain or pressure in the chest
- New confusion
- Inability to wake or stay awake
- Pale, gray, or blue-colored skin, lips, or nail beds, depending on skin tone (9)

#### 1.5.5 How to diagnose COVID-19

Types of tests

COVID-19 tests are available that can test for current infection or past infection.

- A viral test tells you if you have a current infection. Two types of viral tests can be used: nucleic acid amplification tests (NAATs) and antigen tests.
- An antibody test (also known as a serology test) might tell you if you had a past infection. Antibody tests should not be used to diagnose a current infection (10)

#### 1.5.6. Treatment:

At-home treatment: Most people who become sick with COVID-19 will only experience mild illness and will feel better in about a week. Treatment is aimed at relieving symptoms and includes rest, fluid intake and pain relievers (11).

#### 1.5.7 Prevention

most commonly spreads between people who are in close contact through respiratory droplets or small particles produced when an infected person coughs, talks, or breathes. Growing evidence shows that droplets can remain suspended in the air and travel distances beyond six feet, according to the CDC. Indoor environments with poor ventilation increase the risk of transmission.

To prevent infection and to slow transmission of COVID-19, do the following:

- Wash your hands regularly with soap and water, or clean them with alcohol-based hand rub.
- Cover your mouth and nose with a mask when in public settings or around others.
- Maintain at least six feet distance between you and people coughing or sneezing.
- Avoid touching your face.
- Cover your mouth and nose when coughing or sneezing.
- Stay home if you feel unwell.
- Refrain from smoking and other activities that weaken the lungs.
- Practice physical distancing by avoiding unnecessary travel and staying away from large groups of people.

(<http://www.who.int>)

### 1.5.8 Mental health & COVID-19

Fear, worry, and stress are normal responses to perceived or real threats, and at times when we are faced with uncertainty or the unknown. Ergo, it is normal and understandable that people are experiencing fear in the context of the COVID-19 pandemic.

- Added to the fear of contracting the virus in a pandemic such as COVID-19 are the significant changes to our daily lives as our movements are restricted in support of efforts to contain and slow down the spread of the virus. Faced with new realities of working from home, temporary unemployment, home-schooling of children, and lack of physical contact with other family members, friends and colleagues, it is important that we look after our mental, as well as our physical, health.

(<http://www.who.int>)

### 1.5.9 Previous studies:

In Sudan:

In Omdurman Islamic University, Omdurman, Sudan, a cross sectional study was conducted to find out the psychological impact of COVID – 19 on health professionals in Sudan on January, 2020. The study conducted reported the following results: PHQ-9(12) depression scale showed that 285 (82%) staff members had some, with mild depression being the most frequent, seen in 96 (24.2%), whereas, severe depression was found to be more common among the age group between 45 and 65 years and was associated with working in the emergency room (ER) ( $P = 0.03$ ). The PTSD among participants was assessed using the IES-R (13) that showed that 116 (29.3%) had subclinical PTSD, 124 (31.3%) had mild PTSD symptoms, 98 (24.7%) had moderate PTSD symptoms, and 58 (14.6%) had severe PTSD symptoms.

Also, a statistical association was seen between the IES-R mean score and the age group between 25 and 34 years ( $P < 0.0001$ ), having a friend or family member infected with the disease ( $P < 0.0001$ ), and having a history of contact with a positive COVID-19 ( $P < 0.0001$ ). They used GAD-7(14) anxiety score that showed mild anxiety in 32 (23.2%) participants, moderate anxiety in 53 (13.4%), and severe anxiety in 66 participants (16.7%). (15)

Another cross-sectional study was done in 2020 to assess ‘The silent psychological impact’ of the COVID-19 pandemic in Sudan (16). The authors advised that, in addition to prevention and treatment of disease, it may be prudent to perform mental health assessments of confirmed COVID-19 patients, suspected patients, quarantined family members, and healthcare personnel to ensure that individuals are coping well during the pandemic [17]. In particular, health care providers should be employed to address social stigma, fear and vulnerability in the general population. Moreover, government officials need to work towards increasing the public's confidence in the mitigating measures undertaken to combat the spread of SARS-CoV-2 and encourage communities to act together to further reduce infection. Equally as important, we advocate for minimizing the propagation of fake

information in the media and on social network platforms, which can adversely influence people's state of mind and behavior [18].

In neighboring Saudi Arabia, a cross-sectional study to assess the psychological impact of COVID-19 pandemic on physicians in Saudi Arabia. The study included 529 physicians from various regions in Saudi Arabia. The enrolled physicians were practicing different specialties and branches in medicine. The researchers classified them based on their workplace in relation to COVID-19 exposure to: COVID-19 designated center vs. non-COVID-19 designated centers. Furthermore, they subdivided the physicians who work in COVID-19 designated centers to those who work in high-risk areas such as ER, ICU and COVID-19 isolation wards and other areas as low-risk areas. The most common feelings reported by the physicians during the pandemic were: worry (357, 67.5%), isolation (301, 56.9%) and fear (263, 49.7%). According to logistic regression analysis, physicians older than age 60 were less likely to feel isolated (OR = 0.08, 95% CI = 0.01-0.96, P = 0.05), female physicians were more likely to experience fear (OR = 2.96, 95% CI = 1.20 – 7.27, P = 0.02) and worry (OR = 2.87, 95% CI = 1.23 – 6.69, P = 0.02), while physicians with a previous exposure to similar traumatic events were less likely to experience fear (OR = 0.24, 0.10 – 0.64, P = 0.004) during the COVID-19 pandemic (19).

An explanatory study was conducted in South Africa about effect of COVID-19 on the health system and society. It explains increased mortality rates, mental health problems, substance abuse, resurgent of NCDs. The closure of international borders, global demand meltdown, supply disruptions, dramatic scaling down of human and industrial activities during lockdown, which have resulted in a plethora of socio-economic issues of virtually unprecedented proportions. The prolonged effects of lockdown on psychosocial support services resulted in the outbursts of uncertainties, acute panic, fear, depression, obsessive behaviors, social unrests, stigmatization, anxiety, increased gender-based violence cases and, quite unfortunately, discrimination in the distribution of relief food aid (20).

In Singapore, a study was conducted to examine the Psychological impact of the COVID-19 pandemic on health care workers. Of 500 invited health care workers, 470 (94%) participated in the study; baseline characteristics. Sixty-eight (14.5%) participants screened positive for anxiety, 42 (8.9%) for depression, 31 (6.6%) for stress, and 36 (7.7%) for clinical concern of PTSD. The prevalence of anxiety was higher among nonmedical health care workers than medical personnel (20.7% versus 10.8%; adjusted prevalence ratio, 1.85 [95% CI, 1.15 to 2.99];  $P = 0.011$ ), (21)

A Cross-sectional Survey Study was conducted in Eight European Countries with the aim to compare the mental health of medical professionals with nonmedical professionals in different European countries during the COVID-19 pandemic. The sample ( $N=609$ ) consisted of 189 doctors, 165 nurses, and 255 nonmedical professionals. Participants from France and the United Kingdom reported experiencing severe/extremely severe depression, anxiety, and stress more often compared to those from the other countries. Nonmedical professionals had significantly higher scores for depression and anxiety. Among medical professionals, no significant link was reported between direct contact with patients with COVID-19 at work and anxiety, depression, or stress. "Uncertainty about when the epidemic will be under control" caused the most amount of stress for health care professionals while "taking protective measures" was the most frequently used coping strategy among all participants.

### **Research Methodology:**

#### **Study design:**

This was a cross sectional descriptive study.

#### **Study area:**

The study was performed in Psychiatry Training Hospitals & Chest Training Hospitals – Khartoum State – Sudan.

#### **Study period:**

From August to November 2020

#### **Study population:**

Psychiatry Trainees & Chest Trainees in Sudan Medical Specialization Board (SMSB).

#### **Sample Size and Techniques:**

Total coverage method was used for determination of sample size.

**Inclusion criteria:**

Psychiatry Trainees & Chest Trainees in Sudan Medical Specialization Board.

**Exclusion Criteria:**

1. Psychiatry Trainees & Chest Trainees who were unwilling to participate in the study.

2. Psychiatry Trainees & Chest Trainees who were known cases of mental illness prior to the corona pandemic.

### **Materials:**

The questionnaire consisted of 4 divisions:

- 1- Demographic characteristic such as gender, age, residence, marital status and number of children
- 2- Patients health questionnaire 9 (PHQ-9) used to assess depression scale
- 3- Generalize anxiety disorder 7 (GAD-7) used to assess anxiety levels in Psychiatric Trainees & Chest Trainees
- 4- Revised Impact of events scale (IES-R) used to assess depression, anxiety, post-traumatic stress disorder

#### 2.1. Participants

This is a cross-sectional study that targeted chest physicians and psychiatrics in Khartoum state, Sudan, during the COVID-9 pandemic. The sample consisted of 145 medical staff; the questionnaire was restricted to respondents who had to authenticate their membership to their specialty through their social media groups. Sample size was calculated using the sample size of the unknown population (Cochran's formula):

$$n_0 = z^2 (1-p)/e^2$$

$z$  =  $z$  value (1.96 for 95% confidence interval)

$p$  = degree of variability (0.5)

$e$  = 95 % confidence interval.

#### 3. Procedure:

The data was collected using an Internet-mediated questionnaire, because of the unusual circumstances in which there were restrictions on most activities and movements, and person-to-person contacts were maximally reduced due to the fear of the spread of COVID-19 infection.

#### 3.2. Measures:

A validated questionnaire containing sociodemographic characteristics, Generalized Anxiety Disorders-7

(GAD-7) scale, Patient Health Questionnaire-9 (PHQ-9), and the Revised Impact of Event Scale (IES-R) were used to assess anxiety, depression, and post-traumatic stress disorder on the participants, respectively.

The GAD-7 scale contains seven questions and is used to measure the anxiety symptoms in the participants, each question contains four options ranging from (not at all) to (nearly every day) given a three-point result and interpreted as (5–9) for mild anxiety, (10–14) moderate anxiety, and (>15) for severe anxiety [14].

PHQ-9 scale contains nine questions to measure depressive symptoms, each question contains four options ranging from (not at all) given zero points to (nearly every day) given three points and the result is interpreted as (0–4) having minimal or no depression, (5–9) having mild depression, (10–14) having moderate, (15–19) having moderately severe, and (20–27) having severe depression [12].

The IES-R is a short, easy, and self-report measure designed to assess current subjective distress resulting from a traumatic life event for both healthy as well as frail individuals and is composed of 22 items, each one of which is rated using a Likert-scale from 0 to 4. The maximum score is 88. The results consist of a total raw score and raw score for three subscales: the avoidance scale, intrusion scale, and the hyper-arousal scale [13]. The event used for this questionnaire was the exposure to or infection by COVID-19. The total scores were categorized as follows: subclinical (0–8), mild distress (9–25), moderate distress (26–43), and severe distress (44–88) [4].

Results consist of a total raw score, and raw scores for three subscales; The Avoidance Scale, Intrusion Scale, and the Hyper-Arousal Scale. Additionally, the mean rating for the total score and each subscale is presented, which gives an indication of the level of impairment from post-traumatic stress [5], where:

0 = No symptoms

1 = Few symptoms

2 = Moderate symptoms

3 = A High level of symptoms

4 = An Extremely high level of symptom

#### **Ethical Consideration:**

The research proposal was submitted to Sudan Medical Specialization Board, informed consent was obtained from Council of Psychiatry & Council of Chest from Psychiatry Trainees & Chest Trainees in Sudan Medical Specialization Board.

## Results:

### 3.1: Enrollment:

We enrolled 145 healthcare providers, Psychiatricians were 74 in number (51%) and Chest Physicians were 71 (49%). The majority of them were between age group, [31-40] 84 (57.9%) years old with 59 (40.7%) between [20-30] years old, and among them 79 (54.5%) were males and 66 (45.5%) were females. Most of the participants, that is 89 (61.4%), were single, while 56 (38.6%) were married, and among them, 92 (63.4%) had no child, 18 (12.4%) had either one child or more than two children (Table 1).

### 3.2. Anxiety among participants (GAD-7):

The GAD-7 Anxiety Scale was used in this study to evaluate anxiety among study participants. The scores revealed, most of them (46.9%) had mild anxiety, followed by moderate anxiety (29.7%), minimal to no anxiety (13.8%) and only (9.7%) of the participants suffering from severe anxiety (Figure 1).

The association between anxiety levels and demographic characteristics was tested. The only statistically significant association found between gender of the participants, mild anxiety was higher in males (66.2%) than females (33.8), ( $p$  value 0.007). However, no significant difference was found between anxiety levels with age, marital status, number of children and specialty of the study group (Table 2).

### 3.3. Depression among participants (PHQ-9):

The PHQ-9 Depression Scale was used in this study to evaluate depression among study participants. We found that most of them (43.4%) suffering from moderate depression, followed by moderately severe depression (33.1%). Mild depression found in (9%), Minimal/no depression and severe depression were (8.3%) and (6.2%), respectively (Figure 2).

We explored the association between depressive level and participant's demographic characteristics. No significant difference between level of depression with age, gender, marital status and No. of children. The only significant difference found in specialty of the participants ( $p = 0.003$ ). we found that moderately 32 (58.8%) and moderately severe depression 27 (56.3%) was higher in chest physicians than psychiatricians (Table 3).

### 3.4. Post-traumatic stress disorder among participant (IES-R):

The IES-R scale and its subscales were used to evaluate the post-traumatic stress disorder among our participants, and the result showed that (42.1%) had moderate PTSD, (29%) had mild PTSD symptoms,

Variables		None	Mild	Moderate	Severe	Total	P value
<u>Gender</u>	<b>Male</b>	13 (65%)	45 (66.2%)	15 (34.9%)	6 (42.9%)	79 (54.5)	<b>0.007</b>
	<b>Female</b>	7 (35%)	23 (33.8%)	28 (65.1)	8 (57.1%)	66 (45.5)	
<u>Age</u>	<b>20-30</b>	8 (40%)	29 (42.6%)	18 (41.9%)	4 (28.6%)	59 (40.7%)	<b>0.576</b>
	<b>31-40</b>	11 (55%)	39 (57.4%)	24 (55.8%)	10 (71.4%)	84 (57.9%)	
	<b>&gt;40</b>	1 (5%)	0 (0.0%)	1 (2.3%)	0 (0.0%)	2 (1.4%)	
<u>Marital status</u>	<b>Single</b>	14 (70%)	45 (66.2%)	25 (58.1%)	5 (35.7%)	89 (61.4%)	<b>0.147</b>
	<b>Married</b>	6 (30%)	23 (33.8%)	18 (41.9%)	9 (64.3%)	56 (38.6%)	
<u>Specialty</u>	<b>Chest</b>	9 (45%)	35 (51.5%)	20 (46.5%)	7 (50%)	71 (49%)	<b>0.939</b>
	<b>Psychiatry</b>	11 (55%)	33 (48.5%)	23 (53.5%)	7 (50%)	74 (51%)	

(20%) had severe PTSD symptoms and only (9%) had subclinical PTSD symptoms (Figure 3).

On the other hand, on reviewing the subscales, we found that the participants in our study had a mean of (1.43) in the avoidance scale, (1.29) for the intrusion scale and (1.34) for the hyper-

arousal subscale which indicate a few with slightly moderate overall PTSD symptoms (Table 4).

We further evaluated the association between PTSD levels and participant’s demographics. Age and gender showed no statistically significant difference. Number of children showed statistically significant results (p value 0.002). The most frequent PTSD levels, mild (78.6%) and moderate (67.2%), were higher in participants who were childless. Moreover, there was statistically significant difference between single and married participants (p value 0.000). moderate PTSD (67.2%) was higher in single than married participants. Association between PTSD and Specialty was also statistically significant (p value 0.004).

Moderate PTSD was higher in chest physicians (54.1%) than psychiatrics (Table 5).

Table [1]: Demographic characteristics

Variables		None	Mild	Moderate	Severe	Total	P value
<b>Gender</b>	<b>Male</b>	13 (65%)	45 (66.2%)	15 (34.9%)	6 (42.9%)	79 (54.5)	<b>0.007</b>
	<b>Female</b>	7 (35%)	23 (33.8%)	28 (65.1)	8 (57.1%)	66 (45.5)	
<b>Age</b>	<b>20-30</b>	8 (40%)	29 (42.6%)	18 (41.9%)	4 (28.6%)	59 (40.7%)	<b>0.576</b>
	<b>31-40</b>	11 (55%)	39 (57.4%)	24 (55.8%)	10 (71.4%)	84 (57.9%)	
	<b>&gt;40</b>	1 (5%)	0 (0.0%)	1 (2.3%)	0 (0.0%)	2 (1.4%)	
<b>Marital status</b>	<b>Single</b>	14 (70%)	45 (66.2%)	25 (58.1%)	5 (35.7%)	89 (61.4%)	<b>0.147</b>
	<b>Married</b>	6 (30%)	23 (33.8%)	18 (41.9%)	9 (64.3%)	56 (38.6%)	
<b>Specialty</b>	<b>Chest</b>	9 (45%)	35 (51.5%)	20 (46.5%)	7 (50%)	71 (49%)	<b>0.939</b>
	<b>Psychiatry</b>	11 (55%)	33 (48.5%)	23 (53.5%)	7 (50%)	74 (51%)	

Table [2]: Association between anxiety levels (GAD-7) with participant's Variables

IES-R Subscales	N	Minimum	Maximum	Mean	Std. Deviation
Avoidance Score	145	0.0	4.0	1.43	0.80
Intrusion Score	145	0.0	4.0	1.29	0.91
Hyperarousal Score	145	0.0	4.0	1.34	0.96

Table [3]: IES-R subscales among participants

Variables		Subclinical	Mild	Moderate	Severe	Total	P value
<u>Number of children</u>	<b>No child</b>	8 (61.5%)	33 (78.6%)	41 (67.2%)	10 (34.5%)	92 (63.4%)	<b>0.002</b>
	<b>One child</b>	0 (0.0%)	2 (4.8%)	11 (18%)	5 (17.2%)	18 (12.4%)	
	<b>Two children</b>	2 (15.4%)	4 (9.5%)	3 (4.9%)	8 (27.6%)	17 (11.7%)	
	<b>More than two children</b>	3 (23.1%)	3 (7.1%)	6 (9.8%)	6 (20.7%)	18 (12.4%)	
<u>Marital status</u>	<b>Single</b>	8 (61.5%)	32 (76.2%)	41 (67.2%)	8 (27.6%)	89 (61.4%)	<b>0.000</b>
	<b>Married</b>	5 (38.5%)	10 (23.8%)	20 (32.8%)	21 (72.4%)	56 (38.6%)	
<u>Specialty</u>	<b>Chest</b>	2 (15.4%)	16 (38.1%)	33 (54.1%)	20 (69%)	71 (49%)	<b>0.004</b>
	<b>Psychiatry</b>	11 (84.6%)	26 (61.9%)	28 (45.9%)	9 (31%)	74 (51%)	

Table 4

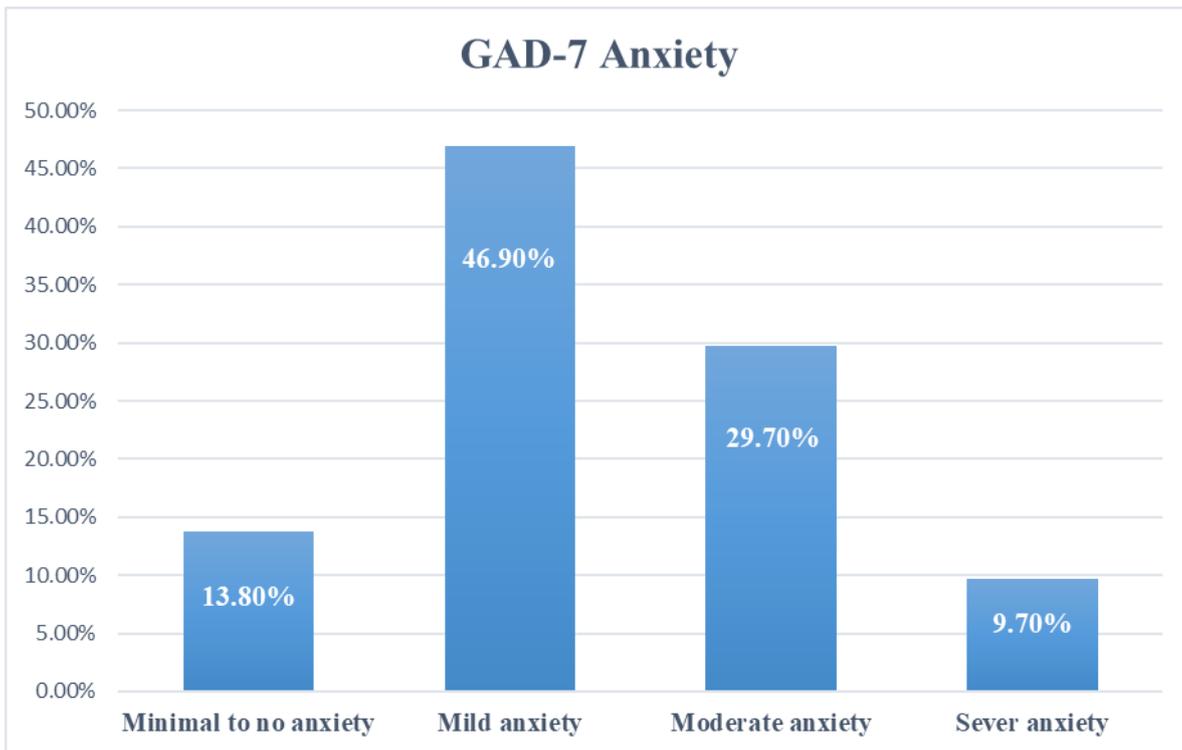


Figure [1]: GAD-7 score among participants

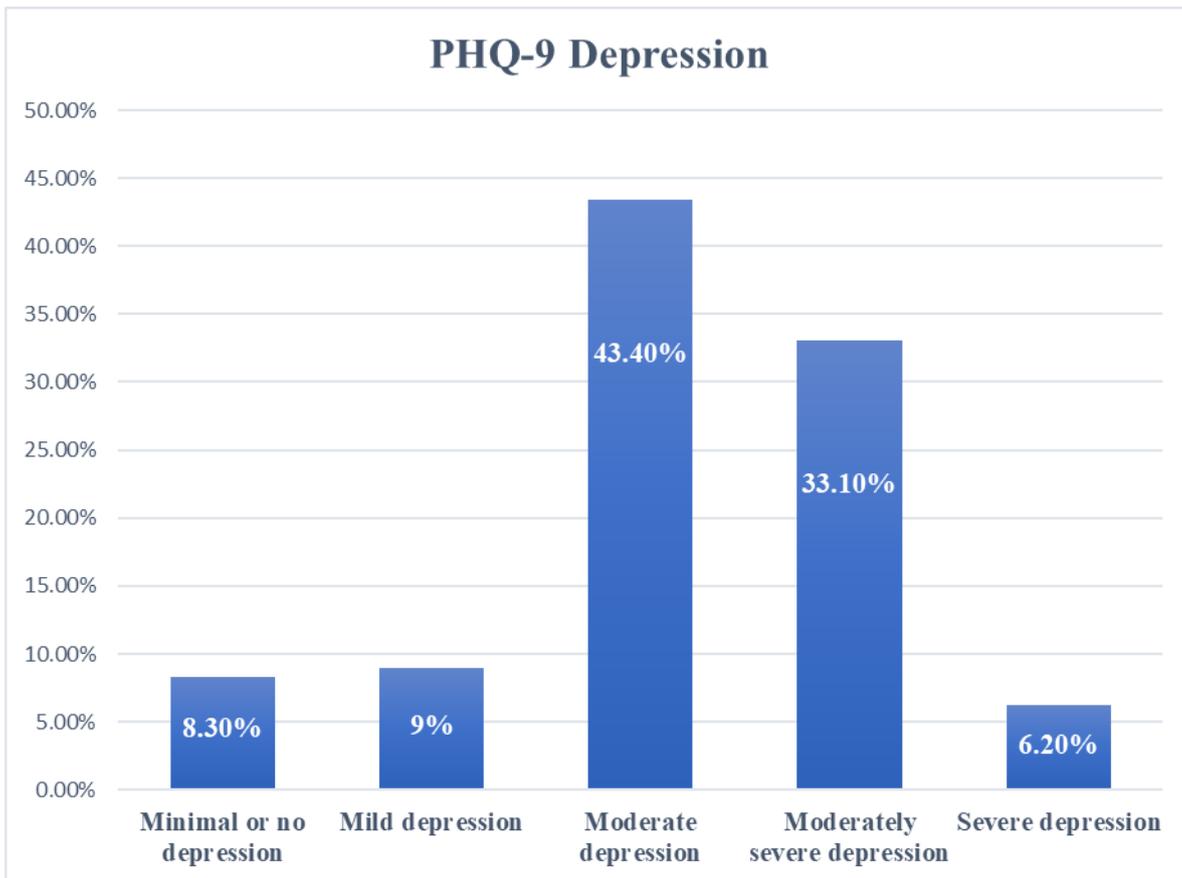


Figure [2]: PHQ-9 score among participants

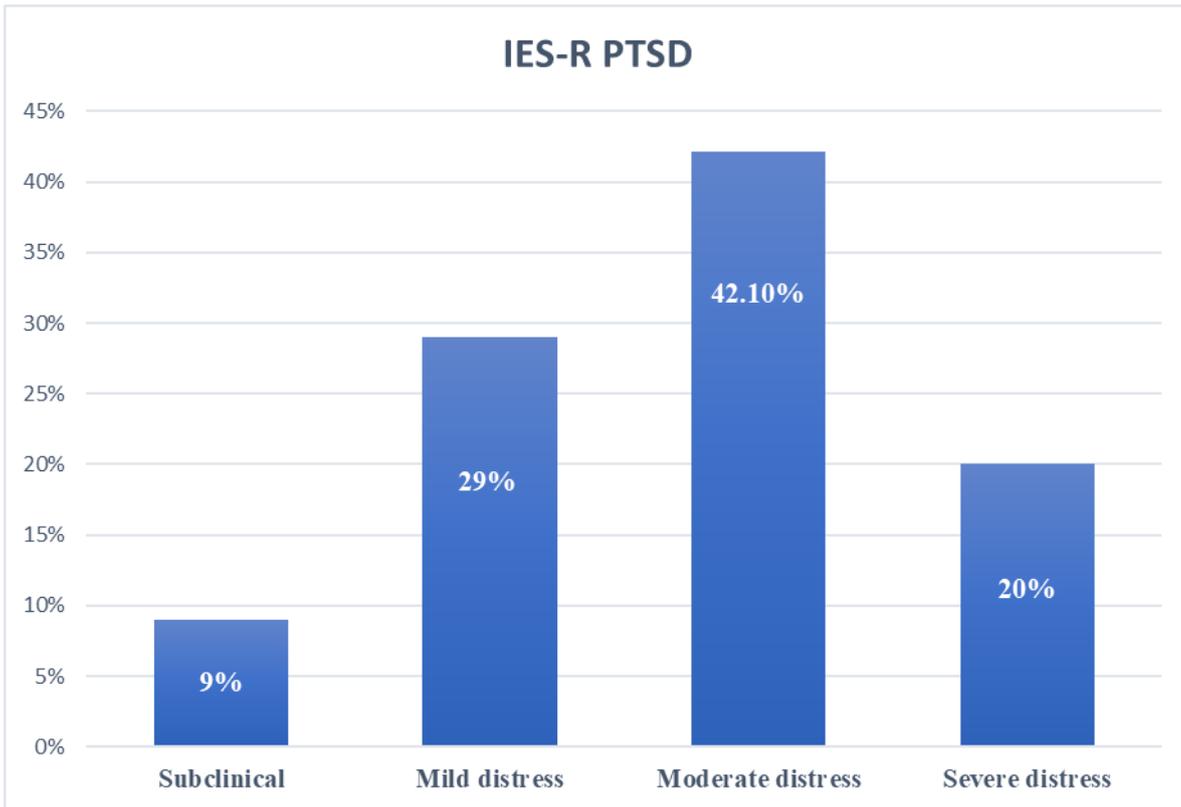


Figure [3]: IES-R score among participants

**Discussion:**

COVID-19 pandemic had a considerable impact on healthcare systems worldwide, and manifests itself as a threat not only to the physical health but also psychological and social health of HCWs including junior doctors. To our knowledge, this study is the first small-scale state survey in Sudan.

Our study contributes to literature on prevalence of psychological symptoms in postgraduate trainees. Prevalence of GAD and depression, respectively, in our sample are in line with few recent studies of HCWs during COVID-19. Zhu et al reported prevalence of anxiety symptoms as 24.1%, while in another web-based survey of HCWs in China, 19.8% of HCWs appeared to have depressive symptoms.<sup>4</sup> However, these results are in contrast with extremely high prevalence (35%–50%) of psychological morbidity in some reports from China, particularly in Wuhan province and in neighbouring India.<sup>3 4 6</sup> Similarly, prevalence of acute stress disorder as 4.4% in our sample, although closer to 5% observed in a study following SARS outbreak in

Taiwan in 2004, is very low compared to 29.8% reported by Zhu et al during current COVID-19 outbreak. This comparatively low psychological morbidity in our sample may partially be explained due to relatively lower (2.1%) COVID-19 case fatality of Pakistan as compared to USA (5.9%), Italy (14.3%), UK (14.0%), Iran (5.3%) and China (5.5%). The differences in the results between various studies in the literature can also be contributed to variability in study settings, methodologies, instruments used to assess the psychological morbidity and participants' backgrounds such as age and culture.

Although all the health resources of the country are currently deployed towards service provision for increasing number of patients with COVID-19, the policy makers in teaching and training institutions need to make special efforts to promote the psychological well-being of post-graduate trainees. Self-care, need to maintain healthy balance lifestyle during residency training and in future careers and building skills in resilience should be emphasized in the training curriculum. Adequate training around infectious diseases and provision of adequate personal protective equipment should be recommended to all institutions. The postgraduate trainees should have appropriate work shifts, regular breaks and guaranteed supplies. Encouragement among peers, adequate supervision and access to psychological interventions should be guaranteed in order to deal with the psychological problems.

Psychological first aid for front-line workers has also been recommended by WHO and includes the assessment of needs and concerns; practical care and support; basic needs provision; empathic listening; and access to information, services and social supports. These steps can allow postgraduate trainees to function at their best during this global health emergency.

Trainee psychiatrists reported that tensions were high within inpatient settings due to the increased restrictions involved in infection control. For example, service users were not able to go outside for exercise or smoking breaks, and staff perceived that these restrictions and other pressures associated with the pandemic sometimes led to incidents that they saw as verbally or physically intimidating. Further, because consultants were not visible on the wards, psychiatry trainees reported a need to act at or beyond their own perceived authority. For instance, they had to address service user questions about treatment decisions and to manage other interactions that they found challenging. While participants saw the behaviors as understandable given the situational strains on service users, they reported that anticipating and dealing with incidents was sometimes stressful.

Staff who moved to remote working based at home encountered different challenges. The boundaries separating home and work became blurred, sometimes resulting in a pervasive sense that people were always 'at work' or 'on call'. Breaks between consultations (which, before the pandemic, were enabled by travelling time) were reduced or removed altogether, and often staff found themselves working longer hours to

'compensate' for what would have typically been commuting time to and from work. Several members of staff reported feeling guilty that they were working from home while their colleagues on the frontline were not coping well. Back-to-back appointments resulted in a loss of opportunity to process and debrief after consultations. Many participants reported symptoms of burnout and expressed concern that if the pandemic lasted much longer [as it has done] this would worsen, considerably.

The study has some limitations, only PHQ-9 and GAD-7 has been previously validated in Sudanese population. As the study was cross sectional, we cannot evaluate the temporality and causality of the observed factors. Psychological assessment in our study was based on self-report tools. Despite the limitations, this study has significant strengths. To the best of our knowledge, this is the first state level study to report the psychological symptoms among physician's trainees during the COVID-19 pandemic.

### **Conclusion:**

The present study provides insight into the potential immediate psychological sequelae of COVID-19 pandemic on postgraduate trainees in the resource-constrained setting. Our results show high levels of depression and anxiety experienced by physician's. It is necessary to employ strategies to minimize the psychological distress and provide adequate psychosocial support for postgraduate trainees during a crisis situation such as COVID-19. Further research is needed to assess the long-term impact of this outbreak on trainee mental health as well as effectiveness of interventions to improve their psychological well-being.

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