Research Article

# Prevalence of Anxiety and Depression in COVID-19 Patients and Frontline Healthcare Workers

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**Abstract: Background:** During global health crises such as the COVID-19 pandemic, understanding the psychological impact on both patients and healthcare workers is crucial for effective public health response and support strategies.

**Objective:** To assess anxiety and depression prevalence among COVID-19 patients and healthcare workers in Pakistan, utilizing the Aga Khan University Anxiety and Depression Scale.

**Materials and Methods:** A cross-sectional survey from 20th May 2020 to 25th August 2020, using a 15-item structured questionnaire was conducted on patients diagnosed with COVID-19 and healthcare workers at the Pakistan Kidney and Liver Institute & Research Center, Lahore. The Aga Khan University Anxiety and Depression Scale - Short Form (AKUADS-SF) was employed to assess the levels of anxiety and depression among the participants. Data were analyzed using descriptive statistics, chi-square tests, and logistic regression to identify significant predictors of anxiety and depression.

**Result:** Out of 183 participants, 55% were healthcare workers and 44.8% were patients. Preliminary findings showed 37.6% of healthcare workers had anxiety and depressive symptoms. Significant predictors among healthcare workers included family members with psychiatric disorders, family members affected by COVID-19, and a history of psychiatric disorders. Among patients, 13.4% had positive scores on the AKUADS-SF, with significant predictors being marital status (single), affected family members, smoking, and addiction.

**Conclusion:** The study identified significant anxiety and depression among healthcare workers and patients during COVID-19. Predictors for healthcare workers included family psychiatric issues and personal history, while patients' predictors were marital status, affected family members, smoking, and addiction. This underscores the need for targeted psychological support.

**Keywords:** COVID-19, Anxiety, Depression, Healthcare workers, Psychosocial impact, Aga Khan University Anxiety and Depression Scale (AKUADS).

## INTRODUCTION

The global impact of COVID-19 has surpassed 770 million cases, with a mortality rate of approximately 0.91% since March 2020 [1]. The pandemic has had a substantial impact on people's mental health in addition to their physical health, affecting people from a variety of backgrounds, including patients and healthcare workers (HCWs) [2].

Concerns about the psychological effects of COVID-19, including PTSD, anxiety, sadness, and sleeplessness, are becoming increasingly widespread. 34.7% and 28.4%, respectively, of the 144 COVID-19 patients in Chinese studies showed signs of anxiety and depression [3, 4].

The psychological toll has not spared HCWs, the front-line fighters in this conflict. Concerningly high rates of anxiety (44%) and depression (50%) were found among HCWs in research published in JAMA [5]. In the world, the combined prevalence of anxiety and depression in medical personnel and the public is 28% and 33%, respectively [6]. According to a cross-sectional study conducted in Jordan, frontline healthcare professionals reported high levels of anxiety (29.5%), depressive episodes (34.5%), and insomnia (31.9%) [7]. The worrisome rise in anxiety and sadness around the world, particularly in relation to COVID-19, highlights the pressing need for thorough assessment and treatment [8-10].

The COVID-19 pandemic has created an environment of perpetual anxiety, depression, and fear, necessitating immediate policy responses. In Pakistan, studies have documented high levels of moderate to severe depression (72%), anxiety (85%), and stress (90%) among HCWs [11]. Another study from Pakistan reported anxiety in 43% of HCWs [12]. A web-based study from Islamabad and Rawalpindi indicated that 22.7% of students from various universities experience anxiety related to COVID-19 [13].

The World Health Organization (WHO) has reported a global increase of 25% in depression and anxiety, with women and

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young people being the most affected [14]. The mental health status of confirmed COVID-19 patients in Pakistan remains unclear. Given the vulnerability of COVID-19 patients to psychological distress due to stigma, uncertainty, isolation, and distancing from their families, it is crucial to investigate the prevalence of anxiety and depression in this population. Frontline HCWs, risking their lives in the battle against highly contagious viruses, also demand attention.

This study aims to address the urgent need for a comprehensive evaluation of the psychological impact of the COVID-19 pandemic on both HCWs and patients. By assessing the prevalence of anxiety and depression, our findings have the potential to inform the development of psychological counseling interventions as an essential component of the holistic treatment approach for COVID-19 patients.

## MATERIALS & METHODS

In this cross-sectional analysis, we examined patients recently admitted or discharged with COVID-19 and healthcare workers providing care at the Pakistan Kidney and Liver Institute & Research Center, Lahore (PKLI&RC) from 20th May 2020 to 25th August 2020, a designated tertiary referral center for COVID-19 patients endorsed by the Government of Punjab. Ethical approval was secured from the institutional review board (IRB) following evaluation by the Research Committee with reference number PKLI-IRB/AP/014. Participants were eligible if they met the following inclusion criteria: age over 14 years, confirmed COVID-19 cases, frontline workers (including physicians, nurses, technicians, pharmacists, housekeeping, and security personnel) involved in the care of COVID-19 patients, the ability to speak and interact, and the ability to give informed consent. Participants were excluded if they were under 14 years of age or had any medical or psychological disorder that could interfere with their responses and ability to consent. To minimize the risk of virus transmission, we developed and distributed a structured questionnaire comprising 15 items using Google Forms. It was an idiopathic disease episode, COVID-19, therefor, all the consented, participants associated with the disease were consecutively enrolled during study duration. The participants were divided into two groups: patients and healthcare workers. The patient group consisted of individuals diagnosed with COVID-19, from PKLI&RC. The healthcare worker group included staff actively providing care to COVID-19 patients at PKLI&RC during the study period. Seventeen healthcare workers participated in the study, responding to inquiries related to anxiety and depression through the Aga Khan University Anxiety and Depression Scale (AKUADS). The AKUADS-SF, validated in Urdu for screening anxiety and depression in Pakistan, employed its 13-item short form (AKUADS-SF). Participants rated each item on a scale from 0 to 3, encompassing responses of never, sometimes, often, and always. The internal consistency reliability of the AKUADS-SF, as measured by Cronbach's alpha, was found to be 0.79 in this study. A follow-up reminder call or message was dispatched two days post-initial communication to enhance participation rates. Informed consent was diligently obtained from all participants. Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics, including frequencies and percentages, summarized the data. Univariate analysis was conducted using the chi-square test to identify significant associations between categorical variables and the outcome. Binary logistic regression analysis was then applied to determine the odds ratios (Exp B) of various predictors on anxiety and depression, with results reported along with 95% confidence intervals and p-values to assess statistical significance.

## RESULT

Of the total sample (n=183), 55% (n=101) were HCWs and 44.8% (n=82) were patients. The majority of the participants were younger than 61 years (95%, 174) and married (72%, n=132). Our participants were mostly educated with approximately 50.8% (n=93) graduates and 32.7% (n=60) postgraduates. Only 7% (n=13) of the total sample reported having psychiatric disorders. A statistically significant 14.7% (n=27, p = 0.031) of participants reported that someone in their family had contracted COVID19. In the HCWs group (n=101), 61.4 % (n=62) were graduates and 27.7% (n=28) were having a postgraduate degree. The sample mostly consisted of nursing staff (27.7%, n=28) and medical officers (24.8%, n=25). There were 12.9% (n=13) senior registrars / registrars and only 7.9% (n=8) were consultants. Approximately 37.6% (n=38) of participants reported anxiety and depressive symptoms based on the AKUADS-SF. There were no significant statistical findings (p =0.174) for HCWs based on work designations. A family history of COVID-19 and psychiatric disorders were found to be statistically significant (p = 0.023 and 0.001, respectively) (Table **1**). Similarly, the history of psychiatric disorders was found to be significant (p = 0.056). Most of the sample (87.1%, n=88) declined any coercion of work in the COVID ward and associated fear of losing their jobs. We also applied binary logistic regression analysis to determine the odds ratio of variables with significance at the univariate level among health care workers (Table **2**). In our patient group, a significant proportion were graduates or postgraduates (37.8% and 29 %, respectively). Approximately 14.6% were housewives and the majority (73.2%) were employed. The survey was completed by the majority (89%) after discharge, and in 56% of the cases, it was completed more than 21 days after discharge. The length of hospital stay was more than 7 days in 65.8 % (n = 54) of patients and less than seven days in 34.1 % (n = 28) of patients. The majority (76.8%) did not report any other family members suffering from COVID and similarly, only 7.3% (n=6) reported a history of psychiatric illness. A small number of participants (7.9%; n=4) smoked. Admission to the COVID ward was voluntary, accounting for approximately 34.1% (n=54). The AKUADS-SF score was positive for anxiety and depression in approximately 13.4% (n=11) of patients. Our analysis suggested that marital status and the presence of COVID in family with AKUADS-SF scores were statistically significant (p =0.007 and p = 0.008, respectively) (Table **3**). We also applied binary logistic regression analysis to determine the odds ratios of variables that were significant at the univariate level among patients (Table **4**).

**Table 1.** Association between Socio Demographic Factors and Depression/Anxiety Indicators among Healthcare Workers (HCW).

| Variables | | Outcome | | P-Value |
|---|---|---|---|---|
| | | Absent (n=63) | Present (n=38) | |
| Age (years) | 21-40 | 54 (53.47%) | 33(32.67%) | 0.874 |
| | > 41 | 9 (8.91%) | 5 (4.95%) | |
| Marital status | Ever married | 41 (40.59%) | 23 (22.77%) | 0.645 |
| | Never married | 22 (21.78%) | 15 (14.85%) | |
| Type of Employment/Occupation | Consultant | 3 (2.97%) | 5 (4.95%) | 0.174 |
| | SR/Registrar | 8 (7.92%) | 5 (4.95%) | |
| | Nursing staff | 17 (16.83%) | 11 (10.89%) | |
| | Medical officer | 14 (13.86%) | 11 (10.89%) | |
| | Pharmacist | 13 (12.87%) | 6 (5.94%) | |
| | Housekeeping | 8(7.92%) | (0%) | |
| Direct Involvement in COVID-19 Patient Care | Yes | 37 (36.63%) | 26 (25.74%) | 0.330 |
| | No | 26 (25.74%) | 12 (11.88%) | |
| Telemedicine Consultation | Yes | 22 (21.78%) | 14 (13.86%) | 0.877 |
| | Both direct and Tele-medicine | 23(22.77%) | 12(11.88%) | |
| | No | 18(17.82%) | 12(11.88%) | |
| Working due to Job Loss Fear? | Yes | 9(8.91%) | 4(3.96%) | 0.585 |
| | No | 54(53.47%) | 34(33.66%) | |
| Working with COVID-19 Patients (No Coercion/ Pressure)? | Yes | 40(39.60%) | 26(25.74%) | 0.614 |
| | No | 23 (22.77%) | 12 (11.88%) | |
| Family Member Affected by COVID-19? | Yes | 2 (1.98%) | 6 (5.94%) | 0.023 |
| | No | 61(60.40%) | 32 (31.68%) | |
| Smoking Habits | Yes | 14 (13.86%) | 5 (4.95%) | 0.259 |
| | No | 49 (48.51%) | 33 (32.67%) | |
| Currently on Psychiatric Medication? | Yes | -(0%) | 2(1.98%) | 0.066 |
| | No | 63(62.38%) | 36 (35.64%) | |
| Family History of Psychiatric Disorder? | Yes | 5(4.95%) | 13 (12.87%) | 0.001 |
| | No | 58(57.43%) | 25 (24.75%) | |
| Previous Psychiatric History? | Yes | 2(1.98%) | 5 (4.95%) | 0.056 |
| | No | 61(60.40%) | 33 (32.67%) | |
| Involved in Addiction? | Yes | 2(1.98%) | - (0%) | 0.267 |
| | No | 61(60.40%) | 38(37.62%) | |

**Table 2.** Binary Logistic Regression Analysis for Predictors of Depression and Anxiety among Healthcare Workers (HCW).

| Predictor Variable | Odds Ratio (Exp(B) | 95% Confidence Interval (CI) | P-Value |
|---|---|---|---|
| Family members with psychiatric disorders | 6.03 | 1.94 - 18.73 | 0.002 |
| Family members affected by COVID-19 | 5.72 | 1.10 - 29.97 | 0.039 |
| History of psychiatric disorders | 4.62 | 0.85 - 25.14 | 0.077 |

**Table 3.** Association between Socio Demographic Factors and Depression/Anxiety Indicators among Patients.

| Variables | | Absent (n=71) | Present (n=11) | P-Value |
|---|---|---|---|---|
| Age (years) | 21-40 years | 32(39.02%) | 7(8.54%) | 0.474 |
| | 41-60 years | 33(40.24%) | 3(3.66%) | |
| | > 61 years | 6(7.32%) | 1(1.22%) | |
| Marital Status | Ever married | 62(75.61%) | 6(7.32%) | 0.007 |
| | Never married | 9(10.98%) | 5(6.10%) | |
| Education Level | Undergraduate | 11(13.41%) | 2(2.44%) | 0.201 |
| | Graduate | 24(29.27%) | 7(8.54%) | |
| | Post-graduate | 30(36.59%) | 2(2.44%) | |
| | Not literate | 6(7.32%) | -(0%) | |
| Employment Status | Employed | 52(63.41%) | 8(9.76%) | 0.900 |
| | Unemployed/Supported by others | 9(10.98%) | 1(1.22%) | |
| | Housewife | 10(12.20%) | 2(2.44%) | |
| Family Member Affected by COVID-19? | Yes | 13(15.85%) | 6(7.32%) | 0.008 |
| | No | 58(70.73%) | 5(6.10%) | |
| Smoking Habits | Yes | 2(2.44%) | 2(2.44%) | 0.028 |
| | No | 69(84.15%) | 9(10.98%) | |
| Currently on Psychiatric Medication? | Yes | 6(7.32%) | 1(1.22%) | 0.944 |
| | No | 65(79.27%) | 10(12.20%) | |
| Do you have any Addiction? | Yes | 1(1.22%) | 2(2.44%) | 0.006 |
| | No | 70(85.37%) | 9(10.98%) | |
| Previous Psychiatric History? | Yes | 5(6.10%) | 1(1.22%) | 0.808 |
| | No | 66(80.49%) | 10(12.20%) | |

**Table 4.** Binary Logistic Regression Analysis for Predictors of Depression and Anxiety among Patients.

| Predictor Variable | Odds Ratio (Exp(B)) | 95% Confidence Interval (CI) | P-Value |
|---|---|---|---|
| Marital Status (Never Married) | 5.74 | 1.45 - 22.76 | 0.016 |
| Family Members Affected by COVID-19 | 5.35 | 1.42 - 20.25 | 0.014 |
| Smoking | 7.67 | 0.96 - 61.33 | 0.069 |
| Addiction | 15.56 | 1.28 - 189.27 | 0.029 |

## DISCUSSION

Our study highlights some different results from the available data across the globe. Our sample consisted of both patients and healthcare workers (HCW). The frequency of anxiety and depression in patients with COVID-19, based on the AKUADS, was found to be low (approximately 13.4 %) compared to other studies. A meta-analysis conducted by Salari *et al*. (2020) found that the prevalence of anxiety and depression in COVID-19 confirmed patients was 31.9% and 33.7%, respectively [15]. These rates were significantly higher than those reported in the general population before the pandemic. The study also found that female patients, those with more severe symptoms, and those with comorbidities were at higher risk of anxiety and depression. Our findings among HCW were found to have 37.6% anxiety and depression comparable to those of other studies conducted in different countries [16]. The center of this study may also have served as a unique factor for anxiety and depression in HCWs, as initially the transplant center was closed and converted to the COVID hospital with the same clinical staff to serve the people-in-need. The change in practice from transplant to COVID (though for a few weeks only) may have precipitated the current episode. In the HCW group, family history of COVID and psychiatric disorder, and personal history of psychiatric disorders were found to be statistically significant. Multiple studies have found that frontline healthcare workers have experienced high levels of anxiety and depression during the COVID-19

pandemic. A systematic review and meta-analysis by Pappa *et al*. (2020) found that the pooled prevalence of anxiety and depression among healthcare workers was 23.2% and 22.8%, respectively [16]. The study also found that female healthcare workers and those working in COVID-19 designated hospitals or in direct contact with COVID-19 patients were at a higher risk of anxiety and depression.

Another study by Wu *et al*. [17] found that the prevalence of anxiety and depression among healthcare workers was 44.6% and 50.4%, respectively. The study also found that healthcare workers who were younger, single, and had less work experience were more likely to experience anxiety and depression. Nevertheless, in a cohort study from Karachi, no additional risk was found after six months of developing depression and anxiety in HCW infected with COVID-19 [18].

This study found that the family history of COVID-19 was statistically significant in patients and HCW who developed anxiety and depression. The literature also suggests the presence of a moderate to high risk of depression and anxiety in families of patients admitted to critical care due to COVID-19 [19]. This could be due to the high stress and uncertain fate associated with COVID-19 compared to other illnesses. Another pertinent finding of this study is the increased risk of developing anxiety and depressive symptoms in patients with a history of psychiatric disorders. This finding is in agreement with the available evidence reported by Wang *et al*. in a multi-centre study [20].

Our study revealed a notable prevalence of anxiety and depressive symptoms among both patients and healthcare workers. Zhu *et al*. [21] in Gansu, China, which similarly investigated the psychological well-being of medical staff. Their cross-sectional survey involving 79 doctors and 86 nurses identified a high prevalence of anxiety (11.4% among doctors and 27.9% among nurses) and depression (45.6% among doctors and 43.0% among nurses) symptoms. Importantly, they highlighted a history of depression or anxiety as a common risk factor for both anxiety and depression symptoms in healthcare workers.

Building on our results, a study by Lu *et al*. [22] emphasized the distinctions in psychological status between medical and administrative staff during the COVID-19 pandemic. Notably, medical staff, especially those working closely with COVID-19 patients, exhibited higher levels of fear, anxiety, and depression compared to administrative staff. This aligns with our observation of healthcare workers reporting anxiety and depressive symptoms.

The study by Tan *et al*. [23] on health care workers in Singapore during COVID-19 reveals a substantial psychological impact. Among 470 participants, anxiety prevalence was higher in non-medical workers (20.7%) than medical personnel (10.8%).

Du *et al*. [24] study on frontline healthcare workers (HCWs) in Wuhan during the COVID-19 outbreak sheds light on the significant psychological impact. Elevated stress, anxiety, and depression were prevalent, with Wuhan HCWs showing greater vulnerability. Factors like psychological preparedness, self-efficacy, and family support played pivotal roles. Fear of infection and supply-related stress were major concerns.

Chew *et al*. [25] comprehensive study on 906 healthcare workers underscores the profound psychological toll during the COVID-19 outbreak, notably with anxiety and depression. A substantial 8.7% experienced moderate to extremely severe anxiety, while 5.3% screened positive for moderate to very-severe depression.

## STRENGTH AND LIMITATIONS

The strength of our study lies in its unique dual focus on both patients and healthcare workers (HCWs), offering a comprehensive perspective on the psychological impact of the COVID-19 pandemic. The use of the Aga Khan University Anxiety and Depression Scale (AKUADS), a validated tool, enhances the reliability of our results. Our study contributes significantly to understanding pandemic-related psychological effects. It highlights the urgent need for targeted mental health support during major medical crises and advocates for integrating psychosocial evaluations into routine care.

However, our study has limitations. The virtual design of the study may have limited participation, particularly for patients who are physically unstable or for healthcare professionals who are extremely busy. Additionally, the single-center focus and reliance on self-reported data introduce potential biases.

Despite these limitations, our research contributes significantly to understanding the psychological effects of COVID-19. It underscores the need for targeted mental health support for both patients and frontline healthcare providers to address the pandemic's long-term challenges effectively.

## CONCLUSION

This study aimed to comprehensively evaluate the psychological impact of the COVID-19 pandemic on both healthcare workers (HCWs) and patients. Compared to global trends, our findings reveal that patients experienced lower anxiety and depression rates (13.4%), whereas, HCWs exhibited prevalence rates consistent with international figures (37.6%). Key predictors for HCWs included a family history of psychiatric disorders and COVID-19, while patients' predictors included marital status, family history, smoking, and addiction.

## LIST OF ABBREVIATIONS

**AKUADS-SF:** Aga Khan University Anxiety and Depression Scale- Short Form.

**CI:** Confidence Interval.

**HCWs:** Healthcare Workers.

**PTSD:** Post-Traumatic Stress Disorder.

## AUTHORS' CONTRIBUTION

- **Faheem Khan**: Conceptualization, Data collection, Manuscript writing and Correspondence, Final approval.
- **Zainab Babar**: Conceptualization, Data collection, Final approval.
- **Saira Imtiaz**: Data Analysis, Manuscript writing and Correspondence, Final approval.
- **Abdullah Khalid**: Conceptualization, Manuscript writing and Correspondence, Final approval.

## CONFLICT OF INTEREST

Declared none.

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