

# DEPRESSION, ANXIETY AND STRESS LEVEL DUE TO COVID-19 PANDEMIC IN PATHOLOGISTS WORKING IN TERTIARY HEALTH CARE CENTRES OF PAKISTAN

Muhammad Idrees<sup>1</sup>, Muhammad Ihtesham Khan<sup>1</sup>, Mohsin Shafi<sup>1</sup>, Zarmina Hussain<sup>2</sup>, Hamid Nawaz Khan<sup>3</sup>, Haroon Ur Rasheed<sup>1</sup>

<sup>1</sup>Department of Pathology, Khyber Medical College, Peshawar - Pakistan

<sup>2</sup>Department of Pathology, Bacha Khan Medical College, Mardan - Pakistan

<sup>3</sup>Zulfiqar Ali Bhutto Postgraduate Paramedical Institute, Peshawar - Pakistan

## ABSTRACT

**Objectives:** To determine the level of depression, anxiety and stress in pathologists due to the Covid -19 pandemic.

**Materials and methods:** It was a Cross-sectional Analytical Multicenter Questionnaire-based study conducted from April 2020 to June 2020 including Pathologists working in Khyber Teaching Hospital and Pakistan Institute of Medical Sciences, Islamabad. Informed written consent was obtained and DASS-21 Questionnaire was administered. Data were analysed by SPSS. Levels of depression, anxiety and stress were determined and analysed by multiple regression method to predict depression anxiety and stress levels from demographics.

**Results:** Mean age of the study sample was 25-63 (37±8.75). There were 13(22.4%) males and 45(77.6%) females. Overall DAS score, mean depression, anxiety and stress score were 31.5±22, 8.7±9.1, 7.4±7.1 and 15.3±9 respectively. Females had a higher overall DAS score (U=156.5,  $p=.011$ ), depression score (U=178.5,  $p=.032$ ) and anxiety score (U=168.5,  $p=.029$ ) as compared to males. Anxiety scores were highest in pathologists working in the microbiology section and lowest in those of the chemical pathology section ( $\chi^2=8.13$ ,  $p=.043$ ). Multiple regression analysis showed that the female gender was significantly associated with a higher overall DAS score ( $\beta=13.69$ ,  $p=.047$ ) and stress score ( $\beta=6.10$ ,  $p=.031$ ) as compared to the male gender.

**Conclusion:** Pathologists working in the Covid-19 pandemic have a high level of mental distress and females have a higher level of psychological distress as compared to males. Implementation of mental support programmes for health care workers during pandemic situations is required to provide psychological support to health care workers.

**Keywords:** Anxiety, Covid-19, Depression, Pathologists, Stress.

---

**This article may be cited as:** Idrees M, Khan MI, Shafi M, Hussain Z, Khan HN, Rasheed H. Depression, anxiety and stress level due to covid-19 pandemic in pathologists working in tertiary health care centres of Pakistan. J Med Sci 2021 October;29(4):221-226

---

## INTRODUCTION

In December 2019, there were reports of cases of a distinct type of pneumonia near the food market in Wuhan city of China. The disease was identified to be caused by the Coronavirus. It was named as novel Coronavirus disease-2019, abbreviated as Covid-19 by World health organization (WHO) <sup>1,2</sup>. Spread of the The disease was not only in China but to every part of the world until it took the form of a pandemic <sup>2,3</sup>.

Correspondence

**Dr Muhammad Ihtesham Khan,**

Assistant Professor,

Department of Pathology, Khyber Medical College,  
Peshawar - Pakistan

**Email:** ihteshamkhan9@yahoo.com

**Cell:** +92-301-7402226

**Date received:** 22-06-2020

**Date revised:** 01-08-2021

**Date accepted:** 07-22-2021

Advanced technology and extensive use of social media has made it possible for the news and information to spread fast all over the world. When the news of the Covid-19 pandemic spread across the world, it created mental stress and fear among the general population <sup>3</sup>. Despite the Covid-19 pandemic, health providers like physicians and pathologists continued to provide health-related services in hospitals. This situation put them at increased risk of contracting the disease as compared to the general population<sup>3</sup>. Literature shows that 29% of the health care providers got infected while working in hospitals as the Covid-19 started <sup>3</sup>.

Literature showed scanty knowledge about the virus and the spread of the disease at the beginning of the pandemic. Despite this, pathologists continued to provide diagnostic services in hospitals <sup>1,4</sup>. The spread of infection to them and their families was the main concern <sup>5</sup>. These fears and worries lead to mental stress, anxiety and

depression in pathologists working in hospitals as they had to deal with patients and specimens like nasal swabs, blood samples and other body specimens<sup>6</sup>.

It is reported that the majority of health care workers had already suffered from psychiatric problems during and after the severe acute respiratory syndrome epidemic in 2003<sup>7</sup>. Middle East respiratory syndrome epidemic in 2015 also caused the health care workers to suffer from dysphoria and stress<sup>7</sup>. It was noted that the mental stress in health care workers persisted even after these epidemics ended. This shows that the mental effects on health care workers are long-lasting and may persist for long durations<sup>8,9</sup>. Therefore, it is necessary to identify the health care workers who are having mental stress, anxiety and depression in this pandemic, so that they can be helped out by the provision of psychological support. It is necessary to identify and address the factors responsible for this stress. This is important as the psychological problems in health care workers may affect their work performance and impair their decision-making capabilities. This can cause pathologists to make diagnostic errors and which will in turn cause patients to suffer<sup>3</sup>. Therefore, the mental health of health care workers in the Covid-19 pandemic can be considered as a public health problem<sup>3</sup>.

Pakistan is the country that is affected by Covid-19. The pathologists are continuously involved in providing diagnostic services to Covid-19 patients and the general population during the pandemic. Mental health affects the working ability. We conducted this study to determine levels of depression, stress and anxiety in pathologists in our region<sup>6</sup>.

## MATERIALS AND METHODS

It was a Cross-sectional Analytical Multicenter Questionnaire-based study which was conducted from April 2020 to June 2020 by including Pathologists working in Khyber Teaching Hospital, Peshawar and Pakistan Institute of Medical Sciences, Islamabad. Sampling was done using the non-probability consecutive sampling technique. The sample size was calculated by using an online sample size calculator taking confidence level as 95%, and margin of error as 5%. Ethical approval for the study was obtained from the Ethical review board. Informed written consent was obtained from the participants and the DASS-21 (Depression, anxiety, stress scale)

A questionnaire was administered to assess the mental health of Pathologists<sup>10,11</sup>. The data analyzed using SPSS Chronbach alpha for depression, anxiety and stress sections of the questionnaires was .898, .709, and .886 respectively, while that for the complete DASS-21 questionnaire was .928. Cases were categorized on a depression scale a normal, mild, moderate, severe and extremely based on the score as per the DASS-21 questionnaire.

The normality of the data was analysed by the

Shapiro Wilks test and visual inspection of histograms and Q-Q plots. Mean and standard deviation was used for quantitative data while frequency and percentages were used for qualitative data. The significance of the difference in scores between genders and marital status was determined by the Mann-Whitney U, while that for speciality and qualification with Kruskal Wallis test. Multiple regression analysis was done to determine the effect of gender, marital status, and speciality on DAS scores. In all the statistical procedures, the *p*-value of less than 0.05 was taken as statistically significant.

## RESULTS

The Characteristics of the study population are shown in table 1. Different levels of depression, anxiety and stress are shown in figure 1. DAS scores are shown in table 2. Multiple regression analysis is shown in table 3.

## DISCUSSION

Pathologists have worked in hospitals during the Covid-19 pandemic to provide diagnostic services to the of Covid-19 patients despite stressful circumstances<sup>6</sup>. Due to being exposed to the patient's samples and subsequent risk of contracting the infection, scarcity of protective equipment, and separation from families, pathologists suffered from psychological stress, which manifests as depression and anxiety<sup>12</sup>. Despite suffering from mental stress, most of the time the affected professionals do not seek psychiatric help which keeps the problem unsolved. A psychological crisis intervention plan needs to be developed such as the provision of online courses by psychiatrists for the guidance of health workers in a pandemic, giving pre-job training to identify psychological problems in healthcare workers and regular mental health surveillance programmes by a team of psychologists and counsellors, who should visit medical professionals to listen to their problems and provide support<sup>6</sup>.

In the present study, the mean age of the study sample was 37±8.7 years. There was a predominance of females and married participants. Similar demographic data is reported in a study done by Elbay RY, where the mean age of the study sample was 36.05±8.69, females were predominant and the majority of the participants were married<sup>13</sup>. Similarly in another study done by Tan BY from Singapore, the mean age of the sample was 30 years, females were predominant as compared to males, and the majority of the participants were married<sup>14</sup>. Similar demographics are reported by Sandesh from Karachi and Si MY from China<sup>1,15</sup>.

In the present study, depression, anxiety and stress were seen in 36.2%, 37.9% and 44.8% pathologists respectively. Mean overall DAS, depression, anxiety and stress scores among the pathologists was 31.5±22, 8.7±9.1, 7.4±7.1 and 15.3±9 respectively. In a study

done by Elbay RY, 64.7% of study participants had depression, 51.6% had anxiety, and 41.2% suffered from mental stress<sup>13</sup>. In the same study, the mean DAS score was  $19.04 \pm 12.93$ , while that for depression, anxiety and stress the score was  $6.92 \pm 4.70$ ,  $4.67 \pm 4.21$  and  $7.46 \pm 4.85$  respectively<sup>13</sup>. It means that depression scores are higher in pathologists in our study compared to that of Albay RY. In another study done by Zhu Z in China, depression, anxiety and stress were seen in 13.5%, 24.1% and 29.8% of healthcare workers<sup>3</sup>. These figures are much lower than those in our study. In another study done by Sandesh R from Karachi, the overall mean score for depression, anxiety and stress were  $18.12 \pm 10$ ,  $19.01 \pm 9.2$  and  $20.12 \pm 12.0$  respectively<sup>1</sup>. In a study done by Tan from Singapore, the overall mean DASS-21 scores among health care workers were lower than those in the present study<sup>14</sup>. This shows that the rates of depression, anxiety and stress in our pathologists are more as compared to other parts of the world.

In the present study, most of the participants had moderate depression (13.8% cases), moderate anxiety (19% cases), and mild stress (19% cases). These figures are comparable to those reported by Elby RY, where most of the participants had moderate depression (27.4% cases), mild anxiety (16.3% cases) and moderate level stress (15.6% cases)<sup>13</sup>. A similar pattern is reported from China<sup>15</sup>. However, in a study done by Sandesh R from Karachi, most of the cases were in the severe category of depression, anxiety and stress<sup>1</sup>.

In the present study, it was seen that as compared to males, females had significantly higher overall DAS score ( $U=156.5$ ,  $p=.011$ ), depression scores ( $U=178.5$ ,  $p=.032$ ) and anxiety scores ( $U=168.5$ ,  $p=.029$ ). Anxiety scores were highest in pathologists working in the microbiology section and lowest in those of the chemical pathology section ( $\chi^2=8.13$ ,  $p=.043$ ). Multiple regression analysis showed that female gender was significantly associated with a higher overall DAS score ( $\beta=13.69$ ,  $p=.047$ ) and stress score ( $\beta=6.10$ ,  $p=.031$ ) as compared to the male gender.

Zhu Z from China also found that the female gender was associated with increased scores of depression, anxiety and stress<sup>3</sup>. Additionally, Zhu Z also reported a job duration of more than 10 years, history of mental disorder and chronic disorder as significantly related to stress<sup>3</sup>. However, we could not find the effect of the above-mentioned elements on the DAS score in our study. Elbay also reported female gender is more prone to stress and depression<sup>13</sup>. In our study, marital status had no significant association with DAS scores, however, Elby reports that married participants had a low overall DAS score<sup>13</sup>.

In Pakistan, pathologists are having high levels of stress, depression and anxiety as compared to other countries even though the hospital management kept all

the health care workers alert regarding the pandemic, its effects and preventive measures. There is a need to provide psychological support to the health care workers that are front line warriors against Covid-19, like pathologists, physicians and nursing staff. This can be achieved by developing teams that do regular surveillance of the staff and provide mental health education, psychological guidance and counselling to those who are prone to develop psychiatric problems<sup>17,18</sup>. To make things simple, online surveys may be conducted to identify those who are having psychological problems, followed by online counselling by psychologists<sup>19</sup>. We could not assess the effect of so-

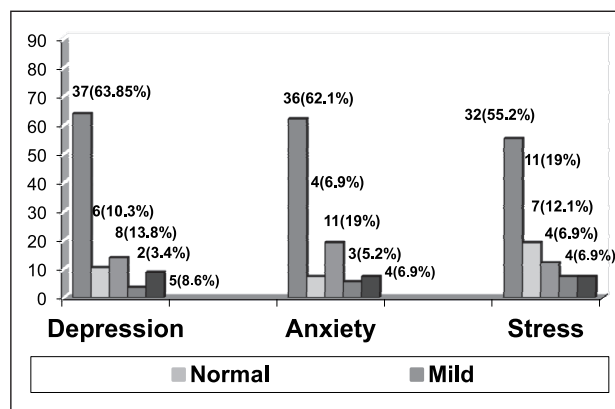


Fig 1: Gender distribution in study sample (n=101)

Table 1: Characteristics of the study participants (n=58)

Characteristics	Value		
Age in years (Range, Mean ± SD)	25-63 (37 ± 8.75)		
Gender	Males	13 (22.4%)	
	Females	45 (77.6%)	
Marital status	Married	49 (84.5%)	
	Unmarried	9 (15.5%)	
Qualification	M.B.B.S	8 (12.8%)	
	M.Phil	40 (69%)	
	F.C.P.S	9 (15.5%)	
	PhD	1 (1.7%)	
Speciality	Haematology	22 (37.9%)	
	Chemical pathology	9 (15.5%)	
	Microbiology	10 (17.2%)	
	Histopathology	17 (29.3%)	
Mental status	Depression	Present	21 (36.2%)
		Absent	37 (63.8%)
	Anxiety	Present	22 (37.9%)
		Absent	36 (62.1%)
	Stress	Present	26 (44.8%)
		Absent	32 (55.2%)

**Table 2: DAS scores in study participants (n=58)**

Scores		Mean±SD		Range				
Overall DAS score		31.5±22		0-106				
Mean depression score		8.7±9.1		0-34				
Mean anxiety score		7.4±7.1		0-36				
Mean stress score		15.3±9		0-42				
DAS scores concerning demographic characteristics								
Demographic characteristics	Overall DAS score	p-value	Depression score	p-value	Anxiety score	p-value	Stress score	p-value
Gender		.011		.032		.029		.074
Male	20.9±20.6	(U=156.5)	5±7	(U=178.5)	5.2±7.9	(U=168.5)	10.6±8.05	(U=197.0)
Female	34.6±21		9±9		8.04±6.8		16.7±8.9	
Marital status		.408		.369		.825		.590
Married	32.6±23.3	(U=182.0)	9.4±9.6	(U=179)	7.5±7.3	(U=210.5)	15.75±9.3	(U=195.5)
Unmarried	25.3±21.2		5.3±4.7		6.8±6.4		13.11±6.7	
Qualification		.394		.128		.747		.933
M.B.B.S	39.5±19.7	(X2=2.98)	13.7±6.9	(X2=5.63)	9.2±7.9	(X2=1.22)	16.5±9.05	(X2=.433)
M.Phil	30.3±23.2		7.8±9.4		7.5±7.5		14.9±9.1	
FCPS	30.8±20.3		9.3±9.1		5.5±4.4		16±9.8	
PhD	24		4		4		16	
Speciality		.060		.367		.043		.166
Haematology	27.3±13	(X2=7.4)	6.5±5.8	(X2=3.16)	6.9±5.1	(X2=8.13)	14.6±6.02	(X2=5.076)
Chemical pathology	20.2±21.		6.8±9.7.		2.8±2.6.		10.4±10.1.	
Microbiology	40.4±29		10±9.4		11.2±11		19.2±11.04	
Histopathology	37.8±24		12±11.6		9.2±6.6		16.5±9.8	
P-value determined by Mann Whitney test and Kruskal Wallis test								

**Table 3: Multiple regression analysis showing factors affecting DAS scores**

Predictors	S.E	p-value	Confidence level	
			Lower limit	Upper limit
Overall DAS score				
Gender				
Male	-	-	-	-
Female	13.69	6.75	.047	.168
Marital status				
Married	-	-	-	-
Unmarried	-7.36	8.0	.361	-23.38
Speciality				
Haematology	-	-	-	-
Chemical pathology	-7.051.	8.45.	.408.	-23.9.
Microbiology	13.12	8.14	.113	-3.20
Histopathology	10.61	6.89	.130	-3.2
Depression Score				
Gender				
Male	-	-	-	-
Female	4.790	2.83	.097	-.892
Marital status				

Married	-	-	-	-	-
Unmarried	-4.09	3.30	.220	-10.7	2.52
Speciality					
Haematology	-	-	-	-	-
Chemical pathology	.343	3.5	.924	-6.85	.7.54
Microbiology	3.45	3.4	.322	-3.98	16.39
Histopathology	5.45	2.92	.068	-4.18	11.32
Anxiety Score					
Gender					
Male	-	-	-	-	-
Female	2.81	2.23	.214	-1.672	7.29
Marital status					
Married	-	-	-	-	-
Unmarried	-.62	2.61	.813	-5.85	4.61
Speciality					
Haematology	-	-	-	-	-
Chemical pathology	-3.202	2.68.	.238	-8.58	2.18
Microbiology	5.71	2.58	.053	-.079	10.29
Histopathology	3.20	2.19	.150	-1.19	7.59
Stress Score					
Gender					
Male	-	-	-	-	-
Female	6.10	2.75	.031	.584	11.61
Marital status					
Married	-	-	-	-	-
Unmarried	-2.64	3.28	.424	-9.23	3.73
Speciality					
Haematology	-	-	-	-	-
Chemical pathology	-4.19.	3.5.	.238	-11.28	2.84.
Microbiology	4.56	3.38	.183	-2.22	11.34
Histopathology	1.95	2.86	.499	-3.79	7.69

cioeconomic status, previous history of depression or anxiety in covid-19 patients. Secondly, we did not follow up with the participants to assess the duration for which the psychological effects persisted and whether they recovered or not. Thirdly, we did not determine post-traumatic stress disorder in pathologists.

## CONCLUSION

Pathologists working in the Covid-19 pandemic have a higher level of stress, depression and anxiety in our region. The female gender is associated with higher rates of psychological distress. This warrants the initiation of psychological support programs and follow ups during emergencies like Covid-19 by the authorities to promote mental health in pathologists.

We recommend the initiation of psychological support programmes for the health care workers by authorities during emergencies like Covid-19. We suggest that follow-up studies should be done to see the progression and outcome of psychological problems in health care workers. Moreover, we recommend further studies to find out the cause of greater stress in females as compared to males in our population.

## REFERENCES

1. Sandesh R, Shahid W, Dev K, Mandhan N, Shankar P, Shaikh A, et al. Impact of COVID-19 on the Mental Health of Healthcare Professionals in Pakistan. *Cureus*. 2020;12(7).
2. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. *Asian journal of psychiatry*. 2020 Aug 1;52:102066.
3. Zhu Z, Xu S, Wang H, Liu Z, Wu J, Li G, Miao J, Zhang C,

- Yang Y, Sun W, Zhu S. COVID-19 in Wuhan: immediate psychological impact on 5062 health workers. *MedRxiv*. 2020 Jan 1.
4. Huang JZ, Han MF, Luo TD, Ren AK, Zhou XP. Mental health survey of 230 medical staff in a tertiary infectious disease hospital for COVID-19. *Zhonghua lao dong wei sheng zhi ye bing za zhi= Zhonghua laodong weisheng zhiyebing zazhi= Chinese J Indust hygiene and occu dis*. 2020 Mar 4;38:E001-.
  5. Xiang Y-T, 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.
  6. Rana W, Mukhtar S, Mukhtar S. Mental health of medical workers in Pakistan during the pandemic COVID-19 outbreak. *Asian journal of psychiatry*. 2020 Jun;51:102080.
  7. Lee SM, Kang WS, Cho A-R, Kim T, Park JK. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Compr Psychiatry*. 2018;87:123-7.
  8. 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.
  9. Ornell F, Schuch JB, Sordi AO, Kessler FHP. "Pandemic fear" and COVID-19: mental health burden and strategies. *Brazilian Journal of Psychiatry*. 2020;42(3):232-5.
  10. Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behav Res Ther*. 1995;33(3):335-43.
  11. Beaufort IN, De Weert-Van Oene GH, Buwalda VA, de Leeuw JRJ, Goudriaan AE. The depression, anxiety and stress scale (DASS-21) as a screener for depression in substance use disorder inpatients: a pilot study. *Eur Addict Res*. 2017;23(5):260-8.
  12. 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.
  13. Elbay RY, Kurtulmuş A, Arpacioğlu S, Karadere E. Depression, Anxiety, Stress Levels of Physicians and Associated Factors In Covid-19 Pandemics. *Psychiatry Res*. 2020:113130.
  14. Tan BY, Chew NW, Lee GK, Jing M, Goh Y, Yeo LL, Zhang K, Chin HK, Ahmad A, Khan FA, Shanmugam GN. Psychological impact of the COVID-19 pandemic on health care workers in Singapore. *Annals of internal medicine*. 2020 Aug 18;173(4):317-20.
  15. Si MY, Su XY, Jiang Y, Wang WJ, Gu XF, Ma L, Li J, Zhang SK, Ren ZF, Ren R, Liu YL. Psychological impact of COVID-19 on medical care workers in China. *Infectious diseases of poverty*. 2020 Dec;9(1):1-3.
  16. 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;17(5):1729.
  17. Banerjee D. The COVID-19 outbreak: Crucial role the psychiatrists can play. *Asian J psychiatry*. 2020 Apr;50:102014.
  18. Duan L, Zhu G. Psychological interventions for people affected by the COVID-19 epidemic. *The Lancet Psychiatry*. 2020;7(4):300-2.
  19. Liu S, Yang L, Zhang C, Xiang Y-T, Liu Z, Hu S, et al. Online mental health services in China during the COVID-19 outbreak. *The Lancet Psychiatry*. 2020;7(4):e17-e8.

**CONFLICT OF INTEREST:** Authors declare no conflict of interest

**GRANT SUPPORT AND FINANCIAL DISCLOSURE:** NIL

#### AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

- Idrees M:** Concept, Design and Proof reading  
**Khan MI:** Acquisition of Data and critical review  
**Shafi M:** Analysis and interpretation of data  
**Hussain Z:** Data collection, Bibliography  
**Khan HN:** Statistical Analysis  
**Rasheed H:** Writing of manuscript, proof reading

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.