

Psychological Impact of the COVID-19 Pandemic among Frontline Health Workers in Gandaki Province, Nepal

Nirupa Thapa¹, *Nisha Shrestha¹, Gita Devi Ghimire¹

¹ Pokhara Nursing Campus, Institute of Medicine, Tribhuvan University

ABSTRACT

Introduction: Coronavirus disease (COVID-19) has envisioned great fear in people including health workers who faced various problems such as work overload, long duty hours, fear of getting infected, discrimination, and stigmatization. The aim of this study was to identify psychological impact of COVID-19 among frontline health workers and identify the associated factors for post-traumatic stress disorders.

Methods: A cross-sectional descriptive research design was used to collect data using web-based questionnaire from 235 purposively selected health workers working in hospitals of Gandaki Province. Descriptive data were analyzed using mean, frequency and percentage; and Chi-square test to find association between variables. t-test and ANOVA were used to determine factors for PTSD among health professionals.

Results: The results indicated that 51.5% of health workers had psychological impact of clinical concern. Among them, 35.3% had likely presence of PTSD and 28.5% had severe psychological impact who can show impact even 10 years after the event. There were differences in experiencing traumatic stress differentiated by age, gender and profession where males had higher traumatic stress for all dimensions than females, and doctors had higher stress than nurses. Moreover, having a family member with a chronic disease, working in a higher level health facility with either intermediate or below educational level or higher educational level master's, and being under medication for mental illness was more stressful. Health workers working overtime, facing any stigma, and having a change in their regular jobs were more stressed.

Conclusions: The prevalence rates of psychological impact reveal a worrying view of mental health challenges among Nepalese frontline health workers. Hence, the best possible care with psychological support and first aid should be provided to health workers.

Keywords: COVID-19; Health workers; nurses; Psychological impact.

***Correspondance:** Nisha Shrestha, Lecturer, Pokhara Nursing Campus, Institute of Medicine, Tribhuvan University, Email: nishapkr061@hotmail.com, Mobile: 9846562311

INTRODUCTION

During the coronavirus disease-19 pandemic, health workers faced numerous challenges, including work overload and long duty hours, leading to fatigue and restlessness. They also experienced mental pressure and anxiety due to the constant risk of coronavirus infection. Working in hospitals, they encountered incidents that instilled feelings of sadness and insecurity. The prevailing fear and

insecurity during this time also resulted in social misapplications, such as discrimination and stigmatization. For example, coronavirus-infected individuals were treated heartlessly and isolated from society, and health workers were even asked to vacate their rented houses. Despite these difficulties, health workers persevered, dedicating themselves day and night to safeguarding people's well-being (1) different events of cooperation among people

and health workers and other incidents depicting stigma and discrimination in Nepal and other places during the COVID 19 pandemic are discussed based on a review of literatures. Post-traumatic stress disorder (PTSD) emerged as an intense physical and emotional response that persisted for weeks or months after a traumatic event. The symptoms of PTSD could be categorized into three broad types: re-living, avoidance, and increased arousal. Although most individuals tended to feel better within three months following a traumatic event, if problems persisted or worsened beyond one month, it could indicate the presence of post-traumatic stress disorder(2). The impact of mental well-being on a person's daily performance is well recognized through extensive research in various populations, including frontline health workers. Stigma was a prevalent issue faced by over half of the health workers, and a previous study in Nepal revealed that 41.9% experienced symptoms of anxiety, 37.5% exhibited depression symptoms, and 33.9% reported symptoms of insomnia(3)depression and insomnia among health workers involved in COVID-19 response in Nepal. This was a cross-sectional web-based survey conducted between April 26 and May 12, 2020. A total of 475 health workers participated in the study. Anxiety and depression were measured using a 14item Hospital Anxiety and Depression Scale (HADS: 0- 21. Notably, frontline healthcare workers bore witness to the sorrow and deaths of many COVID-19 patients, rendering them vulnerable to PTSD.

In the context of Nepal, the shortage of health workers in COVID-19 special hospitals resulted in overloaded schedules with extended duty hours. Additionally, inadequate supplies of personal protective measures during the early days of the pandemic, as well as discrimination and societal restrictions imposed on hospital workers, compounded the challenges they faced, including separation from their families. Despite previous research indicating

a likelihood of psychological distress among frontline health workers, there remains limited research in this area in Nepal. Therefore, this study aims to assess the psychological impact of the COVID-19 pandemic on frontline health workers in Gandaki Province, with the objective of identifying associated factors for PTSD.

METHODS

This study utilized a cross-sectional descriptive design, conducted in the aftermath of the initial wave of the Corona pandemic. In this case, a sample size of 235 was deemed necessary to achieve a 95% confidence level, with a tolerable error rate of 0.05%. This study targeted health workers purposefully selected for inclusion. data collection occurred from September 1, 2021, to October 30, 2021. The first step involved identifying all 38 COVID hospitals, followed by reaching out to the designated COVID focal person and COVID nurse in-charge at each health facility. they were requested to provide the email addresses or Viber numbers of frontline health workers who had been actively working since the first wave of the COVID-19 pandemic. Subsequently, potential respondents were contacted through their provided email or Viber details. Only those health workers who willingly participated and had been continuously engaged as frontline workers from the first wave to the second wave of the pandemic were eligible for inclusion in the study. To ensure the integrity of the data collection process, a carefully designed Google form was employed, with provisions in place to prevent resampling. The research instrument consisted of three parts. The first part focused on gathering sociodemographic information, including age, gender, marital status, ethnicity, educational qualification, type of profession, family type, living arrangement with children under 15 years of age or elderly members over 60 years, presence of a family member with chronic disease, and any history of mental health problems, among other relevant details. The second part of the instrument consisted of

work related variables such as work experience, type of health facility, working district, working area, condition of precautionary measures in workplace, getting government incentive, average working hours per day, change in regular job duty, infected with COVID-19, infected family members with COVID-19, faced stigma due to working in the hospital or infected with COVID-19 etc. The third part was Impact of Event Scale-Revised (IES-R 22) which is developed by Weiss & Marmar (4). The IES-R was designed as a measure of post-traumatic stress disorder (PTSD) symptoms, and is a short, easily administered self-report questionnaire that can best be used for recent and specific traumatic events. It has 22 questions, to better capture the DSM-IV criteria for PTSD. After data collection, it was coded, checked for completeness and consistency in excel sheet and then exported to SPSS 16.0 for further analysis. As per the objective of the study, descriptive statistics (frequency, percentage, mean, and standard deviation) was used to reveal demographic information and level of PTSD and Inferential statistics (t-test, regression) was used to identify associated factors of PTSD. The different dimensions of post-traumatic stress were tested with different variables as per the nature of the variable. The correlation was calculated between the continuous dependent variable and the stress dimensions. But in the case of the categorical variable with binomial category, t-test was performed, and in case of more than 2 categories ANOVA was done.

RESULTS

Most health workers (68.5%) were between the ages 20-30 years with a mean age of 28.85 ± 7.67 years. Most (86.8%) were female and 60.9% were Brahamhin/Chhetri. Among 235, 59% of the health workers had gained bachelor-level education and majority (83.4%) were nurses. More than half (52.3%) were single whereas 63% of them were from nuclear families and 56.2% were living with under 15 years' children

during the COVID-19 pandemic.

More than half (55.7%) were staying with a family member who had a chronic illness like hypertension, diabetes mellitus, etc. but most (94.9%) had no history of medication for mental health problems yet. Almost all (97.4%) received Covid-19 vaccine and a maximum of them (46.4%) were working in tertiary-level health facilities. Similarly, most (66.8%) were recently working in non-COVID ward where more than half (52.8%) were not getting a sufficient number of personal protective equipment during their duty. Almost half (49.4%) did extra hour duty during the COVID-19 and majority of them (48.1%) faced stigma due to their job nature as well as COVID-19 infection.

Table 1 Level of Psychological Distress among Health Workers **n=235**

Level (IES-R22 Score)	Number	Percent
Normal (0-23)	114	48.5
Mild Psychological Impact (24-32)	38	16.2
Moderate Psychological Impact (33-36)	16	6.8
Severe Psychological Impact (37+)	67	28.5
Total	235	100

The mean overall IES-R score of health workers was 1.17 ± 0.77 . Among the different dimensions of post-traumatic stress, the Avoidance 1.27 ± 0.85 is the highest, then the Hyperarousal 1.1 ± 0.81 followed by the Intrusion dimension with mean score 1.14 ± 0.79 . As the overall result and the outcomes of each dimension are higher than 1, therefore medical concern is to be given.

Table 2 Mean differences of Experienced Post-Traumatic Stress and Selected Baseline Variables **n=235**

	Avoidance	p-value	Intrusion	p-value	Hyperarousal	p-value	Total	p-value
Age(r-value)	r=0.13	0.03	r=0.16	0.01	r=0.21	0.00	r=0.1	0.00
Gender								
Female	1.22 ±0.81	0.01	1.08 ±0.75	0.00	1.04 ±0.75	0.00	1.12 ±0.72	0.00
Male	1.63 ±1.02		1.55 ±0.98		1.54 ±1.05		1.58 ±0.99	
Marital Status								
Married	1.26±0.82	0.97	1.11±0.66	0.77	1.09±0.79	0.95	1.16±0.72	0.93
Unmarried	1.28±0.88		1.18±0.9		1.11±0.83		1.2±0.83	
Separated/ Widow/ Widower	1.13±0		1.14±0		1.29±0		1.18±0	
Educational Level								
Intermediate and below	1.33±0.8	0.11	1.32±0.85	0.03	1.24±0.7	0.09	1.30±0.73	0.06
Bachelor Level	1.18±0.82		1.03±0.73		1.01±0.79		1.08±0.74	
Masters' Level and above	1.46±0.94		1.30±0.86		1.24±0.92		1.34±0.86	
Profession								
Doctor	1.6 ±0.87	0.00	1.5 ±0.85	0.00	1.51 ±0.88	0.00	1.54 ±0.85	0.00
Nurse	1.21 ±0.83		1.08 ±0.76		1.02 ±0.77		1.11 ±0.74	
Level of working health facility								
Primary	0.98±0.76	0.00	0.83±0.7	0.00	0.69±0.68	0.00	0.84±0.64	0.00
Secondary	1.47±0.85		1.32±0.81		1.3±0.75		1.37±0.76	
Tertiary	1.17±0.84		1.07±0.77		1.03±0.85		1.09±0.78	
Living with children below 15 years								
No	1.27 ±0.8	0.89	1.07 ±0.72	0.11	1.04 ±0.76	0.21	1.13 ±0.71	0.32
Yes	1.28 ±0.91		1.24 ±0.87		1.18 ±0.87		1.23 ±0.84	
Having a family member with chronic disease								
No	1.19 ±0.88	0.09	1.08 ±0.88	0.16	1.01 ±0.81	0.04	1.1 ±0.82	0.07
Yes	1.38 ±0.8		1.23 ±0.67		1.22 ±0.79		1.28 ±0.7	
History of medication for mental health problems								
No	1.25 ±0.84	0.04	1.12 ±0.79	0.07	1.07 ±0.8	0.01	1.15 ±0.76	0.02
Yes	1.76 ±0.88		1.55 ±0.78		1.69 ±0.87		1.67 ±0.83	

Table 3 Mean differences of Experienced Post-Traumatic Stress and Selected COVID-related Variables **n=235**

	Avoidance	p-value	Intrusion	p-value	Hyperarousal	p-value	Total	p-value
Vaccinated against COVID-19								
No	0.67 ±0.61	0.07	0.67 ±0.5	0.13	0.71 ±0.72	0.23	0.68 ±0.6	0.11
Yes	1.29 ±0.85		1.16 ±0.8		1.11 ±0.81		1.19 ±0.77	
Status of Precautionary measures in workplace								
Sufficient	1.24 ±0.82	0.52	1.13 ±0.71	0.7	1.08 ±0.79	0.67	1.15 ±0.73	0.61
Insufficient	1.31 ±0.87		1.16 ±0.87		1.12 ±0.83		1.2 ±0.81	
Received regular salary during COVID-19 pandemic								
No	1.23 ±0.83	0.54	1.06 ±0.8	0.12	1.00 ±0.76	0.08	1.1 ±0.74	0.19
Yes	1.3 ±0.86		1.22 ±0.79		1.18 ±0.84		1.24 ±0.8	
Got incentive during COVID-19 pandemic								
No	1.2 ±0.85	0.10	1.04 ±0.75	0.00	1.00 ±0.79	0.00	1.09 ±0.76	0.01
Yes	1.39 ±0.84		1.33 ±0.84		1.29 ±0.82		1.34 ±0.78	
Worked over time during COVID-19 pandemic								
No	1.13 ±0.79	0.01	0.91 ±0.65	0.00	0.91 ±0.74	0.00	0.99 ±0.67	0.00
Yes	1.42 ±0.88		1.38 ±0.85		1.3 ±0.84		1.37 ±0.83	
Changes in regular job duty								
No	1.19 ±0.74	0.17	0.93 ±0.67	0.00	0.92 ±0.72	0.00	1.02 ±0.65	0.00
Yes	1.34 ±0.93		1.32 ±0.85		1.26 ±0.85		1.31 ±0.84	
Faced any stigma due to your job nature or COVID-19 infection								
No	1.08 ±0.78	0.00	0.9 ±0.62	0.00	0.87 ±0.7	0.00	0.96 ±0.66	0.00
Yes	1.48 ±0.88		1.41 ±0.87		1.35 ±0.85		1.42 ±0.82	
Family infected with COVID-19								
Maybe	1.04±0.39	0.05	1.11±0.67	0.05	0.96±0.53	0.18	1.04±0.5	0.06
No	1.17±0.82		1.02±0.65		1.02±0.8		1.08±0.71	
Yes	1.42±0.91		1.28±0.93		1.21±0.84		1.31±0.85	
Infected with COVID								
Maybe	1.19±0.96	0.18	1.06±0.97	0.00	1.02±0.84	0.02	1.1±0.88	0.02
No	1.21±0.88		1.03±0.75		1±0.82		1.09±0.77	
Yes	1.43±0.7		1.4±0.69		1.32±0.75		1.38±0.67	

DISCUSSION

WHO has put lot of efforts for prevention and control of covid-19 pandemic. Health workers were also appreciated as 'health heros' that means there were lots of supports (training,

PPE, vaccine, etc.) to protect health workers from this new emerged disease. Despite these efforts, few health workers especially nurses died, and many are sufferers of psychological problems. This study was conducted to assess the psychological impact of the COVID-19

pandemic among frontline health workers of Gandaki Province and also to identify associated factors for PTSD.

The current study showed that 48.5 percent were normal whereas 51.5 percent of health workers had PTSD of clinical concern. Among them, 35.3 percent had likely presence of PTSD and 28.5 percent are likely to have an impact even 10 years after an event. The results reflect the similar findings revealing 44% from England(5), 39.9% in Turkey (6) and 14%-24% in other pandemics(7)with putative psychological consequences for healthcare workers (HCWs. The findings are also almost similar to the findings of the study by Elamin et. al. which showed that 29.3 percent of frontline health workers had subclinical PTSD, 31.3 percent had mild PTSD symptoms, 24.7 percent had moderate PTSD symptoms, and 14.6 percent had severe PTSD symptoms (8)and is therefore associated with severe health problems and high public anxiety, with healthcare community speculation to be the most distressed because they are at the highest risk of infection. This study aimed to investigate the psychological impact on frontline medical staff in Khartoum state, Sudan, during the COVID-19 pandemic between January and March 2020. Materials and Methods: Patient Health Questionnaire-9 (PHQ-9. Similarly, findings from Johnson showed 28.9% had clinical or subclinical symptoms of PTSD(9). The findings by Tan et. al(10) and Shrestha et. al (11)anxiety and depression are affecting not only COVID-19 patients but also health professionals, and general population. Fear of contracting COVID-19, forced restrictive social measures, and economic hardship are causing mental trauma. Nepal is a developing country from South Asia where the COVID-19 pandemic is still evolving. This online survey has been carried out to understand impact of COVID- 19 on mental health of Nepalese community dwellers.\nMethods: The COVID-19 Peritraumatic Distress Index (CPDI contrast with the study findings which revealed that

only 7.7 percent had PTSD of clinical concern; 11 percent had mild to moderate distress and 0.5 percent had severe distress respectively. The study by Liang et. al(12) showed a PTSD prevalence of 12.8% and Guo et. al (13) showed 11% prevalence within 1 month of the occurrence of COVID-19 outbreaks in China. The above differences in PTSD prevalence after a traumatic event may be due to the difference in research methods, culture, type, and severity of disaster, time interval measures after the disaster and diagnostic criteria. Lack of sufficient support and appropriate care might be a reason for experiencing higher traumatic stress in frontline health workers. Additionally, the symptom of avoidance, intrusion and hyperarousal dimension has been reported to be more highly prevalent among healthcare workers experiencing high exposure to stressor who are to be given special medical attention. Hence, it is expected that these psychological pains and deprived mental health can eventually lead to advanced mental health problems owing to the long-term ongoing nature of the COVID-19.

The findings of this study showed a significant positive weak correlation between age and all the dimensions of experiencing traumatic stress whereas the study findings by Nowicki et. al. showed no correlation with age (14)but also mental health, resulting in sleep problems, depression, and traumatic stress. Our research investigates the level of posttraumatic stress, perceived social support, opinions on positive and negative consequences of the pandemic, sense of security and sense of meaning among nurses in the face of this new and not fully understood global epidemiological phenomenon. For this purpose, computer-assisted web interviews were conducted between May 1 and May 15, 2020. Participating nurses completed the following research tools: The Impact Event Scale-Revised (IES-R. There was no statistically significant difference in marital status and experiencing traumatic stress which contrasts

with the study findings by Nowicki (14) but also mental health, resulting in sleep problems, depression, and traumatic stress. Our research investigates the level of posttraumatic stress, perceived social support, opinions on positive and negative consequences of the pandemic, sense of security and sense of meaning among nurses in the face of this new and not fully understood global epidemiological phenomenon. For this purpose, computer-assisted web interviews were conducted between May 1 and May 15, 2020. Participating nurses completed the following research tools: The Impact Event Scale-Revised (IES-R). There was no difference in living with children below 15 years and the level of experienced traumatic stress which differs from the study findings by Nowicki (14) but also mental health, resulting in sleep problems, depression, and traumatic stress. Our research investigates the level of posttraumatic stress, perceived social support, opinions on positive and negative consequences of the pandemic, sense of security and sense of meaning among nurses in the face of this new and not fully understood global epidemiological phenomenon. For this purpose, computer-assisted web interviews were conducted between May 1 and May 15, 2020. Participating nurses completed the following research tools: The Impact Event Scale-Revised (IES-R). There was higher traumatic stress experienced by males for all dimensions than for females but finding by other studies showed female had higher level of distress (11,15) anxiety and depression are affecting not only COVID-19 patients but also health professionals, and general population. Fear of contracting COVID-19, forced restrictive social measures, and economic hardship are causing mental trauma. Nepal is a developing country from South Asia where the COVID-19 pandemic is still evolving. This online survey has been carried out to understand impact of COVID-19 on mental health of Nepalese community dwellers.

Methods: The COVID-19 Peritraumatic Distress Index (CPDI). The study showed health workers having family members with chronic disease were more stressed in the hyperarousal dimension of experiencing traumatic stress only. Additionally, health workers who had a history of medication for mental illness had a significant mean difference in avoidance, hyperarousal dimension, and total score of IES-R which is similar to study by Chen et. al (15).

The study showed status of vaccination against COVID, sufficient availability of precautionary

difference in experiencing stress (13). The reason may also be caused by the different coping styles during the study time, or it may be because women are more likely to show symptoms during emergencies, which can effectively reduce the chance of getting PTSD. Doctors had higher level of stress than for nurses which is different from the findings by Bayazit et. al (6), Lai et. al (16) and Guo et. al (13). Working at tertiary health care level had differences in experiencing traumatic stress which may be due health workers exposed to higher number of COVID cases who were more complicated and critical. There was a significant difference in education level where health workers having intermediate and masters level was more stressed in the intrusion dimension of experiencing traumatic stress as compared to bachelor level of education which is different from the findings of other studies revealed health workers having post-secondary education and masters had a higher chance of developing distress (11,13) anxiety and depression are affecting not only COVID-19 patients but also health professionals, and general population. Fear of contracting COVID-19, forced restrictive social measures, and economic hardship are causing mental trauma. Nepal is a developing country from South Asia where the COVID-19 pandemic is still evolving. This online survey has been carried out to understand impact of COVID-19 on mental health of Nepalese community dwellers.

Methods: The COVID-19 Peritraumatic Distress Index (CPDI). The study showed health workers having family members with chronic disease were more stressed in the hyperarousal dimension of experiencing traumatic stress only. Additionally, health workers who had a history of medication for mental illness had a significant mean difference in avoidance, hyperarousal dimension, and total score of IES-R which is similar to study by Chen et. al (15).

The study showed status of vaccination against COVID, sufficient availability of precautionary

measure in workplace and getting salary and presence of family infected with COVID had no significant difference in experiencing traumatic stress. But experiencing stigma had significant difference in experiencing traumatic stress which is similar to the study by Gu et. al(17). Getting incentive in COVID period had significant difference in experiencing traumatic stress which may have serve as a compliment to their service in such pandemic. Being self-infected with COVID had significant difference in experiencing trauma whereas the change in usual job had significant difference in traumatic stress after the event.

This study also has limitations as data obtained for this study was from self-reported questionnaires through online survey. Study was performed early in the outbreak after first wave of COVID pandemic hence, there might be differences in prevalence of PTSD. Frontline health workers usually have to make decisions about life and death who are overwhelmed with the burden of making decisions requiring mental capacities. Hence, health workers are of significant importance during the pandemic, and ensuring of best possible care to them is a must. Psychological first aid and support should be provided to healthcare workers which can deal with mental health problems. This is a cross-sectional study and this study is not generalizable to the whole country. This study further opens the discourse on the psychological impact of pandemics like COVID on health workers in Gandaki Province, Nepal.

CONCLUSIONS

There is a high psychological impact of COVID-19 among frontline health workers who regularly face critical cases, working long duty hours with insufficient resources. Additionally, discrimination and stigma provoke mental health problems in frontline health workers. Hence, Psychological first aid and support should be provided to healthcare workers which can deal with mental health problems. Extending this study nationwide will be ideal

to get wider views and understanding of the psychological impact issues of a pandemic on health workers.

ACKNOWLEDGMENT

Our sincere thanks go to all the health workers who devoted their time and effort to participate in the study.

SOURCE OF FINANCIAL SUPPORT : None.

CONFLICT OF INTEREST: None declared.

REFERENCES

1. Niroula G. Cooperation with Health Professionals during the Pandemic of COVID 19. Dhaulagiri. 2020 Dec 29;14:90–6.
2. What Is a Traumatic Event. Coping with a traumatic event [Internet]. Cdc.gov. [cited 2023 Feb 3]. Available from: <https://www.cdc.gov/masstrauma/factsheets/public/coping.pdf>
3. Khanal P, Devkota N, Dahal M, Paudel K, Joshi D. Mental health impacts among health workers during COVID-19 in a low resource setting: a cross-sectional survey from Nepal [Internet]. In Review; 2020 Aug [cited 2023 Jan 8]. Available from: <https://www.researchsquare.com/article/rs-40089/v2>
4. Post-traumatic stress disorder [Internet]. National Institute of Mental Health (NIMH). [cited 2023 Feb 3]. Available from: <https://www.nimh.nih.gov/health/topics/post-traumatic-stress-disorder-ptsd>
5. Wild J, McKinnon A, Wilkins A, Browne H. Post-traumatic stress disorder and major depression among frontline healthcare staff working during the COVID-19 pandemic. *British Journal of Clinical Psychology*. 2022;61(3):859–66.

6. Bayazit H, Ozel M, Arac S, Dulgeroglu-Bayazit D, Joshi A. Posttraumatic Stress Disorder Among Health Care Workers During the COVID-19 Pandemic. *J Psychiatr Pract.* 2022 Sep 8;28(5):354-61.
7. Alberque B, Laporte C, Mondillon L, Baker JS, Mermillod M, Brousse G, et al. Prevalence of Post-Traumatic Stress Disorder (PTSD) in Healthcare Workers following the First SARS-CoV Epidemic of 2003: A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health.* 2022 Oct 11;19(20):13069.
8. 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 JMS.* 2020 Jul 9;54-70.
9. Johnson SU, Ebrahimi OV, Hoffart A. PTSD symptoms among health workers and public service providers during the COVID-19 outbreak. Vickers K, editor. *PLoS ONE.* 2020 Oct 21;15(10):e0241032.
10. 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. *Annals of Internal Medicine.* 2020 Aug 18;173(4):317-20.
11. Shrestha DB, Thapa BB, Katuwal N, Shrestha B, Pant C, Basnet B, et al. Psychological distress in Nepalese residents during COVID-19 pandemic: a community level survey. *BMC Psychiatry.* 2020 Dec;20(1):491.
12. Liang L, Gao T, Ren H, Cao R, Qin Z, Hu Y, et al. Post-traumatic stress disorder and psychological distress in Chinese youths following the COVID-19 emergency. *J Health Psychol.* 2020 Aug;25(9):1164-75.
13. Guo WP, Min Q, Gu WW, Yu L, Xiao X, Yi WB, et al. Prevalence of mental health problems in frontline healthcare workers after the first outbreak of COVID-19 in China: a cross-sectional study. *Health Qual Life Outcomes.* 2021 Dec;19(1):103.
14. Nowicki GJ, Iusarska B, Tucholska K, Naylor K, Chrzan-Rodak A, Niedorys B. The Severity of Traumatic Stress Associated with COVID-19 Pandemic, Perception of Support, Sense of Security, and Sense of Meaning in Life among Nurses: Research Protocol and Preliminary Results from Poland. *IJERPH.* 2020 Sep 7;17(18):6491.
15. Chen B, Li Q xian, Zhang H, Zhu J yong, Yang X, Wu Y hang, et al. The psychological impact of COVID-19 outbreak on medical staff and the general public. *Curr Psychol.* 2022 Aug;41(8):5631-9.
16. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open.* 2020 Mar 23;3(3):e203976.
17. Gu J, Song J, Wang J, Liu T, Zhan J, Yan W, et al. Stigmatization related COVID-19 and PTSD among Chinese graduates. *BMC Psychiatry.* 2022 Jun 29;22(1):439.