

## Psychosocial Impact of COVID 19 Pandemic on Healthcare Workers in Selected Hospitals in Khartoum State, Khartoum, Sudan, 2020

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### Abstract

**Background:** COVID-19 is highly transmissible disease from human to human and associated with high morbidity and fatality. The outbreak affects not only physical health of infected individuals but also psychological and mental health. Healthcare workers (HCWs) are the most vulnerable group to the mental health effects of this pandemic **Objective:** Assessment of psychological status and the potential risk factors of healthcare workers (HCWs) during the COVID-19 Pandemic. **Method:** A total number of 163 health care workers (doctors and nurses) dealing with suspected COVID-19 patients were selected from accessible hospitals adopting COVID-19 management protocols. Data was collected by the medical students research team using anonymous online Google form questionnaire. Data was analyzed using SPSS computer program. **Result:** Participants had a mean age of  $26.4 \pm 3.6$  years, predominantly females (54.6%), and 87.7% of them were medical doctors almost 76% and 68% had a mild form of depression and anxiety respectively, 14.6% showed moderately severe depression. Most of them were not trained on how to use personal protective equipment. The majority of the HWs believe that PPEs protect against COVID19 infection. There is increased financial stress among HWs compared to pre pandemic period

**Key words:** Psychosocial, health workers, anxiety, depression, PPEs

### Conclusion;

Corona virus disease increase the potential risk of developing psychological illness among health workers. There is positive correlation between anxiety and depression ( $r^2 = 40\%$ )

Strategies to improve mental health services and well-being of health care workers are recommended.

### Introduction:-

In late December 2019, World Health Organization (WHO) reported cases of viral pneumonia of an unknown causative agent in Wuhan, China(1). Later on, a novel coronavirus related to SARS (Severe Acute Respiratory Syndrome) was discovered to be responsible. The virus was given the name “SARS-CoV-2”(2) and the disease was named “Coronavirus Disease 2019” (COVID-19) (3). On the 30<sup>th</sup> of January 2020, WHO recognized the disease as a Public Health Emergency of International Concern (4) and then, on the 11<sup>th</sup> of march, declared it as a pandemic (5). COVID-19 is highly transmissible from human to human through respiratory droplets and is associated with high morbidity and fatality(6). Recent WHO statistics shows that there are more than **141,000,000** confirmed cases worldwide with more than **3,000,000** deaths (7).

The disease outbreak affects not only physical health of infected individuals but also psychological and mental health, even on non-infected community (8,9). Healthcare workers (HCWs) are the most vulnerable group to the mental health effects of this pandemic (10); they face an increased workload, a high risk of infection, a fear of protective equipment shortage, increased physical fatigue, limited patient care resources, increased demands over the available capacity, having to choose whether to prioritize their own or their patients' health and working in emotionally charged situations and the irrational public expectations (11,12). In addition, HCWs worries about transmitting the disease to their families and colleagues (13).

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Many researchers found increased levels of depression, anxiety and posttraumatic stress disorder among HCWs during this pandemic (14,15). In addition, the mental and psychological impact of outbreaks was previously studied in SARS, MERS and Ebola (16–19).

In Sudan, the first case of COVID-19 was reported on the 12<sup>th</sup> of March, 2020 (20). Till now, there are more than **33,157** confirmed cases with more than **2280** reported deaths (21), though the lack of screening facilities and proper reporting system could suggest that the actual numbers are much higher. In response to the problems posed by the pandemic, federal ministry of health in Sudan implemented various public health strategies such as increasing awareness with simple hygiene measures like frequent hand wash and implementing social distancing to limit personal physical contacts. Moreover, isolation of infected patients and quarantine and testing of suspected cases are performed at hospital level. On the 18<sup>th</sup> of April the prime minister of Sudan declared a 3 weeks complete lock down of Khartoum state that has been further extended(22).

The importance of the mental well-being of medical staff in Sudan cannot be overlooked, especially with the challenges its health situation faces (23), which make them of higher tendency to be affected; the ill-equipped current health care system and the low levels of awareness and commitment among Sudanese people regarding COVID-19 complicate the burden of the pandemic and put them on a greater pressure. A study to investigate the psychological impact of COVID-19 on frontline medical staff in Khartoum state founded that out of the enrolled participants (n= 396), majority had depression and 53.3% had anxiety(24). Although this study provides insight about mental health of the Sudanese medical staff during the pandemic it has many limitations which question its significance.

#### **Rationale:**

Implications made by this study can be used as guide by ministry of Health in Sudan to create strategies for the mental well-being of health care workers, and new methods of mental health services can be introduced during the pandemics.

The study findings are expected to provide reference for future psychological support protocols and may assist the health authorities in safeguarding the mental well-being of the health care professionals.

#### **Objective:**

The study aimed to: Estimate the proportions of depression and anxiety among healthcare workers dealing with COVID-19 and identify the potential risk factors for developing the mental illness.

#### **Materials and methods:**

##### **Study design and setting:**

This was a cross sectional facility-based study conducted in governmental hospitals in Khartoum state. Khartoum state is one of the eighteen states of Sudan with an estimated area of 22,142 km<sup>2</sup>. It contains Khartoum city which is the capital of Sudan as well as Omdurman and Khartoum north (Bahri) cities. Khartoum state is the Sudan's most populous state (7,687,547). We included all accessible hospitals adopting COVID-19 protocols (accepting COVID-19 patients and implementing triage with isolation facility). A List of five teaching hospitals, Bahri, Haj Alsafi, Ibrahim Malikm, Al Shaab and Omdurman which meet the inclusion criteria was obtained from the state Ministry of Health (SMoH) / department of curative medicine (CM). Letters were written through the CM department /SMoH and sent to the medical directors of the selected hospitals and their permissions were granted.

##### **Study population:**

This study was conducted among healthcare workers (doctors and nurses) who were dealing with COVID-19 patients in different departments (emergency room, sorting out and primary isolation units and intensive care units) either Ministry of health (MoH) appointed or volunteers. List of enrolled healthcare workers meeting the inclusion criteria and their phone numbers were obtained from the medical directors of the selected hospitals. We excluded healthcare workers who refused to participate or had pre-existing mental disease.

##### **Sampling:**

Following WHO protocol for assessment of potential risk factors for coronavirus disease 2019 among health workers in a health care setting, a convenient non-probability sampling was used to cover a total number of (163) healthcare workers who met the inclusion criteria (25).

##### **Data collection:**

Data was collected by the medical students' research team using the pretested coded and anonymous online questionnaire in a Google form. All healthcare workers were contacted through phone calls to explain the purpose of the study and to take their verbal consents.

Those who accepted to participate then received a link to the Google form. After opening the link of the form list of questions appeared consecutively to be answered. The first page contained an explanation and purpose of the study and participants had to confirm their acceptance to proceed in the questionnaire. Those who didn't confirm were regarded as refusals and excluded from the study. The second page assessed the presence of preexisting mental disease using a close ended "Yes or No" question. For those who responded "Yes" the form automatically ended and the response was excluded. To minimize missing data, questions were marked as required being filled to proceed to subsequent pages in the questionnaire.

### Measurements:

The online questionnaire was designed to assess the following:

Socio demographic characteristics (Age, gender, marital status, job title, and currently working department)

Identify the potential risk factors and personal protective equipment (PPE) in relation to the development of mental illnesses during the COVID19 pandemic

Mental disorders (depression and anxiety) using the following scales:

Patient health questionnaire-9 (PHQ9):

This is a 9-items self-administered depression module which scores each of the 9 DSM-IV criteria from 0 "Not at all" to 3 "Nearly every day" (26). 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. PHQ-9 score  $\geq 10$  had a sensitivity of 88% and a specificity of 88% for major depression (27).

Generalized anxiety disorder-7 (GAD)7:

This is a 7-items questionnaire used to measure anxiety symptoms. Each item has a score from 0 "not at all" to 3 "Nearly every day" (28). Scores of 5, 10, and 15 are taken as the cut-off points for mild, moderate and severe anxiety, respectively. Using the threshold score of 10, the GAD-7 has a sensitivity of 89% and a specificity of 82% for GAD. It is moderately good at screening three other common anxiety disorders - panic disorder (sensitivity 74%, specificity 81%), social anxiety disorder (sensitivity 72%, specificity 80%) and post-traumatic stress disorder (sensitivity 66%, specificity 81%) (28).

**Data analysis:** Data was analyzed using SPSS computer software program version 25

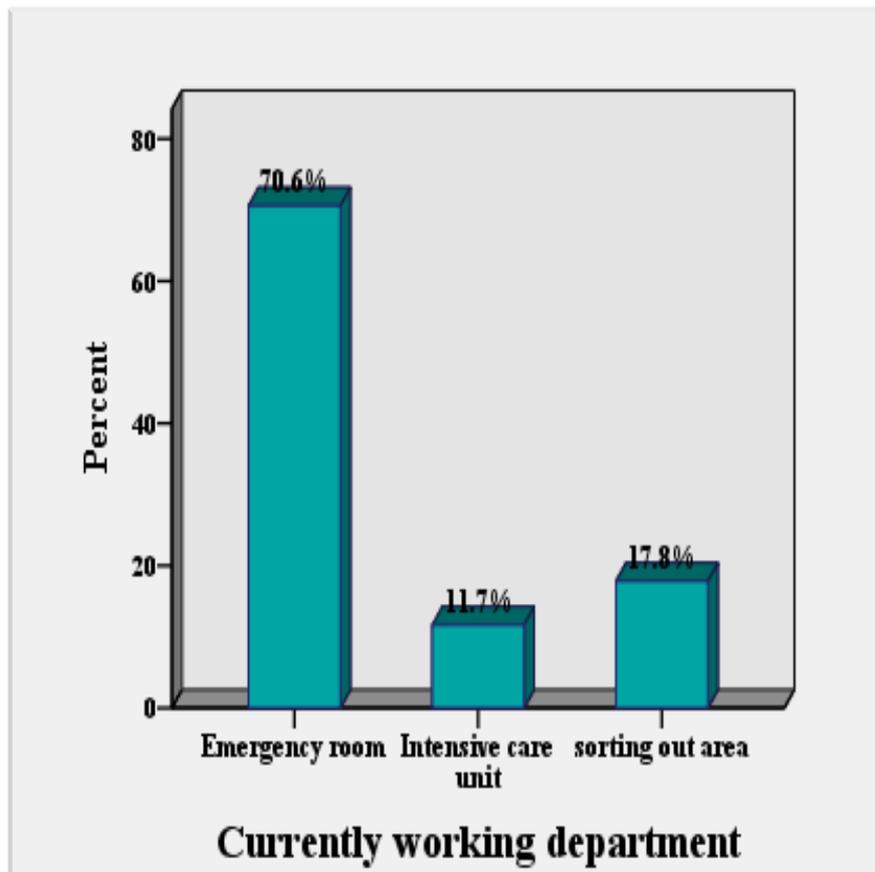
### Results:

In our study, a total of 206 responses were received through the online questionnaire among which 43 were excluded, either because they were duplicate responses or they met the exclusion criteria. Therefore, we ended up with 163 valid responses which were included in the study. Almost 61% mentioned that their financial stress has increased in comparison to pre-pandemic.

**Table (1): Socio-demographic characteristics of healthcare workers in selected Hospitals during COVID 19 pandemic in Khartoum state, Sudan, 2020. (N= 163).**

Participants had a mean age of  $26.4 \pm 3.6$  years. They were predominantly females (54.6%, n=89), single (87.7%, n= 143), medical doctors (83.4%, n=136). Medical doctors were mostly medical officers (44.2%, n=72).

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	74	45.4
	Female	89	54.6
Marital status	Single	143	87.7
	Married	20	12.3
Job	Medical doctor	136	83.4
	Nurse	27	16.6
Job title (for doctors)	House officer	45	27.6
	Medical officer	72	44.2
	Registrar	17	10.4



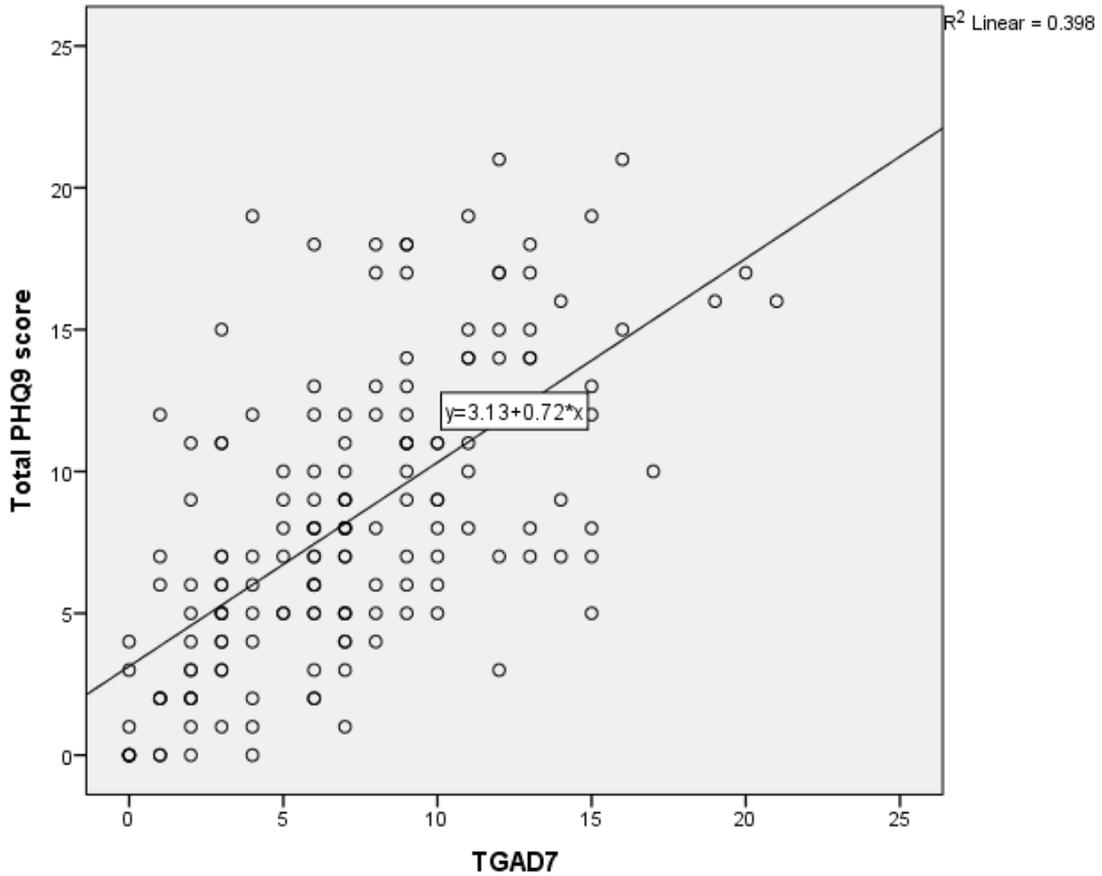
**Fig (1):** Showed the distribution of health workers (HWs) in different hospital departments.

Nearly 70 % were in the emergency room where the least of them work in the Intensive Care units

**Table (2):** Depression and anxiety levels among Healthcare workers

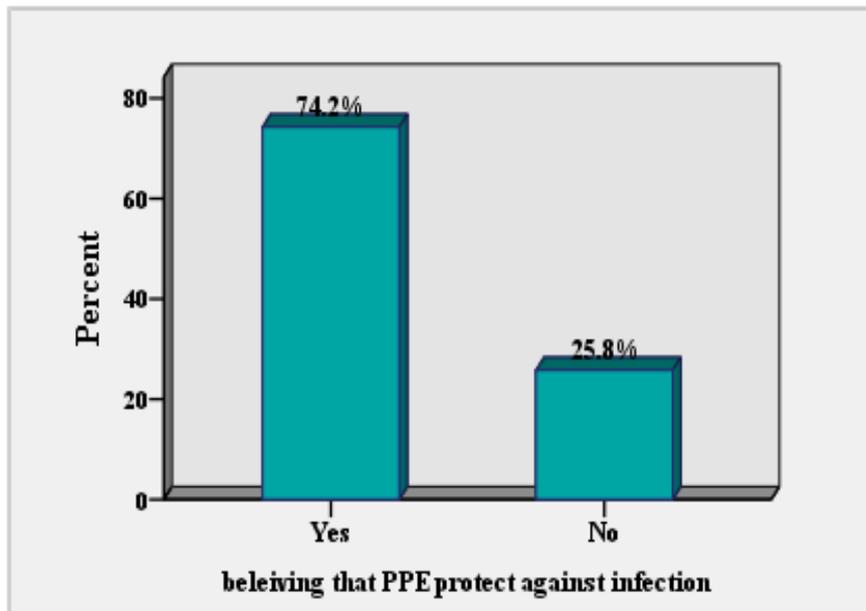
In this study, 76.1% had a level of depression (n=124) with the mild form being the most common one (39.9%, n=65). The mean score of PHQ9 scale was found to be  $8.3 \pm 5.2$ . On the other hand, 68.2% had a level of anxiety with the mild form being the most common one (39.9%, n= 65). The mean score of GAD7 was equal to  $7.1 \pm 4.6$ .

Depression (n, %)	No or minimal	39 (23.9)
	Mild	65 (39.9)
	Moderate	35 (21.5)
	Moderately severe	24 (14.6)
Anxiety (n, %)	No or minimal	52 (31.9)
	Mild	65 (39.9)
	Moderate	34 (20.9)
	Severe	12 (7.4)



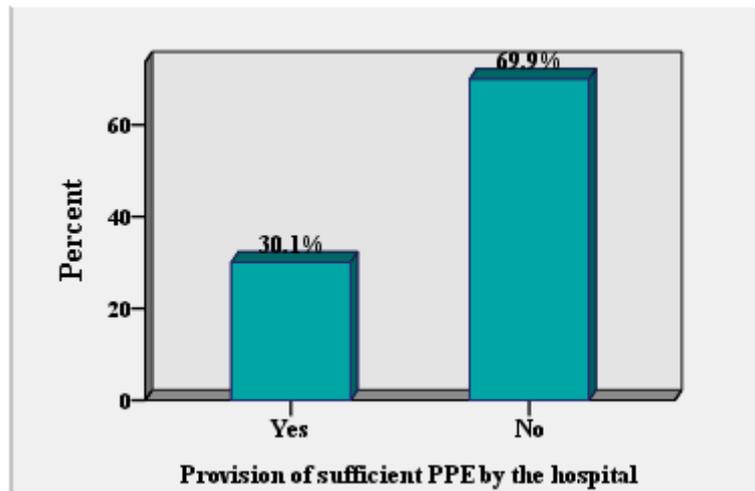
**Fig (2):The relationship between Anxiety and depression**

Relationship showed positive correlation between Anxiety as a predisposing factor for depression with correlation coefficient ( $r^2$ ) = 40%

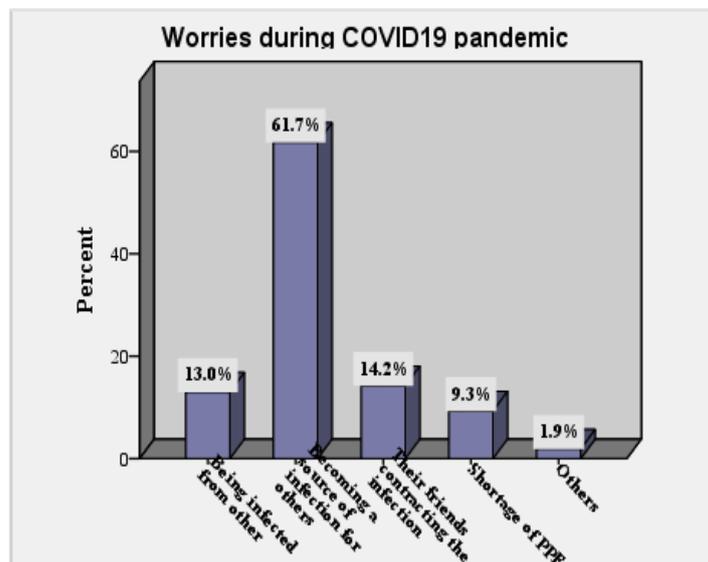


**Fig (3): Perception of the Personal Protective Equipment(PPE)**

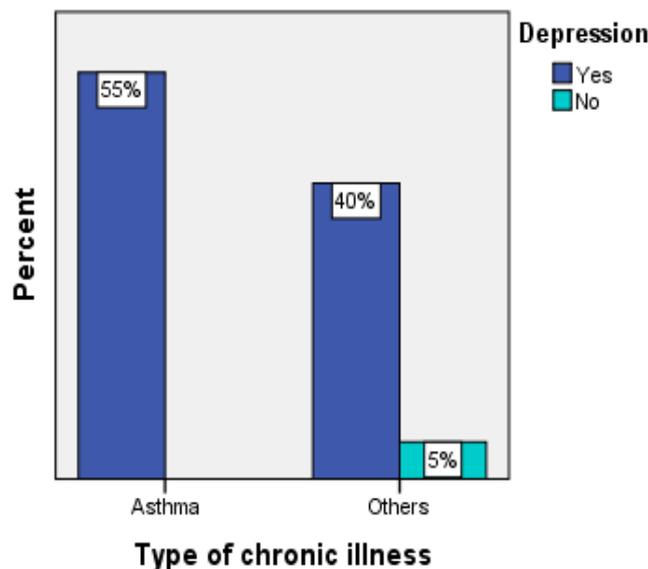
The majority (74.4 %) had the belief that PPEs protect against COVID19 infection, in comparison to 25% of them who didn't believe as such



**Fig (4): Supply of Personal protective equipment (PPE)**  
 The majority (69.9) mentioned that PPEs were not distributed by the hospital



**Fig (5): Common worries and beliefs reflected by the study Participants**  
 Almost 61 % were worried of becoming a source of infection for others, 14 % were afraid of their friends contracting the infection and 9.3 % worried about the unavailability of PPEs



**Fig (6): Types of chronic disease among the study participants**

Fifty five percent had asthma and 45% had other chronic disease. There is a relation between depression and chronic illnesses with significant P value (0.043)

### **Discussion:**

Our study has found that there was no significant difference in risk of development of depression and anxiety between healthcare workers who believed in the efficacy of personal protective equipment (PPE) (74.4%) and those who did not (25.6%). This result disagrees with the findings of an earlier study done in China, which stated that lack of confidence in protection measures led to increased risks of anxiety(29). Research done during previous pandemics, such as the 2009 H1N1 pandemic, provides further evidence that lack of confidence in PPE was a risk factor for mental illness(30). So, our results are quite surprising, especially when considering the answers of a separate question in our study, which stated that the participants' main worry was becoming a source of infection for others (61.7%). Because of the proven effects of PPE on decreasing risk of infection, we expected healthcare workers who believed in PPE efficacy to have significantly lower scores on the GAD-7 and PHQ-9 scales, however this was not the case.

Almost all participants(98%)stated that they didn't receive social support, so this study cannot tell if there is a difference in mental health between health workers who received social support and those who did not. A study conducted in Turkey showed that greater depression and anxiety symptoms were observed among those healthcare workers who admitted they require psychiatric support(31). Another study conducted also in Turkey showed that higher DAS-21 scores among healthcare workers were associated with lower level of support from peers and supervisors(32). To minimize the stress and feelings of loneliness, healthcare workers should be encouraged to talk freely to each other and share their concerns and fears.

### **Conclusion:**

Coronavirus disease increase the potential risk of developing psychological illness among health workers. Anxiety increases the risk of depression with positive correlation ( $r = 40\%$ )

Social support improved the psychological status but this result was not significant, however 61% mentioned that their financial stress was increased during the pandemic

There was insignificant relationship between the depression and the use of PPEs. A significant relationship between chronic illnesses and depression was discovered with P value (0.04).

### **Recommendations:**

Advocate for a change in Ministry of Health policy to:

- Establish a strategy for strengthening mental health services such as an early detection program and counseling. This could be done by distributing self-assessment questionnaires with the purpose of finding out the current mental well-being among HWs and acting on the feedback received.
- Construct a training program for the preparedness and management of outbreaks, with a focus on IPC measures
- Put plans for stock management.

### **Ethical consideration:**

**Consent:** Written consent has been obtained from the medical directors of the selected hospitals. Verbal consent was obtained from health workers due to the lockdown situation

Ethical approval: written approval from national ethics committee/ Federal Ministry of Health was obtained before conducting the study.

### **Acknowledgement**

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### **Conflict of interest:**

Authors have declared that no competing interests exist and they are alone responsible for the content and writing of this article.

**References:**

- WHO: Emergencies preparedness, response. Pneumonia of unknown origin – China. WHO - Dis outbreak news. 2020;5–7.
- Gorbalenya AE, Baker SC, Baric RS, Groot RJ De, Gulyaeva AA, Haagmans BL, et al. The species and its viruses – a statement of the Coronavirus Study Group. *Biorxiv (Cold Spring Harb Lab.* 2020;1–15.
- World Health Organization. Novel Coronavirus(2019-nCoV). WHO Bull. 2020;(February):1–7.
- Organization WH. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)). Emerg Comm regarding outbreak Nov coronavirus (2019-nCoV) 2020. 2020;(2005):1–6.
- Organisation WH. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. WHO Dir Gen speeches. 2020;(March):4.
- Rana W, Mukhtar S, Mukhtar S. Mental health of medical workers in Pakistan during the pandemic COVID-19 outbreak. *Asian J Psychiatr.* 2020;51:102080.
- World Health Organization. WHO Coronavirus Disease (COVID-19) Dashboard. 2020.
- Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The Lancet Psychiatry.* 2020;7(3):228–9.
- Liang L, Ren H, Cao R, Hu Y, Qin Z, Li C, et al. The Effect of COVID-19 on Youth Mental Health. *Psychiatr Q.* 2020;91(3):841–52.
- Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *The Lancet Psychiatry.* 2020;7(3):e14.
- Fernandez R, Lord H, Halcomb E, Moxham L, Middleton R, Alananzeh I, et al. Implications for COVID-19: A systematic review of nurses' experiences of working in acute care hospital settings during a respiratory pandemic. *Int J Nurs Stud.* 2020;111(01):1–8.
- Walton M, Murray E, Christian MD. Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. *Eur Hear J Acute Cardiovasc Care.* 2020;9(3):241–7.
- Neto MLR, Almeida HG, Esmeraldo JD ar., Nobre CB, Pinheiro WR, de Oliveira CRT, et al. When health professionals look death in the eye: the mental health of professionals who deal daily with the 2019 coronavirus outbreak. *Psychiatry Res.* 2020;288(April):2–4.
- Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. 2020;(January).
- Song X, Fu W, Liu X, Luo Z, Wang R, Zhou N. Mental health status of medical staff in emergency departments during the Coronavirus disease 2019 epidemic in China. 2020;(January).
- Jeong H, Yim HW, Song Y, Ki M, Min J, Cho J, et al. Mental health status of people isolated due to Middle East Respiratory Syndrome. :1–7.
- Min S, Sub W, Cho A, Kim T, Kyung J. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. 2020;(January).
- Thomas SP. Ebola and Mental Health. 2015;247–8.
- D RGM. Was SARS a mental health catastrophe? *Gen Hosp Psychiatry.* 2009;31(4):316–7.
- Hct/unct. SUDAN, CORONAVIRUS-COVID-19, COUNTRY PREPAREDNESS AND RESPONSE PLAN-CPRP. 2020;(May).
- Federal Ministry of Health R of S. Coronavirus in Sudan. 2020.
- GARDA WORLD. Sudan: Three-week lockdown in Khartoum and Omdurman to take effect from April 18 /update 5. 2020.
- Wharton G, Ali OE, Khalil S, Yagoub H, Mossialos E. Rebuilding Sudan's health system: opportunities and challenges. *Lancet.* 2020;395(10219):171–3.
- Elamin MM, Hamza SB, Abdalla YA, Mohammed Mustafa AA, Altayeb MA, Mohammed MA, et al. The Psychological Impact of the COVID-19 Pandemic on health professionals in Sudan 2020. *Sudan J Med Sci.* 2020;(July):54–70.
- WHO. Protocol for assessment of potential risk factors for COVID-19 infection among health care workers in a health care setting. 2020;(March):1–48.
- Lewis. PATIENT HEALTH QUESTIONNAIRE ( PHQ-9 ) NAME : Over the last 2 weeks , how often have you been DATE : Several More than Nearly half the every day. *Depression.* 2005;9–10.
- Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med.* 2001;16(9):606–13.
- Spitzer RL Kroenke K WJBLB. Generalized {Anxiety} {Disorder} 7-item ( {GAD}-7 ) scale. *Arch Intern Med.* 2006;166:1092–7.

- Wang Y, Ma S, Yang C, Cai Z, Hu S, Zhang B, et al. Acute psychological effects of Coronavirus Disease 2019 outbreak among healthcare workers in China: a cross-sectional study. *Transl Psychiatry* [Internet]. 2020;10(1). Available from: <http://dx.doi.org/10.1038/s41398-020-01031-w>
- Vinck L, Isken L, Hooiveld M, Trompenaars MC, IJzermans J, Timen A. Impact of the 2009 influenza A(H1N1) pandemic on public health workers in the Netherlands. *Eurosurveillance* [Internet]. 2011;16(7):1–7. Available from: <http://dx.doi.org/10.2807/ese.16.07.19793-en>
- Şahin MK, Aker S, Şahin G, Karabekiroğlu A. Prevalence of Depression, Anxiety, Distress and Insomnia and Related Factors in Healthcare Workers During COVID-19 Pandemic in Turkey. *J Community Health* [Internet]. 2020 Dec 11;45(6):1168–77. Available from: <https://doi.org/10.1007/s10900-020-00921-w>
- Rumeysa E, Kurtulmus A, Arpacioğlu S, Karadere E. Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. *Psychiatry Research* [revista en Internet] 2020 [acceso 19 de octubre de 2020]; 290(1): 1-5. 2020;(January). Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7255248/>