

MENTAL HEALTH STATUS OF HEALTH CARE PROFESSIONALS DURING COVID-19 PANDEMIC

¹Rida Riaz, ²Dr Abdur Rashid, ³Sharafat Ali*, ⁴Reshma Shahdi & ⁵Atiqa Bano

¹ MPhil Scholar, Dept. of Social Sciences, SZABIST, Islamabad

² Assistant Professor, Dept. of Social Sciences, SZABIST, Islamabad

^{3,4,5} Lecturer in Dept. Psychology & Human Development, KIU, Gilgit Baltistan

ABSTRACT

In the present study the mental health issues in health professionals during COVID-19 pandemic has identified. Total 150 health professionals including doctors, nurses\paramedical staff working in isolation wards was included as research participants of the study. Purposive sampling technique is used to collect the data. "DASS-21" and "Insomnia Severity Index" is used to collect the responses regarding mental health e.g. depression, anxiety, stress, and insomnia. Results are compiled and analyze through SPSS. By using independent sample t-Test applied to see the effect of working in isolation wards during COVID-19 on the mental health of health professionals including doctors and paramedical staff. Results showing that about 38 % health care professionals overall showed normal score, 42 % mild and 18 % severe depression score. About 36 % health professionals show normal score, 24.2 % mild, 32.7 % moderate and 6.6 % severe symptoms of anxiety. There 97.4 % health professionals score normal, 0.7 on mild, 0.7 moderate, 0.7 severe stress symptoms. Sleep issues reported by both genders and there are differences seen in same gender health professionals sleep issues as well. It's concluded that mental health issues in health professionals are associated with working in isolation wards of COVID-19 pandemic. It's suggested that there should be some measures to protect the mental health of health professionals during pandemics.

Keywords: Mental Health; COVID-19; Pandemic; Health Professionals; DASS-21; Insomnia Severity Index; Depression; Anxiety; Stress.

INTRODUCTION

COVID-19 pandemic is a health crisis and it has nasty effect upon the human beings all over the world. This infectious disease has so many physical concerns as well as mental concerns. There are huge population facing the mental health issues due to abrupt surge of this disease and nobody was mentally prepared to face this pandemic situation (Huang et al, 2020). There was no adequate information or knowledge about this disease that's another reason causing irritability, fear, anxiety and so many other complaints or mental health issues in the population that's previously called as normal population. Some people have illogical personal beliefs regarding the occurrence of this disease. Families, children's, professionals, students all are being disturbed due to this health crisis but the intensity of disturbance is different in these individuals or vary according to the daily routine, job, work that they were doing before (Hayat et al, 2020).

In Pakistan this disease started from 26th (February, 2020) and after that situation became worse and complete lockdown on 23rd march was imposed according to the sensitivity of the situation. Health professionals those who are working front desk, emergency and isolation wards to treat the patients with COVID-19 they are more prone to develop mental issues as compare to others. At the start (WHO, 2020) there was a meeting organized by the "World Health Organization" in crisis situation and acknowledges the COVID-19 as the public health emergency for the internationals all over the world (Cao et al, 2020). Through facing these circumstances, the healthcare workers those who were working on the front line were directly being involved to diagnose, treat and provide health care with COVID-19 were at the risk to develop any kind of psychological distress and other mental health warning signs. The increasing numbers of the patients, and the workload in crisis situation and less availability of safety equipment, extensive spread of news and media reporting, less availability of pharmacological treatment and the emotional state of being incompetency may also the contributing factors to increase the mental health issues by the increased burden on the healthcare professionals (Muhammad et al, 2022: Zaman et al, 2021).

When the "The Middle East Respiratory Syndrome" (MERS, 2015) arose, similarly began by a corona virus, healthcare professionals at that time suffered from stress and depressive

symptoms. Numerous other revisions having stated that mental health suggestions for specialists involved in healthcare throughout epidemics and viruses are enduring. Straight after certain time had emerged after such proceedings, higher level of stress, anxiety, depression, and even “Post-Traumatic Stress Disorder” (PTSD) was perceived in many cases. So, it is enormously significant to classify the healthcare professionals who are at great danger of tension and are more probable to undergo from anxiety, depression and stress in this epidemic, so that aid can be providing anywhere and while needed. It is also similarly significant to classify and address the issues accountable for this stress (Zaman, et al, 2021).

Theoretical Background

The Health Belief Model

This was a helping model developed to understand that why some people did or sometime didn't use the preventive measures or services offered by the public healthcare department (PHD, 1950). This model theorizes that due to people's beliefs that they are at risk or not for any health problem, their perception regarding the certain benefits of taking some actions to stay away from it, influence the readiness of them to take any action. If we relate HBM with current pandemic situation, people have some irrational beliefs about COVID-19, some people taking this pandemic seriously but on the other hand some are still ignoring the fact and their belief system effects their readiness to take any precautionary measure e.g. in some areas due to lack of knowledge.

Trans-Theoretical Model of Change

Stage of change is important element in this model, it proposes that there are some stages of change and people are at diverse stage to adopt any healthy behavior. This readiness to change behavior has been observed by research and it's helpful to explain and predict the change for different behaviors. This model may apply in numerous settings. If we relate this model to current pandemic situation, this can be helpful to identify the people acceptance and non-acceptance of worst effects of COVID-19. Pre-contemplation stage, at this level people has no recognition to change. Contemplation, at this stage they are just thing about change. Preparation, at this level they are planning to implement the change.

Social Cognitive Theory

This social theory has been top voiced (Bandura, 1977), explains any human conduct in the form of a tripartite, dynamic and the reciprocal model through which individual factors, environmental effects, and behaviors repeatedly interrelate. SCT creates ideas and procedures from mental, behaviorist, and demonstrative or emotional representations of actions change, so it can be willingly useful to therapeutic interpositions for disease inhibition and supervision.

Social Ecological Model

This model helps us to comprehend the problems, affecting actions and also offers supervision for rising fruitful programs through the social settings. This ecological model also helps us to understand the pandemic situation, how the problems affect the performance through different sources e.g. individual, relational or public we can shape our actions according to community environment.

Significance of Study

Mental health is important such as our physical health, and any health crisis can disturb the mental health of individuals because these crisis or epidemics are sudden and no one can predict before the outburst. COVID-19 is suddenly occurred virus which has worst effects all over the world. This virus affects the Pakistan as well. Health care professionals are affected by this COVID-19 differently. In this research mental health issues faced by the frontline health professionals are identified. Identification is more important to cure from any issues either it's medical or psychological. If we critically analyze the COVID-19 pandemic it has both worsened effects physical as well as psychological. This research is a beginning point to grab the attention of government or community to take some measure to help these professionals to maintain their mental health and perform their duties as well. As any professional diagnosed with depression, anxiety, stress or any sleep issue, so without any delay they are provided with counseling or psychotherapy with the help of responsible bodies. So this research has good impact to grab the attention of higher authorities to take step for the mental health of health professionals.

Objectives of the study

- To investigate the “Mental Health Issues in Health Professionals during Covid-19”.

- To identify percentage of related mental health issue (depression, anxiety, stress and sleep problems) separately according to severity level.
- To investigate that which gender in healthcare professionals is more prone to acquire the mental health issues during COVID-19 pandemic.
- To identify the correlation between working hours and mental health issues during COVID-19 Pandemic.

Hypotheses

Ho: There might be some mental health issues (depression, anxiety, stress and sleep problems) in healthcare professionals during COVID-19 Pandemic.

Ho: Male paramedical staff and male doctors will be equally affected by depression, anxiety and stress while working in isolation wards of COVID-19 Pandemic.

Ho: There will be no significant differences between depression, anxiety and stress issues in female doctors and paramedical staff while working in isolation wards.

Ho: Paramedical staff will be more prone to sleep issues than doctors while working in isolation wards.

LITERATURE REVIEW

Ping Wu (2013) conducted a study upon the psychological impacts of SARC on the hospital employee in China. The researcher studies the impact of SARC epidemic that happened in (China, 2003). The sample of 549 randomly selected employees was surveyed in Beijing to know about their exposure to SARC and effects upon persons "mental health". Consequences about that showing considerably nearly a little percentage of the participants have practiced higher level of the "post-traumatic stress" signs meanwhile the respiratory emergency epidemic.

Tengfei Tian (2020) conducted a study in China to identify the mental health issues in those healthcare professionals working in frontline through the earlier period of "COVID-19". Study suggest that by the provision of safety equipment and measures to address the mental health issues later on problems became reduced in health professionals. It's concluded from the present study that pandemic situation caused anxiety, depression and insomnia in the frontline

health professionals, but timely expansion and application of operative mental health services and the psychosocial care are important to look after the mental health challenges faced by these professionals.

Pratik Khanal (2020) conducted a cross-sectional survey study in Nepal regarding the impact on mental health between the health workers during the COVID-19 in the setting where resources was low. Consequences was showing that more than 41% of health workers those who were working at that instance have sign of nervousness, about 37 % have some of the signs of sadness, and 33 % workers was facing the symptoms of insomnia. Sardar Muhammad Alfareed Zafar and Muhammad Junaid Tahir (2020) conducted a study regarding the awareness in healthcare professionals, general population and medical students as well in Pakistan during this COVID-19. Major plan for this research intensively was to measure the frequency and the manipulating features of lack of interest and anxiety through pandemic in Pakistan.

METHODOLOGY

Population and sample

Population of this study is consists of frontline health workers including general physicians, doctors working in isolation wards of COVID, paramedical staff including both male and female nurses working in isolation wards in day and night shifts. Sample is consisting of 150 frontline “Health Professionals” and “Paramedical Staff” working with COVID patients from in public hospitals of twin cities Rawalpindi and Islamabad. Age range of health professionals must between 22 to 60 years, both fresh graduates and experienced professionals are selected as a sample of this study. Works hours are also mentioned and data regarding that also collected.”. Here in this research purposive sampling also named as judgmental sampling is used to collect the data because in this way careful selection of the participants is done.

Research design

Here in the present research, researcher used cross-sectional method of research to study the sample of interest. This is a quantitative research in which questionnaire was given to each participants and researcher also conducted a brief interview to collect the data, and the participants had to fill out the questionnaires according to the guidelines. At the end analysis is made upon the basis of response, this research was helpful for the researcher to identify the

gender relate prevalence regarding mental health issues in healthcare professionals including doctors, nurses and paramedical staff.

INSTRUMENTS

Demographic form

In the present study researcher made her own demographic sheet that consists of main headings regarding the basic information including name, age, gender, education, socioeconomic status, family system and monthly income, department, working hours, how many years of field experience, worked with COVID-19 positive and working in isolation ward. It's also consists of their email address and contact numbers to further investigation or to confirm queries later on at any stage of research.

DASS-21

The "Depression, Anxiety and Stress Scale" that was given by Lovi bond, have 21 Items and it is combined set of three different self-ratings planned to calculate the significant mild to moderate levels of depression, anxiety and the stress.

Insomnia severity index

This index is given by Charles (Charles Morin, 1993). It is designed to measure the nature of sleep disturbance, severity level of disturbance, and effect of sleeplessness and screen action or the treatment response in adults.

STATISTICAL ANALYSIS

In the present study the researcher collected the data about the mental health issues faced by the Health Professionals including doctors and paramedical staff during the COVID-19. For the purpose of data collection the researcher conducted face to face interview and questionnaire method is used to collect the data.

RESULTS

Descriptive analysis was used to find the percentage and frequency between demographic variables. t-Test was used to find out the gender differences regarding mental health issues in health professionals in pandemic.

Table 1 Information related to overall mental health issues.

Characteristics	N	%
DASS21		
Depression		
Mild	65	43.3%
Moderate	28	18.6%
Sever	-	-
Anxiety		
Mild	37	24.6%
Moderate	50	33.3%
Sever	10	6.6%
Stress		
Mild	1	0.6%
Moderate	1	0.6%
Sever	1	0.6%
Insomnia Severity Index		
Mild	96	64%
Moderate	31	20%
Sever	3	2%

Table 1 indicating the overall percentages of mental health issues depression, anxiety, stress and sleep issues in health professionals. It can be seen that there are some mental health issues exist during COVID-19 from mild to severe context.

Table 2

Characteristics	N	%
Gender		
Male	75	50%
Female	75	50%
Age (years)		
21-30	90	60%
31-40	40	26.7%

41-50	20	13.3%
Occupation		
Doctor	75	50%
Paramedics	75	50%
Working Hours		
0-6	10	6.6%
7-12	64	42.7%
13-18	64	42.7%
19-24	12	8%

Table 2 showing that male participants of the study ($n = 75, 50\%$) and female participants were also ($n = 75, 50\%$). The doctors (male and female) participants of the study

Table 3

Mean Comparison of male and male paramedical staff

Variables	Male Doctors working with Covid patients		Male paramedics working with Covid patients				
	M	SD	M	SD	$t(74)$	p	Cohen's d
DASS-21	1.12	0.19	0.10	0.17	0.46	0.64	0.11
Insomnia Severity Index	1.20	0.40	1.35	0.46	1.53	0.12	0.34

Table 3 is revealing that there are no significant mean differences on insomnia severity index with $t(74) = 1.53, p > .05$. Findings showing that paramedical male exhibited more score on insomnia severity index ($M = 1.35, SD = 0.46$) as compared to male doctors ($M = 1.20, SD = 0.40$). The value of *Cohen's d* is $0.34 (< 0.50)$ which indicated a little or small effect size. Findings showing that there are no significant mean differences between male doctors and paramedical staff on Insomnia Severity index. It's also seemed that there are no significant mean differences on DASS-21 with $t(74) = 0.46, p > .05$. Finding showing that male paramedical staff exhibited lower score on DASS-21 ($M = 1.10, SD = 0.17$) as compared to male doctors ($M = 1.12, SD = 0.19$). Value of *Cohen's d* is $0.11 (< 0.50)$ which indicated small effect size.

Table 4 Mean Comparison of Female doctors and female paramedical staff

Female Doctors working with Covid patients			Female paramedics working with Covid patients				
Variables	M	SD	M	SD	<i>t</i> (74)	<i>p</i>	Cohen's d
DASS-21	1.60	0.26	1.62	0.17	0.24	0.81	0.09
Insomnia Severity Index	1.36	0.27	2.36	0.44	11.96	0.00	2.73

Table 4 revealing that there are significant mean differences on insomnia severity index with $t(74) = 11.96, p < .05$. Result findings showed that female paramedical staff has higher score on insomnia severity index ($M = 2.36, SD = 0.44$) as compared to the female doctors ($M = 1.36, SD = 0.27$) working in isolation wards of COVID-19 patients. The value of Cohen's d is 2.73 (> 0.50) which indicated higher effect size.

Table 5

Separate Mean Comparison of Depression, Anxiety, Stress and Insomnia Severity Index of Doctors and Paramedical staff

Doctors (Male & Female)			Paramedical Staff (Male & Female)				
Variables	M	SD	M	SD	<i>t</i> (150)	<i>p</i>	Crobach's α
Depression	10.14	2.98	10.63	3.41	0.42	0.66	.414
Anxiety	8.82	3.06	8.75	3.36	0.15	0.88	.363
Stress	9.51	4.10	9.28	2.39	0.41	0.68	.342
Insomnia Severity Index	1.28	0.35	1.86	0.67	6.59	0.00	.466

Table 5 revealed that there are significant mean differences on insomnia severity with $t(150) = 6.59, p < .05$. Finding showing that Paramedical Staff working in isolation wards exhibited higher score on insomnia severity ($M = 1.86, SD = 0.67$) as compared to doctors working in

isolation wards ($M = 1.28$, $SD = 0.35$). The value of *Cohen's d* is $1.08 (> 0.50)$ which is indicating higher effect size.

Comparison between Sleep Issues of Health Professionals (Doctors and Paramedical Staff)

It can be seen in Table 1 that male participants sample showed no significance difference on insomnia severity index. Male paramedical staff exhibited a little difference score on Insomnia severity index and they have same sleep issues as male doctors who score same on insomnia index. Paramedical staff's shows same level insomnia $Cohen's d = 0.34 (< 0.50)$ which indicates a little effect size.

It's also mentioned in the Table 1 that there is no significant difference between male paramedical staff and doctors on DASS-21 with $t(74) = 0.46, p > .05$. Finding showing that male paramedical staff exhibited lower score on DASS-21 as compared to male doctors. Value of $Cohen's d$ is $0.11 (< 0.50)$ which indicated small effect size.

Female doctors and paramedical staff comparison also made by using independent sample t-Test. Its mentioned in Table 2 that there is significant difference between the insomnia score of female paramedical staff and doctors. Results findings showing that female paramedical staff has more sleep issues than female doctors. Paramedical staff show $Cohen's d$ score $= 2.73 (> 0.50)$ which indicating that there is higher effect size regarding sleep issues in health professionals female.

Findings revealing that there is non-significant mean differences on DASS-21. Results findings showing that female paramedical staff scores on DASS-21 as compare to female doctors scores not significantly different in mental health issues during COVID-19. The value of $Cohen's d$ is $0.09 (< 0.50)$ which indicated small effect size.

Separate Mean Comparison (Depression, Anxiety, Stress and Insomnia Severity index)

As mentioned in Table 3 finding showing that Paramedical Staff working in isolation wards exhibited higher score on insomnia severity as compared to doctors working in isolation wards. The value of *Cohen's d* is $1.08 (> 0.50)$ which is indicating higher effect size.

Result findings also revealing that there are no significant mean differences on depression overall scores of doctors as compared to paramedical staff. The value of *Cohen's d* is $0.07 (<$

0.50) which indicates small effect size. Results showing that there is non-significant mean differences of anxiety. The value of Cohen's d is 0.02 (< 0.50) which indicating lower effect size. Results also showing that there is some significant mean differences on stress overall score of doctors as compared to paramedical staff. The value of Cohen's d is 0.06 (< 0.50) which indicates small effect size.

Mental Health Issues and Working in Isolation Wards Of Covid-19

Overall comparison of the result showing that mental health issues are more in females as compare to male health professionals during COVID-19 while working in isolation wards. Independent sample was working in isolation wards and dependent sample was mental health issues e.g. depression, anxiety, stress and insomnia. Results showing that working in isolation wards have more mental health impacts upon health professionals and female gender is more prone to develop mental health issues during this pandemic. It's seen that female health professionals e.g. doctors have mental health issues same as paramedical staff. But female paramedical staff has more sleep issues than doctors.

No significant high difference is seen between male health professionals and paramedical staff in mental health issues e.g. depression, anxiety and stress. But male paramedical staff's score on insomnia was more than male doctors that's indicating that they are facing more sleep issues than doctors but insomnia is seen in both male doctors and paramedical staff.

Risk of Mental Health Issues In Future While Working In Isolation Wards

According to results it can be assumed that in future there might be increased mental health issues in health professionals while working in any health emergency or pandemic situation if proper therapeutic intervention will not be decided and applied. Results also indicating that gender and working environment can be a factor to develop any of mental health issue such as depression, anxiety, stress and sleep disturbance while working in health emergency situation e.g. pandemic.

DISCUSSION

As compare to previous studies about "Mental Health Issues during Pandemic", through the assessment of mental health of health professionals working in isolation wards present study

indicating high level of mental health issues during COVID-19 Pandemic compared to previous finding reported moderate to higher level of stress. Overall result of DASS-21 showing that male health professionals have mental health issues but intensity is lower than female. Gender related differences also seen that female gender is more prone to develop mental health issues while working in isolation wards of COVID-19 patients (Gao et al, 2020). They also reported sleep issues as well; female paramedical staff reported more sleep issues as compared to doctors who are working in isolation wards. Male score on insomnia indicating that male paramedical staff has more sleep issues than male doctors but they equally prone to develop mental health issues such as depression, anxiety, stress (Zaman et al, 2021). Gender related measure showing that female health professionals have more mental health issues than male.

About 38 % health care professionals overall showed normal score, 42 % mild and 18 % severe depression score. About 36 % health professionals show normal score, 24.2 % mild, 32.7 % moderate and 6.6 % severe symptoms of anxiety. There 97.4 % health professionals score normal, 0.7 on mild, 0.7 moderate, 0.7 severe stress symptoms. It's concluded that health professionals have higher depression score, moderate anxiety score and low or significantly normal score on stress in DASS-21. Overall result's indicating that health professionals have more depressive and anxiety symptoms during COVID-19 while working with COVID patients in isolation wards (Jung & Jun, 2020).

It's proven from this study that working in isolation wards can cause mental health issues in health professionals. Working under pandemic situation in isolation wards has significant effect upon the mental health of health professionals. It also found that there are significant differences in health professionals including doctors and paramedical staff, such as females reported more mental health issues overall (Zaman, Irfan & Khattak, 2021).

CONCLUSION

In conclusion, here the researcher recognized the major contributing factors that causing mental health issues in health professionals during COVID-19 pandemic. Basic aim of this study was to identify and highlight the mental health issues e.g. depression, anxiety, stress and insomnia in health professionals. Although there are several studies has been conducted before this research regarding mental health during COVID-19 for different populations and health

professionals as well but there is no specific study before this that compare the paramedical staff and doctors mental health during COVID-19 pandemic, and there is no comparison is made between same gender health professionals e.g. male doctors and paramedical staff, female doctors and paramedical staff. Besides this no comparison available regarding insomnia and other mental health issues e.g. depression, anxiety and stress.

RECOMMENDATIONS

According to overall analysis it is recommended that there should be psychological intervention made to protect the psychological needs and concerns of health professionals who are working in isolation wards. There should be some support system introduce to these professionals in their working environment. It would be better if these professionals use protective appliances as they are using before along adequate amount of rest. Their diet should be balanced and they have to hydrate themselves, along balancing their diet there should be some psychological interventions made for them at government level.

LIMITATION OF RESEARCH

First of all this is a cross-sectional study where we collect the data from diverse individuals at one single point and same time and we observe the variables of study without any type of change or influencing effect. This method does not allow any type of conclusion regarding the difference or change in problems over various period of time. Secondly, the presenting dimension of the measurement showing the similar ways to investigate the experiences of the past and psychological designation. As it is a self-reported measure that can be biased to some extent and various level and also predisposed by different factors. Thirdly mental health issues such as depression, anxiety and stress assessed by “DASS-21” and sleep issues identified through “Insomnia Severity Index”, these are most validated instrument or questionnaires and also considered as valid and most useful for screening, but there should be some formal screening and evaluation is needed by psychologists before giving the diagnosis of any mental health issue such as for depression there is a criteria that should be fulfilled by the client, in which foremost symptom is loss of interest and pleasure in daily activities along others symptoms e.g. weight loss or gain, insomnia or hypersomnia, appetite issues, fatigue, lose concentration, feeling of worthlessness and suicidal thoughts and attempts as well.

REFERENCES

- Bandura A. (1977). *Social Learning Theory*. Englewood Cliffs, NJ: Prentice Hall World Health Organization. The World Health Report 2006.
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry research*, 287, 112934.
- Gao, J., Zheng, P., Jia, Y., Chen, H., Mao, Y., Chen, S., ... & Dai, J. (2020). Mental health problems and social media exposure during COVID-19 outbreak. *Plos one*, 15(4), e0231924.
- Hayat, K., Rosenthal, M., Xu, S., Arshed, M., Li, P., Zhai, P., ... & Fang, Y. (2020). View of Pakistani residents toward coronavirus disease (COVID-19) during a rapid outbreak: a rapid online survey. *International journal of environmental research and public health*, 17(10), 3347.
- Jung, S. J., & Jun, J. Y. (2020). Mental health and psychological intervention amid COVID-19 outbreak: perspectives from South Korea. *Yonsei medical journal*, 61(4), 271-272.
- Khanal, P., Devkota, N., Dahal, M., Paudel, K., & Joshi, D. (2020). Mental health impacts among health workers during COVID-19 in a low resource setting: a cross-sectional survey from Nepal. *Globalization and health*, 16, 1-12.
- Lee, D. (2019). The convergent, discriminant, and nomological validity of the Depression Anxiety Stress Scales-21 (DASS-21). *Journal of affective disorders*, 259, 136-142.
- Morin, C. M. (1993). *Insomnia: Psychological assessment and management*. Guilford press.

- Muhammad, L., Amin, M., Khattak, A. Z., Mehsud, A. K., & Mustafa, R. (2022). The Impact of Leadership Styles on Employee Wellbeing and Resilience during COVID-19: A Partial Least Square Approach. *Reviews of Management Sciences*, 4(2), 1-13.
- Tian, T., Meng, F., Pan, W., Zhang, S., Cheung, T., Ng, C. H., ... & Xiang, Y. T. (2022). Mental health burden of frontline health professionals treating imported patients with COVID-19 in China during the pandemic. *Psychological medicine*, 52(2), 398-399.
- Wu, A., Peng, Y., Huang, B., Ding, X., Wang, X., Niu, P., ... & Jiang, T. (2020). Genome composition and divergence of the novel coronavirus (2019-nCoV) originating in China. *Cell host & microbe*, 27(3), 325-328.
- Zafar, S. M. A., Tahir, M. J., Malik, M., Malik, M. I., Akhtar, F. K., & Ghazala, R. (2020). Awareness, anxiety, and depression in healthcare professionals, medical students, and general population of Pakistan during COVID-19 Pandemic: A cross sectional online survey. *Medical Journal of the Islamic Republic of Iran*, 34, 131.
- Zaman, S., Irfan, S., Khalid, S., Khattak, A. Z., & Hussain, B. (2021). Health-care professionals coping responses to the COVID-19 pandemic in Pakistan. *Applied Nursing Research*, 62, 151509.
- Zaman, S., Irfan, S., & Khattak, A. (2021). Public Responses to and Mental Health Consequences of the COVID-19 Pandemic in Pakistan. *Pakistan Journal of Medical Research*, 60(2), 96-96.