



## RESEARCH ARTICLE

# IMPACT OF COVID-19 PANDEMIC ON HEALTH CARE WORKERS - AN OBSERVATIONAL STUDY

Tina Priscilla katta<sup>1</sup>, Sree lakshmi latha Avulapati<sup>2</sup>, Aruna kumari Badam<sup>3</sup>

1. Tina Priscilla katta, Associate Professor, Department of DVL, Apollo Institute of Medical Sciences, Hyderabad

2. Sree lakshmi latha Avulapati, Senior resident, Department of Psychiatry, Apollo Institute of Medical Sciences and Research, Hyderabad

3. Aruna kumari Badam, Associate Professor, Department of Respiratory Medicine, ESIC Medical College, Hyderabad

**Corresponding author:** Dr. Sree Lakshmi Latha Avulapati, Psychiatrist, Apollo Institute of Medical Sciences and Research, Hyderabad

**Publication history:** Received on 11 July 2021, Accepted on 31 July 2021, Published online 5 Aug 2021

### ABSTRACT:

**Background:** The ongoing Corona virus disease 2019 (COVID-19) pandemic is now greatly inducing fear among health care workers (HCWs) and there is a need for timely understanding a mental health status in these populations. This study aimed to assess psychological impact of COVID-19 infection among HCWs from Hyderabad, India. **Methods:** A cross-sectional study was conducted among HCWs including doctors, nurses and other hospital staffs working in hospital environment during COVID-19 outbreak and were invited to participate using self-administered questionnaires (online or manual survey). Mental health status was measured using the depression, anxiety and stress scale (DASS-21). Continuous variables between the groups were measured using the Mann–Whitney U-test.  $P < 0.05$  was considered statistically significant.

**Results:** A total of 345 HCWs were included in this study. According to education level, the depression score was significantly higher in the participant who have completed higher level education compared to participant who have completed primary or secondary level education (2.39 [1.34] and 1.99 [1.27];  $P = 0.004$ ). Depression ( $P = 0.039$ ), anxiety ( $P = 0.002$ ), and stress ( $P = 0.006$ ) were more common in participants who were at front desk, housekeepers, and pharmacists or technicians, respectively. Anxiety was significantly increased in lower income ( $< 10000$ /month) participants ( $P = 0.016$ ). Depression score was significantly higher in participants without any illness compared to participants with illness (2.15 vs. 2.08;  $P = 0.020$ ). Anxiety was positively correlated with stress ( $r = 0.308$ ,  $P < 0.001$ ). Posttraumatic stress disorder, anxiety, and occupation were significantly associated with stress. **Conclusion:** Overall observations suggest presence of anxiety, depression and stress among HCWs working in hospital environment during COVID-19 outbreak.

**Keywords:** Anxiety, PTSD, Depression, Stress, DASS scoring



## INTRODUCTION

Corona virus disease 2019 (COVID-19) infection was first detected in Wuhan, China during late 2019 and thereafter rapidly spread all over the world [1]. COVID-19 infection was declared as a global emergency in 30 January 2020 by world health organization (WHO) [2]. There have been nearly 80 million cases of COVID-19 and around 1.7 million deaths reported worldwide as of 30 December 2020 [3]. As the global pandemic accelerates, countries are required urgent trained doctors, critical need for personal protective equipment (PPE), respirators and need for testing.

Health care workers (HCW) including doctors and medical staffs are the only people in frontline handling the infected patients, and risking their lives. During the outbreak, the psychological symptoms including depression, anxiety, stress and posttraumatic stress disorder (PTSD) were more prevalently observed among HCWs [4].

India is a developing country where patients infected with COVID-19 are increasing day by day, substantially overburdened healthcare system which induce anxiety, irritation and stress among HCWs. Shortage of hand sanitizers and other hygienic tools [5] and inadequate supply of PPE [6] among HCWs are the most common reasons contributing to the increasing risk anxiety, depression and stress in HCW who are more prone to infection.

The ongoing COVID-19 epidemic is now greatly inducing fear among the HCWs and a timely understanding of mental health status is urgently needed for society. The aim of this study was to survey among the doctors and medical health care workers those who are in frontline treating the COVID-19 patients to better understand their levels of psychological impact, anxiety, depression, and stress during the initial stage of the COVID-19 outbreak.

## MATERIALS AND METHODS

This was a prospective, observational, cross-sectional study conducted in accordance with the ethical principles that are consistent with the Declaration of Helsinki, International Conference on Harmonization-Good clinical practices (ICH-GCPs). The study protocol approval was obtained from independent Ethics Committee or Institutional Review Board prior to the commencement of the study. All the participants were provided written informed consent.

Health care workers including doctors, nurses and other hospital staffs who were working in hospital environment during COVID-19 outbreak were invited to participate using self-administered questionnaires (online or manual survey). Participants were evaluated by using questionnaires like socio demographic proforma to know the demographic characteristics (age, gender, education, monthly income, occupation, and type of family. Mental health status was measured using the depression, anxiety and stress scale (DASS-21) [7]. Scores for depression, anxiety and stress were calculated by summing the scores



for the relevant items. The rating scale is as follows: 0-Did not apply to me at all; 1-Applied to me to some degree, or some of the time; 2-Applied to me to a considerable degree or a good part of time; 3-Applied to me very much or most of the time.

Data were analyzed using Statistical Package for The Social Sciences (SPSS) software, version 21.0. Quantitative data were presented as mean (standard deviation [SD]). Quantitative variables between the groups were done using the Mann-Whitney U test.  $P < 0.05$  was considered statistically significant.

## RESULTS

A total of 345 HCWs were included in this study. The PTSD, depression score, anxiety score and stress score were comparable between age group (<50 years and >50 years) and men and women. According to education level, the depression score was significantly higher in the participant who have completed higher level education compared to participant who have completed primary or secondary level education (2.39 [1.34] and 1.99 [1.27];  $P=0.004$ ). Depression ( $P=0.039$ ), anxiety (0.002), and stress ( $P=0.006$ ) were more common in participants who were at front desk, housekeepers, and pharmacists or technicians, respectively. Anxiety was significantly increased in lower income (<10000/month) participants ( $P=0.016$ ). Mental health status was comparable according to type of family and zone wise distribution.

Depression score was significantly higher in participants without any illness compared to participants with illness (2.15 vs. 2.08;  $P=0.020$ ) (Table 1). Psychological factors including PTSD, depression, anxiety and stress were comparable between protective measures (yes/no), indirect contact with confirmed COVID (yes/no), contact with suspected or infected patients (yes/no), and adoption of precautionary measure (always/most of the time) (Table 2).

Anxiety was positively correlated with stress (correlation coefficient: 0.308;  $P < 0.001$ ) (Table 3). PTSD, anxiety, and occupation were significantly associated with stress score (Table 4).



**Table 1:** Association between demographic variables and the psychological impact of COVID-19

| Characteristics                 | PTSD         | Depression score         | Anxiety score            | Stress score              |
|---------------------------------|--------------|--------------------------|--------------------------|---------------------------|
| <b>Age (years)</b>              |              |                          |                          |                           |
| <50 (N=326)                     | 23.50 (5.18) | 2.12 (1.30)              | 4.30 (1.40)              | 9.23 (2.29)               |
| ≥50 (N=19)                      | 22.05 (6.40) | 2.68 (1.42)              | 4.42 (1.31)              | 9.37 (1.98)               |
| <b>Sex</b>                      |              |                          |                          |                           |
| Men (N=114)                     | 23.28 (5.41) | 2.30 (1.33)              | 4.42 (1.31)              | 9.51 (2.25)               |
| Women (N=231)                   | 23.48 (5.18) | 2.07 (1.30)              | 4.25 (1.43)              | 9.11 (2.27)               |
| <b>Education</b>                |              |                          |                          |                           |
| Primary + secondary (N=204)     | 23.34 (4.69) | 1.99 (1.27) <sup>a</sup> | 4.37 (1.34)              | 9.17 (2.12)               |
| College (N=140)                 | 23.57 (5.98) | 2.39 (1.34)              | 4.21 (1.46)              | 9.33 (2.47)               |
| <b>Occupation</b>               |              |                          |                          |                           |
| Doctors (N=88)                  | 23.42 (6.07) | 2.27 (1.27)              | 4.22 (1.47)              | 8.85 (2.04)               |
| Nurses (N=122)                  | 23.81 (5.12) | 1.89 (1.28)              | 3.97 (1.41)              | 9.01 (2.40)               |
| Pharmacist + technicians (N=15) | 25.27 (4.08) | 2.60 (1.40)              | 4.47 (1.19)              | 10.33 (2.47)              |
| Housekeepers (N=61)             | 22.28 (4.54) | 2.08 (1.24)              | 4.77 (1.18)              | 9.16 (1.98)               |
| Security (N=36)                 | 23.34 (4.69) | 2.28 (1.45)              | 4.72 (1.39)              | 10.11 (2.23)              |
| Front desk (N=23)               | 23.57 (5.98) | 2.70 (1.40) <sup>b</sup> | 4.48 (1.16) <sup>c</sup> | 10.09 (2.47) <sup>d</sup> |
| <b>Income (rupees)</b>          |              |                          |                          |                           |
| ≥30000 (N=89)                   | 23.45 (6.04) | 2.25 (1.28)              | 4.20 (1.47)              | 8.81 (2.07)               |
| 30000-10000 (N=195)             | 23.76 (5.04) | 2.12 (1.35)              | 4.21 (1.39)              | 9.46 (2.41)               |
| <10000 (N=61)                   | 22.28 (4.54) | 2.08 (1.24)              | 4.77 (1.18) <sup>c</sup> | 9.16 (1.98)               |
| <b>Type of family</b>           |              |                          |                          |                           |
| Nuclear (N=230)                 | 23.89 (5.54) | 2.15 (1.33)              | 4.26 (1.37)              | 9.32 (2.37)               |
| Joint (N=108)                   | 22.46 (4.58) | 2.07 (1.28)              | 4.40 (1.43)              | 9.06 (2.07)               |



|  |              |                          |             |             |
|--|--------------|--------------------------|-------------|-------------|
| Living alone (N=7)   | 22.57 (3.15) | 3.29 (0.49)              | 4.43 (1.27) | 9.43 (1.81) |
| <b>Zone</b>  |              |                          |             |             |
| Red (N=62)   | 23.42 (6.35) | 2.15 (1.35)              | 4.35 (1.41) | 9.05 (2.36) |
| Orange (N=76)  | 23.12 (4.79) | 2.08 (1.36)              | 4.32 (1.27) | 8.92 (1.81) |
| Green (N=206)  | 23.56 (5.05) | 2.17 (1.29)              | 4.30 (1.43) | 9.41 (2.38) |
| <b>Illness</b>   |              |                          |             |             |
| Yes (N=12)   | 24.17 (6.52) | 2.08 (0.79)              | 4.17 (1.12) | 8.75 (1.48) |
| No (N=333)   | 23.39 (5.21) | 2.15 (1.33) <sup>f</sup> | 4.31 (1.40) | 9.26 (2.29) |
| Data shown as mean (SD) PTSD, posttraumatic stress disorder.   |              |                          |             |             |
| <sup>a</sup> P=0.004; <sup>b</sup> P=0.039; <sup>c</sup> P=0.002; <sup>d</sup> P=0.006; <sup>e</sup> P=0.016; <sup>f</sup> P=0.020; only significant P values are presented. |              |                          |             |             |

**Table 2:** Association between protective measures, contact with confirmed or suspected patients, precautionary measures and the psychological impact of COVID-19

| Characteristics   | PTSD         | Depression score | Anxiety score | Stress score |
|---|--------------|------------------|---------------|--------------|
| <b>Protective measures</b>  |              |                  |               |              |
| Yes   | 23.39 (5.20) | 2.11 (1.30)      | 4.30 (1.41)   | 9.18 (2.24)  |
| No  | 23.83 (5.95) | 2.67 (1.37)      | 4.42 (1.18)   | 10.00 (2.45) |
| <b>Indirect contact with confirmed COVID</b>                      |              |                  |               |              |
| Yes (N=20)  | 21.55 (5.34) | 1.80 (1.19)      | 4.50 (1.36)   | 9.00 (1.65)  |
| No (N=324)  | 23.54 (5.24) | 2.17 (1.32)      | 4.30 (1.39)   | 9.27 (2.29)  |
| <b>Contact with suspected or infected patients</b>                |              |                  |               |              |
| Yes (N=139)   | 23.43 (5.31) | 2.20 (1.29)      | 4.16 (1.37)   | 9.05 (2.26)  |
| No (N=206)  | 23.41 (5.22) | 2.11 (1.33)      | 4.41 (1.39)   | 9.37 (2.27)  |
| <b>Adoption of precautionary measures</b>                         |              |                  |               |              |
| Always (N=241)  | 23.44 (5.18) | 2.11 (1.31)      | 4.25 (1.34)   | 9.39 (2.29)  |
| Most of the time (N=103)  | 23.32 (5.44) | 2.25 (1.32)      | 4.43 (1.51)   | 8.89 (2.19)  |
| Data shown as mean (SD).  |              |                  |               |              |
| COVID, Corona virus disease; PTSD, posttraumatic stress disorder. |              |                  |               |              |



**Table 3:** Correlation between scores

| Parameter 1                          | Parameter 2      | Correlation coefficient | P value |
|--------------------------------------|------------------|-------------------------|---------|
| PTSD                                 | Depression score | 0.065                   | 0.230   |
|                                      | Anxiety score    | 0.108                   | 0.044   |
|                                      | Stress score     | 0.241                   | <0.001  |
| Depression score                     | Anxiety score    | -0.043                  | 0.431   |
|                                      | Stress score     | 0.019                   | 0.722   |
| Anxiety score                        | Stress score     | 0.308                   | <0.001  |
| PTSD, posttraumatic stress disorder. |                  |                         |         |

**Table 4:** Regression coefficient

| Dependent variable | Predictors                                  | Odds ratio | P value |
|--------------------|---|------------|---------|
| Stress score       | Posttraumatic stress disorder               | 0.222      | <0.001  |
|                    | Depression score                            | -0.011     | 0.833   |
|                    | Anxiety score                               | 0.257      | <0.001  |
|                    | Age   | -0.067     | 0.333   |
|                    | Gender                                      | -0.050     | 0.390   |
|                    | Education                                   | 0.119      | 0.109   |
|                    | Occupation                                  | 0.163      | 0.034   |
|                    | contact with suspected or infected patients | 0.046      | 0.366   |
|                    | Adoption of precautionary measures          | 0.005      | 0.952   |
|                    | Location                                    | 0.087      | 0.106   |

**DISCUSSION**

The global pandemic has been drastically increased with an obvious visible impact on HCWs. The risk of infection is higher in HCWs due to everyday contact with patients while frontline workers are found to be more susceptible to anxiety, depression and stress during pandemics [8-11]. The major attributable risk factors include clinical symptoms or disease progression, medication side effects, perceived danger, fear of virus transmission to others or social isolation, uncertainty, physical discomfort, and overwhelming negative news portrayal in mass media coverage [12,13]. The ongoing COVID-19 epidemic is now greatly inducing fear among the HCWs and a timely understanding mental health status is urgently needed for society.

The present study prospectively determined the psychological impact of ongoing COVID-19 pandemic on HCWs in Hyderabad, India. The key findings were significantly



increased depression in highly educated participants and significantly increased anxiety in lower income participants, the risk of depression, anxiety and stress is higher among front desk, housekeepers and pharmacists or technicians. We also found that stress was significantly associated with PTSD, anxiety, and occupation. In addition, stress was positively correlated with anxiety score.

As far as PTSD is concerned, all HCWs showed high prevalence of PTSD which is in line with previous study conducted in Spain and China [14,15]. According to earlier studies, experience of traumatic events in the surrounding environment and frequent indirect exposure to traumatic events are contributable risk factors associated with PTSD [14].

In the present study, depression was significantly higher in participants who have higher level education compared to primary or secondary education (2.39 vs. 1.99) indicating real psychological status during initial phase of this pandemic. The prevalence of depression measured by DASS-21 was lower, but still significantly higher in front desk workers. This is consistent with the previous studies where significantly lower DASS-21 score was reported in frontline nurses compared to nonmedical HCWs or general population [16,17].

The results of the present study showed an anxiety score of 4.40 and 4.42 in patients <50 years and  $\geq 50$  years of age, respectively, which was slightly higher than previous Indian studies reported by Singh et al. and Selvaraj et al. However, preceding global studies reported severe anxiety among HCWs [17-20]. The results indicated that the high risk of transmission of COVID-19 infection and large number of patients with asymptomatic infection attributed to anxiety and fear in HCWs [21]. Well trained doctors who are aware about infectious disease can manage patients effectively. Also, these professional workers showed low level of anxiety with positive attitude towards a situation [22].

The present study reported incidence of stress along with PTSD, depression and anxiety. Stress rates were especially high among pharmacist and technicians due to fatigue as a result of extended working hours. Stress level among HCWs has been increased as there is no treatment available to manage these patients [23] which lead to diminish their attention, cognitive functioning, and clinical decision making [24,25].

As far as First survey on psychological impact and mental health was conducted in the general population of China within the first two weeks of the COVID-19 outbreak concluded that more than half of the respondents had psychological impact as moderate-to-severe, and about one-third had moderate-to-severe anxiety [26]. There is an increased risk of exposure to viruses like severe acute respiratory syndrome (SARS) and H1N1 in frontline HCWs which experiences a variety of mental health challenges [27,28]. However, HCWs have higher risk of suicide than general population due to increase psychological distress during outbreaks [29]. With respect to this existing literature reported mild to moderate anxiety with excessive stress indicating mental health problems such as stress and anxiety are commonly associated with nurses [19]. Another study from Wuhan has reported high prevalence of burnout, anxiety, depression and fear among nurses who work continuously during the outbreak. Skin lesions are more common in the participants who use PPE kit as a precautionary measure [20]. This is supported by similar study done in India by Selvaraj et al. found high prevalence of mild and moderate depression and moderate and severe anxiety among male and female doctors. Insomnia was increasing in female doctors while male doctors reported sub-threshold insomnia [18]. Overall observations suggest that catching infection from patients coming to the hospitals, unable to see their families and children due to the high transmission rate, fear



of getting transmitted during the daily transportation from home to work, overwhelming negative news portrayal in mass media coverage may be causative factors which lead to increase stress, anxiety and depression among HCWs.

Several limitations of this study should be considered. This was a single-centrestudy from Southern India which may limit the generalizability of the findings. Follow-up studies could help assess for progression of psychological manifestations in COVID-19 subsides. This study did not conduct any pre- and post-COVID-19 pandemic study which could have added valuable data while inferring the observations.

## CONCLUSION

In conclusion, presence of anxiety, depression and stress are common among HCWs working in hospital environment during COVID-19 outbreak. This indicates the urgent need of psychological support and interventions to maintain the functionality of health care system.

## REFERENCES:

1. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. *Lancet*. 2020; 395: 470-73.
2. World Health Organization. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). Available from: <https://bit.ly/2zc56Vk>. Accessed on December 31, 2020.
3. WHO COVID-19 dashboard. Available from: <https://covid19.who.int/> 30.12.2020. Accessed on December 31, 2020.
4. Dubey S, Biswas P, Ghosh R, Chatterjee S, Dubey MJ, Chatterjee S, et al. Psychosocial impact of COVID-19. *Diabetes MetabSyndr*. 2020; 14: 779-88.
5. Biswas P, Chatterjee S. Hand hygiene compliance among doctors in a tertiary care hospital of India. *Indian J Pediatr*. 2014; 81: 967e8.
6. Chen Q, Liang M, Li Y, Guo J, Fei D, Wang L, et al. Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatry*. 2020; 7: e15e6.
7. Le TA. Multi-level predictors of psychological problems among methadone maintenance treatment patients in dierence types of settings in Vietnam. *SubstAbus Treat Prev Policy*. 2019; 14: 39.
8. Wu P, Fang Y, Guan Z, Fan B, Kong J, Yao Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry*. 2009; 54: 302-11.
9. Wu P, Liu X, Fang Y, Fan B, Fuller CJ, Guan Z, et al. Alcohol abuse/dependence symptoms among hospital employees exposed to a SARS outbreak. *Alcohol Alcohol*. 2008; 43: 706-12.
10. Um DH, Kim JS, Lee HW, Lee SH. Psychological effects on medical doctors from the Middle East Respiratory Syndrome (MERS) outbreak: a comparison of whether they worked at the MERS occurred hospital or not, and whether they participated in MERS diagnosis and treatment. *J Korean Neuropsychiatr Assoc*. 2017; 56: 28-34.
11. McMahon SA, Ho LS, Brown H, Miller L, Ansumana R, Kennedy CE. Healthcare providers on the frontlines: a qualitative investigation of the social and emotional impact of delivering health services during Sierra Leone's Ebola epidemic. *Health Policy Plan*. 2016; 31: 1232-9.
12. 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. *Lancet Psychiatry*. 2020; 7: 228-9.
13. Park SC, Park YC. Mental health care measures in response to the 2019 novel coronavirus outbreak in Korea. *Psychiatry Investig*. 2020; 17: 85-6.
14. Rodríguez BO, Sánchez TL. The Psychosocial Impact of COVID-19 on health care workers. *IntBraz J Urol*. 2020; 46: 195-200.
15. Si MY, Su XY, Jiang Y, Wang WJ, Gu XF, Ma L, et al. Psychological impact of COVID-19 on medical care workers in China. *Infect Dis Poverty*. 2020; 9: 113.





16. Li Z, Ge J, Yang M, Feng J, Qiao M, Jiang R, et al. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. *Brain Behav Immun.* 2020; 88: 916-9.
17. Tan BYQ, Chew NWS, Lee GKH, Jing M, Goh Y, Yeo LLL, et al. Psychological Impact of the COVID-19 Pandemic on Health Care Workers in Singapore. *Ann Intern Med.* 2020; 173: 317-20.
18. Selvaraj P, Muthukanagaraj P, Saluja B, Jeyaraman M, Channaiah TA, Gulati A, et al. Psychological impact of COVID-19 pandemic on health-care professionals in India-A multicentric cross-sectional study. 2020; 72: 1-7.
19. Cui S, Yujun J, Shi Q, Zhang L. Impact of COVID-19 on psychology of nurses working in the emergency and fever outpatient: A cross-sectional survey. 2020; 10.21203/rs.3.rs-20777/v1.
20. Hu D, Kong Y, Li W, Han Q, Zhang X, Zhu LX, et al. Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: A large-scale cross-sectional study. *EClinicalMedicine.* 2020; 24: 100424.
21. Schwartz J, King C-C, Yen M-Y. Protecting healthcare workers during the coronavirus disease 2019 (COVID-19) outbreak: lessons from Taiwan's severe acute respiratory syndrome response. *Clin Infect Dis.* 2020; 71: 858-60.
22. Temsah MH, Al-Sohime F, Alamro N, Al-Eyadhy A, Al-Hasan K, Jamal A, et al. The psychological impact of COVID-19 pandemic on health care workers in a MERS-CoV endemic country. *J Infect Public Health.* 2020; 13: 877-82.
23. Cai H, Tu B, Ma J, Chen L, Fu L, Jiang Y, et al. Psychological impact and coping strategies of frontline medical staff in Hunan between January and March 2020 during the outbreak of coronavirus disease 2019 (COVID-19) IN Hubei, China. *Med Sci Monit.* 2020; 26: e924171-1-e924171-16.
24. Panagioti M, Geraghty K, Johnson J, Zhou A, Panagopoulou E, Chew-Graham C, et al. Association between physician burnout and patient safety, professionalism, and patient satisfaction: a systematic review and meta-analysis. *JAMA Intern Med.* 2018; 178: 1317-30.
25. LeBlanc VR. The effects of acute stress on performance: implications for health professions education. *Acad Med.* 2009; 84: S25-33.
26. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *Int J Environ Res Public Health.* 2020 Mar; 17: 1729.
27. Chong MY, Wang WC, Hsieh WC, Lee CY, Chiu NM, Yeh WC, et al. Psychological impact of severe acute respiratory syndrome on health workers in a tertiary hospital. *Br J Psychiatry.* 2004; 185: 127-33.
28. Goulia P, Mantas C, Dimitroula D, Mantis D, Hyphantis T. General hospital staff worries, perceived sufficiency of information and associated psychological distress during the A/H1N1 influenza pandemic. *BMC Infect Dis.* 2010; 10: 322.
29. Schernhammer ES, Colditz GA. Suicide rates among physicians: a quantitative and gender assessment (meta-analysis). *Am J Psychiatry.* 2004; 161: 2295-2302

**Paper cited as: Tina Priscilla katta, Sree lakshmi latha Avulapati, Aruna kumari Badam .  
IMPACT OF COVID-19 PANDEMIC ON HEALTH CARE WORKERS - AN OBSERVATIONAL  
STUDY . International Journal of Medical and applied Sciences.2021;10(2): 36-44.**