

COMPARATIVE STUDIES BETWEEN POST COVID-19
AND NON-COVID-19 INDIVIDUALS TO ASSESS
DEPRESSION SYMPTOMS BY USING PHQ-9 SCALE

By
Md Takvir Ahmed Ovi
19346078

A thesis submitted to the School of Pharmacy in partial fulfillment of the
requirements for the degree of Bachelors of Pharmacy (Hons.)

School of Pharmacy
Brac University
May,2024

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Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing a degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

Student's Full Name & Signature:

Md Takvir Ahmed Ovi
19346078

Approval

The thesis titled –Comparative studies between Post Covid and Non-covid individuals to assess depression symptoms by using PHQ-9 scale.” submitted by Md Takvir Ahmed Ovi of Summer 2019 has been accepted as satisfactory in partial fulfillment of the requirement for the degree of Bachelor of Pharmacy.

Supervised By:

Dr.Afrina Afrose
Associate Professor
School of Pharmacy
BRAC University

Approved By:

Program Director:

Professor Dr. Hasina Yasmin
Program Director and Assistant Dean
School of Pharmacy
BRAC University

Dean:

Professor Dr. Eva Rahman Kabir
Dean
School of Pharmacy
BRAC University

Ethics Statement

The research was carried out cautiously, according to all norms, regulations, and recommendations. The convincing of patients and the interview were conducted in a suitable manner. This study did not include any human or animal testing.

Abstract

The Corona virus has spread over the world. Those infected with the SARS-CoV-2 virus experience physical, mental health issues, which might persist even after recovery. Depression is one of them. The main objective of this research is to assess the severity of depressive symptoms in between post covid and non-covid patients. The research has been conducted by using The PHQ-9 scales which is a multipurpose instrument to predict the severity of depression. The study included 25 patients: 15 post-covid patients, 10 non-covid individuals. After persuading the patients, face-to-face and online interviews are conducted. In post-covid, 14 patients had depressive symptoms, the mild depression rate was 64% and moderate depressive patients rate was 35% . In non-covid, 8 patients had depression; the mild depression rate was 75% and the moderate rate 25%. Depression levels were observed higher in number and ratio in post covid patients compared to non-covid patients.

Keywords: PHQ-09, Depression, SARS-CoV-2 virus, Neuropsychiatric disorders, Post-covid patients, Non-covid patients.

Dedication

This article is dedicated to my parents. They unconditionally supported me throughout my academic career and believed in my abilities.

Acknowledgement

Firstly, it has been my great pleasure and amazing opportunity to have worked with my supervisor of this research Dr. Afrina Afrose. Throughout the research ma'am was quite helpful for providing sufficient information as well as directions along with arranging multiple meetings for the research. Patients data collection and scoring was done by the help of our supervisor's recommendations through National Institute of Neurosciences & Hospital. The hospital's medical team, including doctors and research assistants, provided ample guidance and assistance in carrying out the research. Eventually, I want to acknowledge the School of Pharmacy and Brac University who have supported me throughout the research.

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List of Acronyms

PHQ-09 Patient Health Questionnaire 09

SARS-CoV-2 Severe acute respiratory syndrome corona virus 2

Glossary

Post covid patients : Refers to the period after being infected with the corona virus.

Neuropsychiatric disorders : Mental or emotional disturbance that results in aberrant brain function.

Depressive symptoms: Individuals having certain mental health problems in their daily activities such as loss of interest in usual tasks, feeling hopeless, melancholy, tearfulness, and concentrating lost.

Chapter 1: Introduction

1.1 Background

Covid-19 resonated widely from 2020 to 2022 with an enormous negative impact on our life. This virus has been known to be life threatening on the other hand causing many detrimental impacts on the human body. These physical negative effects also persist in the post-corona virus period. One of them is depression symptoms. This research also sought to focus on comparative studies for assessing or measuring depression severity among post-covid and non-covid patients using the Patient Health Questionnaire-9. According to (Vassalini et al., 2021), a research conducted on hospitalized 115 covid-19 patients over a three-month period to identify the severity of developing depressive symptoms. Their linear regression model revealed that, in addition to several other medical conditions, a small but clinically significant percentage of patients had experienced depressed symptoms and suicidal thoughts. Moreover, almost similar outcomes are found in another article published by (Zhao et al., 2021), They concluded from their findings that patients who were affected by Covid-19 suffered significant levels of depression as well as fatigue in the post-COVID interval. Furthermore, another research was conducted division wise in Bangladesh over post covid-19 patents by (Zahangir & Rokonuzzaman, 2022), they find that, In terms of Dhaka participants, they found three mental health disorders, with depression having a greater incidence which is 59.8%. In contrast, 34.4% of participants in Chittagong reported depression along with anxiety and stress. A review of each of these articles reveals that post-covid patients are experiencing depressive symptoms in their life and the levels are also alarming. These research are needed more in the long term to determine the extent of depressive symptoms and to prevent the disease.

1.2 Research Gap

There is no comparative as well as informative data or research in Bangladesh that has been conducted in terms of assessing or determining the extent of depression among post covid-19 and non-covid-19 patients, which is tried to focus on this research. According to (Banik et al., 2022), though there is some data or research has been done in Bangladesh based on general psychiatric symptoms over the at least after one year onset of covid-19 patients. Another research by (Tasnim et al., 2021) attempted to predict anxiety and depression among frontline healthcare professionals in Bangladesh who had treated covid-19 patients. However, comparative data between post-covid and non-covid patients to determine whether or not this SARS-CoV-2 virus causes any depressive symptom by the help of PHQ-9 scale not analyzed before in Bangladesh.

1.3 Objectives

The objective of the research is to identify the effect of SARS-CoV-2 virus in causing depression on the post covid patients. Furthermore, for assessing the depressive symptoms PHQ-09 scales were employed.

1.4 Significance

The research has been done to find out the depression status over the post covid patients and determine if the SARS-CoV-2 virus is a contributing factor for the depression. It is quite important to find out the level or extent of the depression symptoms for the individuals. People who are suffering from depression are more vulnerable to be affected with neurological complications such as Alzheimer's, Parkinson's, dementia, epilepsy etc. Furthermore, neuropsychiatric disorders might be seen, is basically mental or emotional disturbance that results in aberrant brain function. If post-covid patients exhibit depressive symptoms, it may suggest a neurological impact of the SARS-CoV-2 virus along with a risk of developing neurological disorders in the near future. This investigation was undertaken in light of the importance of predicting depression in post-covid patients and to treating the disease progressions.

Chapter 2:

Methodology:

The PHQ-09 Questionnaire was used to predict depression among post-covid and non-covid patients. Consequently, it was possible to determine their depression status precisely. Both Patients data was collected from National Institute of Neurosciences & Hospital which is a government hospital in Dhaka. Moreover, Each Patient was notified and offered appropriate interview guidance. Furthermore, online as well as face-to-face interviews were conducted. In terms of face to face interview the venue was the National Institute of Neurosciences & Hospital. Furthermore, after finishing the interview scoring was performed according to the PHQ-09 scale guidelines to ensure the depression status for each individual. Finally, Comparison was done by both post-covid and non-covid patents based on their severity of depression.

The number of patients data collected from the National Institute of Neurosciences & Hospital is given below in Table 1.

Table 1: Number of patients Data

Total Number of Post Covid Patients	15
Total Number of Non covid patients	10

Figure 1: Illustrates the research method by employing a flow diagram-

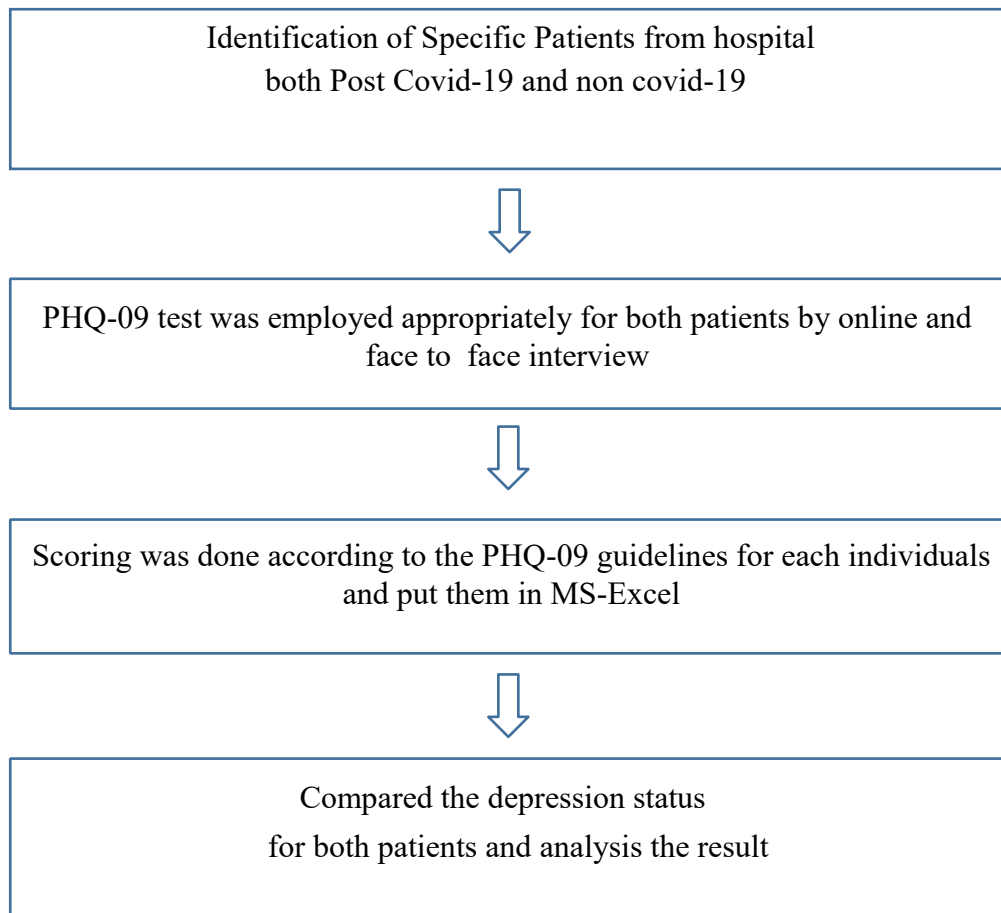


Figure 1: *Flow diagram of research methodology*

Table 2: PHQ-9 Scoring guidelines:

This recommendation can help us score each individual patient based on their performance and assess the severity of depression.

PHQ-9 Score	Depression severity
0-4	None
5-9	Mild
10-14	Moderate
15-19	Moderately Severe
20-27	Severe

Chapter 3:Result and Discussion

3.1: Result

To begin with, PHQ-09 was employed for both post covid and non covid individuals for understanding their depression status. Then scoring was done according to the PHQ-09 guidelines based on each patient's response or performance. The both groups collected data from the interview are given below by the form of a table 3 and table 4:

Table 3: Post Covid-19 patients data with PHQ-09 Score.

Post Covid patients data with PHQ-9 scoring		
Patients Numbers	Score	Depression Severity
1	9	mild
2	7	mild
3	12	moderate depression
4	7	mild
5	14	Moderate
6	3	none
7	11	moderate
8	6	mild
9	7	mild
10	8	mild
11	5	mild
12	16	moderately severe
13	12	moderate
14	8	mild
15	6	mild
	Total percentage of depression=93%	

Table 4:Non Covid patients data with PHQ-09 score

Non covid patients PHQ-9 Score		
Patients Number	Score	Depression severity
1	3	None
2	7	mild depression
3	6	mild depression
4	0	none
5	5	mild depression
6	5	mild depression
7	13	moderate depression
8	9	mild depression
9	15	Moderately severe
10	8	Mild
	Total percentage of depression=80%	

3.2: Discussion:

In this research study included 25 patients in total. To determine each individual's depression level, PHQ-9 questionnaires were employed. To assess the patient's depression, PHQ-9 scoring parameters are employed and depression severity is determined based on the patient's performance. The difference in depression percentage and severity observed in this test between post-covid and non-covid patients. In terms of post covid patients the total participants were 15 and among them apart from one person in total 14 participants have depression symptoms mild to moderately severe. The total percentage of depressive post covid patients was 93%, which indicates that SARS- CoV- 2 virus has created an impact for developing depression symptoms in post covid patients. Among 15 participants the mild depression percentage is 64% and moderate level of depressive patients rate was 35% . On the other hand, by using the same test method non-covid patients depression level is identified. In terms of non covid patients the total participants were 10 and among them 8 participants depression status is identified mild to severe depression. The total non-covid patients' depression percentage is 80% which is comparatively lower than post-covid patients. Moreover, in non-covid patients the percentage of mild depression was 75% and the moderate rate is 25%. The number of depressive patients as well as ratio of relatively higher in post-covid patients.

This overall comparison is showing below by using calculation in between post-covid and non-covid patients:

In terms of Post-covid patients-

Total patients=15

Number of Depressive patients identified= 14

Mild depressive Patients= 9

= $9/14 \times 100 = 64\%$

Moderate depressive patients= 5

= $5/14 \times 100 = 35\%$

In terms of Noncovid patients-

Total patients= 10

Number of depressive patients identified= 8

mild depressive patients =6

= $6/8 \times 100 = 75\%$

Moderate depressive patients= 2

= $2/8 \times 100 = 25\%$

In the context of this discussion and test it is indicated that the depression severity is greater in terms of post covid patients than non-covid patients. There are some similar results obtained by other research papers where it is observed that the covid or post covid patients' depression score is higher and depression severity is noticeable. For instance, According to the (Mamun et al., 2021), In Bangladesh, post-covid patients experienced major psychological repercussions. In their research they detected high rate of depression and suicidal ideation for post covid patents which is 33% and 5% respectively. This rate is comparatively greater than normal individuals. On the other hand, another research conducted by the article (Akhouri et al., 2023), In their statement, a study was done on post-

covid-19 patients in Western Uttar Pradesh, Northern India, with 156 patients, and the results showed that 59.78% of patients had severe levels of depression. Furthermore, the moderate level of depression was 25%. The mild level of depression was observed to be 15.21%. Furthermore, According to the (Abulsaad et al., 2023), A study was undertaken with 150 post-covid patients to examine the prevalence of both depression and anxiety. The results reveal that the rates of depression and anxiety were 65.3% and 36%, respectively which is a comparatively greater percentage than normal individuals. The SARS-CoV-2 virus has a strong detrimental influence on post-covid patients, leading to depressive symptoms (as reported in each paper).

Chapter 4: Conclusion, Limitation & Future Recommendations

4.1 Conclusion:

To conclude, this study attempted to assess the depression levels of both post-covid and non-covid patients using PHQ-09 scales. Moreover, It helps to understand how much impact the Sarscov2 virus can have on the development of depression in patients. Researchers like these will always assist patients, especially post-covid patients in identifying or predicting their depression level in advance, allowing them to obtain adequate treatment and avoid further neurological complications. At the end of the analysis there are some major findings are observed- The test revealed that post-covid patients have a higher rate of depression severity than non-covid patients. With few instances, people may not develop depressed symptoms even if they are infected by SARS-CoV-2 virus once in their lifetime

4.2: Limitations:

- i. The total number of post-covid and non-covid participants was 25, which was relatively little in number.
- ii. Convincing the patients for a face to face or online interview was quite challenging.
- iii. Patients screening based on their age was also quite challenging.

4.3 Future recommendations:

Such investigations should be carried out by more experienced researchers over a longer period of time and with a bigger number of participants. So that it is possible to better identify the prevalence of depression and other neurological complications affecting individuals

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Appendix A.

COMPARATIVE STUDIES BETWEEN POST COVID-19 AND NON-COVID-19 INDIVIDUALS TO ASSESS DEPRESSION SYMPTOMS IN BANGLADESH BY USING PHQ-9 SCALE

Name: Md Takvir Ahmed Ovi

ID:19346078

University: Brac University

Participants: Post covid and non covid patents and patents data collected from National Institute of Neurosciences & Hospital

Project Supervisor: Dr. Afrina Afrose

Associate Professor, School of Pharmacy, Brac University.

Patients Health Questionnaire (PHQ-09)

Patient's Name: Anonymous Date: 30th march, 2024

How often during the past weeks have you been felt by any of the following problems? (use "✓" to indicate your answer)	Not at all	Several days	More than half the days	Nearly Everyday
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed or hopeless	0	1	2	3
3. Trouble falling or staying asleep or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. You felt bad about yourself, like a failure, that you'd let yourself down, or like you were the reason your family failed.	0	1	2	3
7. Trouble concentration on things such as reading or watching television	0	1	2	3
8. You noted that you are moving / speaking slowly, which others may have noticed. Alternatively, you have been moving about a lot more than normal because you are restless.	0	1	2	3
9. Feelings of injuring yourself or that it would be better if you died	0	1	2	3
	Total PHQ-09 Score=	16		

Depression

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