

## ORIGINAL ARTICLE

# Prevalence of Depression among patients of Covid-19, Pulmonary Tuberculosis (TB) and Coronary Artery Disease (CAD)

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## ABSTRACT

**Objective:** To find out the prevalence of depression among patients of COVID-19, Pulmonary Tuberculosis and Coronary Artery Disease.

**Study Design:** Cross sectional, convenient sampling technique, a non randomised study.

**Place and duration of study:** Indoor/Outdoor follow up cases of Pulmonary Tuberculosis and Coronary Artery Disease in the medical and cardiology departments as well as the recovered outdoor cases of COVID-19 in Combined Military Hospital and Army Cardiac Centre Lahore were selected for the study. Research was carried out from 1<sup>st</sup> Jan to 31<sup>st</sup> Mar 2021.

**Methodology:** 30 patients each of Pulmonary Tuberculosis and Coronary Artery Disease and recovered COVID-19 patients were enrolled in the study. After obtaining the informed consent, data was collected using specially designed demographic form and depression severity was evaluated using Beck Depression Inventory (BDI-21) Urdu Version.

**Results:** Mean age of the patients was 42.73 years, 15 participants were females and 75 were males. The results revealed that the Depression was significantly high among CAD ( $18.70 \pm 53$  Depression,  $p = .000^{***}$ ) and TB ( $10.57 \pm 38$  Depression,  $p = .01^{**}$ ) as compared to COVID-19 disease ( $5.79 \pm 18$  Depression) and there was statistically no significant difference between the TB and CAD disease ( $p = .113$ ).

**Conclusion:** On the basis of these findings it is concluded that the patients of Coronary Artery Disease have highest prevalence of depression as compared to Tuberculosis followed by COVID-19 and a prompt liaison with mental health services should be taken into consideration for better management of these patients.

**Keywords:** Depression, COVID-19, Pulmonary Tuberculosis (TB), Coronary Artery Disease (CAD), Prevalence.

## INTRODUCTION

The COVID-19 pandemic severely disrupted everyday activities of all the nations in this world, with 150989419 confirmed cases and 3173576 confirmed deaths all over and 820823 confirmed cases and 17811 confirmed deaths in Pakistan and almost 5112 new cases of COVID-19 everyday with an average of 150 deaths daily (WHO 2021)<sup>1</sup>. There are studies which show an increase in mental health problems of living through the pandemic (Salari et al., 2020)<sup>2</sup>, however a comparative study and analysis was required to ascertain the prevalence of most common mental health problem i.e. depression,<sup>3</sup> in COVID-19, Coronary Artery Disease (CAD) and Pulmonary Tuberculosis (TB). World Health Organization (WHO) declared that depression is the foremost cause of disability as measured by Years Lived with Disability (YLDs) and a major burden of disease and morbidity and mortality with loss of DALYs (Ready MS)<sup>4</sup>.

COVID-19 is generally known as the Corona virus erupted from a wet bazaar in Wuhan China, which now has spread all over the world resulting in hospitalizations and deaths (Wang et al. 2020)<sup>5</sup>. As of April 2020 more than a third of the world's population was under lockdown to control the widespread of the disease (Kaplan et al. 2020)<sup>6</sup>. People have been advised to maintain social distance, wear masks, and disinfect their hands frequently (Cheng et al. 2020)<sup>7</sup>. In times of pandemic, people fear getting infected, resulting in anxiety, distress and depression (Hall et al. 2008)<sup>8</sup>. A wide range of mental outcomes have been observed during the pandemics outbreak at an individual, public, national and international levels (Huang & Zhao, 2020)<sup>9</sup>.

Tuberculosis is a common illness worldwide (Issa et al. 2009)<sup>10</sup>. It often impairs physical, mental and economic health which can be due to inactivity, prolonged hospitalization, avoidance at work, isolation, hopelessness<sup>11</sup> leading to reduced contact with people. (Bhatia, Bhasin & Dubey, 2000)<sup>12</sup>. Pulmonary TB is the only type of TB that can spread to others and is transmitted via droplets/aerosols from coughing of people with the active respiratory disease. Globally, in 2014 almost 9.6 million people fell ill with TB; 5.4 million men, 3.2 million women and 1.0 million children (WHO, 2015)<sup>13</sup>. One-third of the world's population is having latent TB; with 10% chance of latent TB becoming active TB (WHO, 2009)<sup>14</sup>.

Coronary Artery Disease, (CAD) it is a universal public health problem (Hussain, Khan, Uddin, Al-Nozha, 2014)<sup>15</sup>. The third global

burdened disease (GBD) ranked by WHO (Murray & Lopez, 1996)<sup>16</sup> and leading deadly disease till 2020 (Murray & Lopez, 1997)<sup>17</sup> CAD killed millions of people worldwide (Gaziano, Bitton, et al, 2010)<sup>18</sup>. The most frequent symptom of coronary heart disease are angina, which presents with chest pain and tightness, heaviness, neck stiffness, pressure with numbness, bloating or abdominal cramping (Cleveland and Clinic, 2021)<sup>19</sup>. Depression is pretty common in CAD showing 32.5% to 17.5% of patients with CAD to have clinically significant depression (Carvalho & Dantas et al, 2016)<sup>20</sup>. Depression among CAD patients carries poor prognosis. The fear and past tribulations experienced by patients can increase their physical symptoms, which is detrimental to their quality of life (Rumsfeld, Havranek, Masoudi, et al, 2003)<sup>21</sup>.

Depression is a common mental disorder presented with feelings of low mood, loss of interest, anhedonia, happiness, loss of energy, feelings of guilt or shame, disturbed sleep or appetite, impaired mental cognitions and psychomotor retardation or over activity/agitation (Reindeer, 2013)<sup>22</sup>. Various emotional effects have been observed during the outbreak of illness (Huang & Zhao, 2020)<sup>23</sup>. It is concluded that people facing a pandemic have a fear of unknown making them anxious, stressed and depressed. This psychological distress asks for a timely action on mental health during the COVID-19 pandemic (Xiang et al., 2020)<sup>24</sup>.

Being COVID-19 positive, people experience psychological distress like anxiety and stress. In addition, the symptoms of fever, cough, breathlessness and the fear of worsening of disease also gives rise to depressive symptoms (Xiang et al., 2020)<sup>24</sup>. This global pandemic may lead to mass psychological catastrophe (Xiang, Yang, Zhang, Zhang, Cheung, 2020)<sup>24</sup>.

**Objectives:** To find out the difference in the level of depression among the patients of COVID-19, Tuberculosis (TB) and Coronary Artery Disease (CAD).

## METHODOLOGY

It was a Cross sectional, non-probability convenient sampling technique, a non randomized study which was carried out from 1<sup>st</sup> Jan to 31<sup>st</sup> Mar 2021. Sample collection was non probable and the follow up patients in medical and cardiology OPDs were screened. COVID-19 negative PCR patients after one month were approached and were screened as well. Sample size was N=90, with a cohort of 30 patients each of Corona, TB and CAD. Data was collected on a specially designed Performa in Urdu regarding demographics and

severity of depression was marked on the Urdu version of Beck's Depression Inventory (BDI-21).

**Inclusion Criteria**

- Age ranges from 20 to 60 years with non randomized selection.
- Both gender male and female were included
- COVID-19 recovered cases were included.

**Exclusion Criteria**

- The patients suffering any other chronic diseases like endocrinological, hypertension and diabetes were not included.
- Individuals with previous history of any psychiatric morbidity were not included.
- COVID-19 recovered patients who recovered less than 4 weeks ago were not included.

**Measures**

The assessment tools that were used in this study are:

- Demographic Information Sheet- Urdu
- Beck Depression Inventory (BDI-21) Urdu Version

**Procedure:** First of all, permission was taken from hospital ethical committee. After permission from concerned departments researcher selected 30 participants from each department. The researcher gave brief introduction to the participants and established rapport with them, maintaining all the corona safety precautions. The outline, general overview and purpose of the research was provided to the participants. Participants filled the forms in the presence of the researchers/chaperons. After the data collection, the data was analyzed.

**Statistical Analysis**

- Statistical analyses were carried out using SPSS 16 version by IBM.
- Descriptive statistics were applied to find out frequencies and percentage.
- ANOVA was used to find out the differences among the groups

**RESULTS**

Descriptive statistics of the study found that the Mean age of the participants was  $\pm 42.73$  and SD was 14.8. A total of 90 individuals participated, 16% females and 83% were males. The detail of educational level of the participants revealed that there were 51% individuals up to the level of Metric, 26% were up to intermediate,

20% graduate and 2% were Masters. Most of the participants were married (89%) only a few (11%) were unmarried. 44% belonged to rural areas, 16% were from towns and (30%) individuals were from different city areas. Most of the participants belonged to a low income group (63%) that is below Rs 30,000, (23%) individual had income below Rs 60,000, (10%) individuals had income below Rs 90,000 and only (3%) individuals had income above Rs 91,000. Amongst three groups, 16 (53.3%) patients of CAD were suffering from Depression and achieved more than cut off score. However, 7 (23.3%) patients of TB had scores more than cut off and only 4 (13.3%) of recovered COVID-19 patients were found to have depression at the time of study.

Table I. Descriptive characteristics of the sample (N=90)

Variables	M(SD)	f %
Age	42.73(14.88)	
Gender		
Male		75 (83%)
Female		15 (16%)
Disease of Participants		
COVID-19		30 (33%)
TB		30 (33%)
CAD		30 (33%)
Educational Level		
Metric		46 (51%)
Intermediate		24 (26%)
Graduate		18 (20%)
Masters		2(2%)
Marital Status		
Married		80(89%)
Unmarried		10(11%)
Residence		
City		35(38%)
Town		15(16%)
Village		40 (44%)
Socioeconomic Status		
Less than 30,000		57(63%)
Less than 60,000		21 (23%)
Less than 90,000		9 (10%)
More than 91,000		3 (3%)

Table II: Post Hoc test of ANOVA

Disease of Participants	Disease of Participants	MD	SD	P	95% Confidence Interval	
					LB	UB
COVID-19	TB	-5.900	2.91	.113	-12.85	1.05
	CAD	-14.03*	2.91	.000***	-20.99	-7.08
TB	COVID-19	5.900	2.91	.113	-1.05	12.85
	CAD	-8.13*	2.91	.018*	-15.09	-1.18
CAD	COVID-19	14.03*	2.91	.000***	7.08	20.99
	TB	8.12*	2.91	.018*	1.18	15.09

\*. The mean difference is significant at the 0.05 level.

Figure 1:

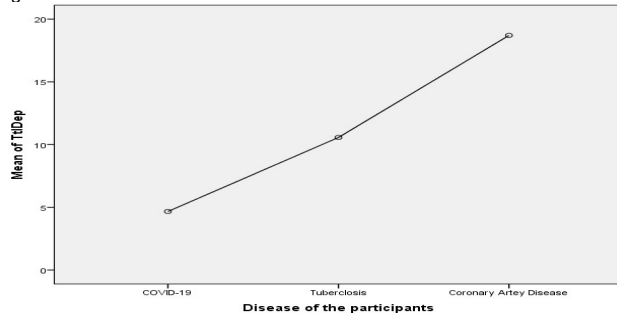


Figure 1 indicates that the level of depression is high among the CAD patients as compared to COVID19 and TB patients.

One way ANOVA was conducted to investigate the differences in level of depression among three groups of patients. The results revealed that there was a statistically significant difference between groups as determined by one way ANOVA ( $F_{2, 88} = 11.67, p = .000***$ ). A Tukey Post Hoc test revealed that the Depression was statistically significantly high among CAD ( $18.70 \pm 53$  Depression,  $p = .000***$ ) disease of the participants compared to TB ( $10.57 \pm 38$  Depression,  $p = 0.1**$ ) and disease of the participants compared to COVID-19 disease ( $5.79 \pm 18$  Depression). There was no statistically significant difference between the TB and CAD disease ( $p = .113$ ).

**DISCUSSION**

The study's aim was to undertake the prevalence of depression among patients of COVID-19, Pulmonary Tuberculosis (TB) and Coronary Artery Disease (CAD). Present study appears to be first in

which prevalence of depression among patients of COVID-19, Pulmonary Tuberculosis (TB) and Coronary Artery Disease (CAD) are studied together. The discussion of results was based on the analysis and interpretation of the data presented on Beck Depression Inventory (BDI-21) and demographic information sheet. Results revealed that there is a significant difference between prevalence of depression among patients of COVID-19, Pulmonary Tuberculosis (TB) and Coronary Artery Disease (CAD).

Our results have revealed that depression is highly prevalent 53.3% in patients with CAD. This is in line with the results of studies conducted by Freedland, et al. (1992)<sup>30</sup>, Carney, et al. (1987)<sup>26</sup> and Hance, et al. (1996)<sup>27</sup> described 17 to 44 % of patients with CAD suffered from severe depressive disorder. Another study found 27 % of patients who had coronary artery bypass graft surgery (CABG) were depressed after surgery (McKhann, et al., 1997)<sup>28</sup>. Studies by Dowlati, et al. (2010)<sup>29</sup> have reported that the prevalence of depression increased twice with CAD. A Chinese meta-analysis showed that the incidence of depression in hospitalized patients with CAD was 51% and was more than that of patients with CAD in the general population (34.6% to 45%). In another study conducted by Lu, et al.<sup>30</sup> 40.82% of the patients of CAD had depression and 25.12% of patients of CAD with anxiety during hospitalization.

The effects of chronic diseases such as tuberculosis are not only physical but also include depression as a major psychiatric diagnosis, as it was recorded in 42.5% of patients hospitalized for treatment of tuberculosis Gulzar Ali, et al (2021)<sup>11</sup>. However, in our subjects with TB depression was not very common and only 23.3% had depression which is close to frequency of depression in general population. This could be due to the fact that most of our subjects were young and govt employees and they were entitled for free medical treatment and were on medical leave during this period which has a rather positive impact on their social wellbeing. This was also shown by Dasa & Roba et.al (2019)<sup>31</sup> in their study of frequency and associated factors of depression among tuberculosis patients in Eastern Ethiopia. The prevalence of depression among tuberculosis patients was 51.9% (95%CI = 42.7, 62.2%) with 34.2% were mild cases. In logistic regression analysis, probability of developing depression among tuberculosis patients with age less than 25 years were 0.5(50% protective effect) (AOR = 0.5, 95% CI 0.26–0.99) whereas patients with lowest monthly income had four times higher odds to have depression (AOR = 3.98, 95% CI: 2.15–7.39).

COVID-19 not only causes anxiety about physical health but also leads to a number of mental disorders. Salari et al., 2020<sup>2</sup> conducted a study to assess the prevalence of stress, anxiety and depression in many people during the COVID-19 pandemic. This meta-analysis showed that the prevalence of stress was 29.6%, the increase in anxiety disorder was 31.9%, and the increase in depression was 33.7%. However, rate of depression in our COVID-19 patients was extremely low i.e.13.3%. This could be because of many reasons. First and foremost reason of low percentage of depression in our patients could be that they had completely recovered from the disease. Another reason could be that they had experienced only mild symptoms of COVID-19. Last but not the least these patients had been on oral steroids for last one month which is known to have euphoric effect on mood.

## CONCLUSION

Our study has highlighted a different result as regards depression in COVID-19 patients as only 4 of our 30 patients tested positive for depression on Beck Depression Inventory. However, patients of Coronary Artery Disease have high prevalence of depression as compared to Tuberculosis and COVID-19. This is at par with the other national and international studies which have studied depression in TB and CAD patients. Results provide the evidence that there were significant differences in the intensity of depression among patients of COVID-19, Tuberculosis (TB) and Coronary Artery disease (CAD). Moreover patients with these physical disorders not only require medical support but most of them need mental health services for their timely recovery.

**Implication:** The results of this research study emphasize the need to identify the reason for such low prevalence of depression in COVID-19 population. Moreover, there is a need to reduce the prevalence of depression among patients of COVID-19, Tuberculosis (TB) and Coronary Artery Disease (CAD). These findings have practical implications for pharmacological and non pharmacological interventions. This study provides awareness in hospital medical departments and promote liaison with psychiatric services in developing strategies to manage depression among patients of COVID-19, Tuberculosis (TB) and Coronary Artery Disease (CAD). It also highlights the integration of mental health services in primary care setups.

## Limitations and Suggestions

This study had its limitations and suggestions which are :

- Sample size was not large enough to generalize the study findings on the whole population of patients of COVID-19, Tuberculosis (TB) and Coronary Artery Disease (CAD).
- As a pandemic, long term sequelae of COVID-19 and its impact on mental health of people needs to be addressed and further studies are needed.

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