Original Research Article

The impact of mental illnesses on the clinical manifestations of COVID-19 patients

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ABSTRACT

Background: The underlying medical conditions with COVID-19 patients may affect the clinical symptoms, morbidity and mortality. Due to the high prevalence of mental illnesses and their impact on inflammatory processes and pulmonary function, we evaluated the impact of depression and anxiety as the highest prevalence of mental illness on clinical manifestations of COVID-19 patients.
Methods: A questionnaire form about past medical history completed for the COVID-19 patients. Patients with underlying depression and anxiety excluded and compared with the patients without comorbidities of medical or mental conditions in terms of the common clinical manifestations.
Results: Total out of the 560 patients reviewed, 174 patients had no history of any disease (named as group A). 39 patients had the history of depression only and 45 patients had the history of anxiety only (respectively named as groups B and C). There was a high and meaningful frequency of feeling dyspnea (p value <0.001), tachycardia (p value <0.001), tachypnea (p value<0.001), cough (p value <0.001) and chest pain (p value <0.001) in groups B and C compare to Group A. In other clinical manifestations, there was not any significant difference among three groups (p value >0.05).
Conclusions: Comorbidity of depression and anxiety may affect the clinical symptoms in patients with COVID-19. Respiratory symptoms (e.g., cough, tachypnea and feeling dyspnea), tachycardia and chest pain are the more manifested symptoms in the patients with depression and anxiety and may be due to their underlying disease. The impact of mental illnesses on morbidity and mortality of COVID-19 patients remains unclear and requires further studies.

Keywords: Mental illnesses, COVID-19, Clinical manifestations, Depression, Anxiety

INTRODUCTION

In December 2019, the 2019 novel coronavirus caused an outbreak in Wuhan City, China. The World Health Organization (WHO) declared an epidemic on 30th of January 2020 and then characterized COVID-19 as a pandemic on 11th of March 2020.[1] The lung is recognized as the most affected organ due to the coronavirus.[2] However, besides the respiratory system, SARS-Cov-2 can infect the digestive system, the urinary system and the hematological system, which causes to observe the virus in the stool, urine and blood samples in addition to throat samples.[3] Entrance of SARS-CoV-2 into alveolar epithelial cells, stimulates a complex immune response which results in cytokine storm syndromes that may cause acute respiratory distress syndrome (ARDS) and multiple organ failure.[4,5] Typical symptoms and manifestations of COVID-19 patients

include fever, cough, sore throat, muscular soreness, fatigue, headache, myalgia and dyspnea. Some patients showed Less common symptoms, such as diarrhea, nausea, abdominal pain and vomiting.[6,7] Complicated symptoms include acute respiratory distress syndrome (ARDS), sepsis and septic shock, multi-organ failure, including acute kidney injury, and cardiac injury.[8,9] Common clinical laboratory findings include leucopenia and lymphopenia. Lymphopenia is a key feature of COVID-19 disease. Lactate dehydrogenase, C-reactive protein and creatinine kinase may elevate in COVID-19 patients.[10-12] The age prevalence of COVID-19 disease is almost within adults (with more than or equal to 15 years old) while most of them are male.[13,14]

There are several studies carried out to investigate the underlying medical conditions with COVID-19 patients which show that nearly half the cases had one or more underlying medical conditions, such as hypertension, diabetes, cardiovascular and lung disease.[15,16] However, the evaluation of mental illnesses as comorbidities of COVID-19 patients remains unclear. In fact, mental illnesses and related drugs may influence the immune system and organs function such as lung that may affect the COVID-19 patient's manifestations.

Depression may cause chronic low-grade inflammation that elevates inflammatory markers such as serum levels of IL-6 and CRP (which are associated with depression).[17-20] In major depressed subjects, significant pulmonary adverse drug reactions have been reported due to using fluoxetine.[21] Besides, several studies showed that depression and anxiety may increase development, frequency and severity of respiratory disease such as dyspnea, COPD and asthma.[22-26]

National Survey of Drug Use and Health (NSDUH) has reported that in 2017 and 2018 there were about 46.632 and 47.635 million adults aged 18 or above in the United States with any mental illness, representing 18.9% and 19.1% of all United States adults. These data show the prevalence and importance of mental illnesses. Furthermore, the effects of mental illnesses on lung function and elevation of inflammatory markers, which are the common complications of the COVID-19 patients, accentuates the importance of investigating the effects of mental illnesses on COVID-19 disease. Since the highest incidence of the mental illnesses are related to anxiety and depression (almost 70% of any mental health disorder population, almost 70% of any mental health disorder population in current study we evaluate the impact of anxiety and depression on clinical symptoms and manifestations of COVID-19 patients.[27]

METHODS

In this study, we have selected the patients (aged 25-60 years) referred to Alinasab Hospital since June 25th 2020

until July 25th 2020 and diagnosed with COVID-19 disease. For this purpose, a separate questionnaire form which includes questions about past medical history, consumption of related drugs and patient's clinical manifestations completed and recorded in the research files prepared for this study by research colleagues. To ensure the accuracy, the data were checked by the chief investigator and entered by specific study codes, and then stored in a secured, locked computer while only the members of research team could access the patient's records.

We excluded the patients with the history of depression or anxiety who had at least one year of these illnesses' history, with no other underlying medical conditions. Then, these groups were considered in terms of the chief complaints and clinical manifestations with the patients with no underlying disorders, even medical or mental disease, who took part in this study based on the research files. For this purpose, we compared the subjects based on 20 chief complaints and clinical manifestations which were more common in our study's patients with COVID-19.

In this study, SPSS Ver. 22 software was used for analyzing the data and the corresponding results were reported in frequency (percentage). We used Chi-square test to compare the clinical symptoms between the three groups of patients and use Fisher exact test when necessary. Also, we consider probability value <0.05 as a statistically significant level.

RESULTS

Total 560 patient's questionnaire form investigated in this study at which 386 patients (69%) of them had underlying disease and 174 of them (31%) had no underlying medical or mental conditions that we named them as group A. 224 patients (40%) had only medical comorbidities, 118 patients (21%) had just mental illness history for at least one year and 44 patients (8%) had both mental and medical underlying disease. Of the 118 patients which had only mental illnesses, 39 patients (7%) had the history of depression (named as group B), 45 patients (8%) had the history of anxiety (named as group C) and the rest of them (34 patients, 6%) had any other mental illnesses. (Figure 1).

We compared these three groups (A, B and C) patient's chief complaint and clinical manifestations with each other and analyzed the data using SPSS software. There were significantly high percent of patients with chief complaints and clinical manifestations of feeling dyspnea, tachycardia, tachypnea, cough and chest pain in groups B and C compare to Group A. But in the other clinical manifestations, there were not significantly difference in percent of patients in three groups (Table 1 and Figure 2).
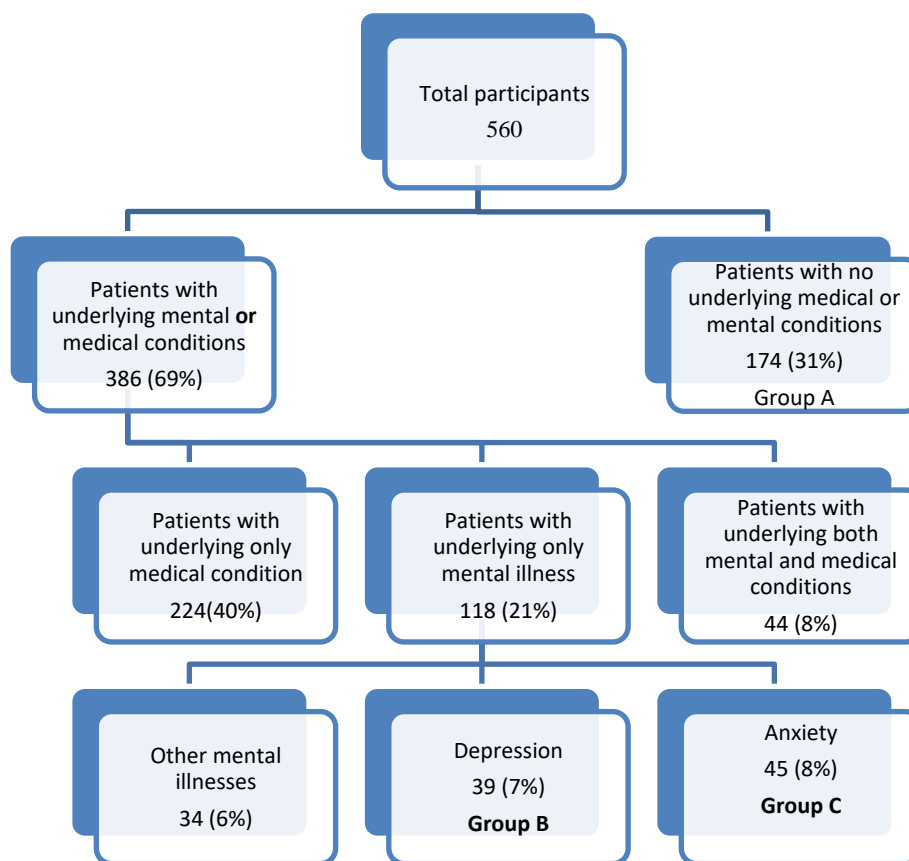
Figure 1: Classification of the study's participants based on underlying mental and medical conditions.

Table 1: Evaluation of the prevalence and frequency of common manifestations and chief complaints in three groups (A, B and C) among the COVID-19 patients.

S.no.	Chief Compliant and clinical manifestation	Group A (174 patients) (without any comorbidities)	Group B (39 patients) (depression)	Group C (45 patients) (anxiety)
		N (%)	N (%)	N (%)
1	Fever (BT>37.2 C)	69 (39.65)	15 (38.46)	19 (42.22)
2	Feeling dyspnea	52 (29.88)	29 (74.35)	32 (71.11)
3	Tachycardia (PR>100)	46 (26.43)	21 (53.84)	29 (64.44)
4	Tachypnea (RR>22)	39 (22.41)	27 (69.23)	33 (73.33)
5	Cough	52 (29.88)	26 (66.66)	29 (64.44)
6	Myalgia	40 (22.98)	10 (25.64)	9 (20)
7	Vertigo	35 (20.11)	8 (20.51)	9 (20)
8	Headache	30 (17.24)	7 (17.94)	9 (20)
9	Nausea	23 (13.21)	6 (15.38)	5 (11.11)
10	Vomiting	17 (9.77)	4 (10.25)	4 (8.88)
11	Diarrhoea	6 (3.44)	2 (5.12)	3 (6.66)
12	Abdominal pain	6 (3.44)	2 (5.12)	2 (4.44)
13	80%<O_2 saturation < 90%	28 (16.09)	6 (15.38)	7 (15.55)
14	O_2 saturation < 80%	16 (9.19)	4 (10.25)	6 (13.33)
15	Chest pain	22 (12.64)	15 (38.46)	18 (40)
16	Sweating	18 (10.34)	6 (15.38)	6 (13.33)
17	Decreased sense of smell or taste	12 (6.89)	3 (7.69)	4 (8.88)
18	Fatigue	34 (19.54)	9 (23.07)	11 (24.44)
19	Sore throat	40 (22.98)	8 (20.51)	11 (24.44)
20	Sneezing	20 (11.49)	4 (10.25)	5 (11.11)

There were meaningful significant levels of patients with chief complaints and clinical manifestations of feeling dyspnea (p value<0.001), tachycardia (p value<0.001), tachypnea (p value<0.001), cough (p value<0.001) and chest pain (p value<0.001) in groups B and C compare to group A. In other clinical manifestations there was not any meaningful significant level among three groups (p value>0.05) (Table 2).
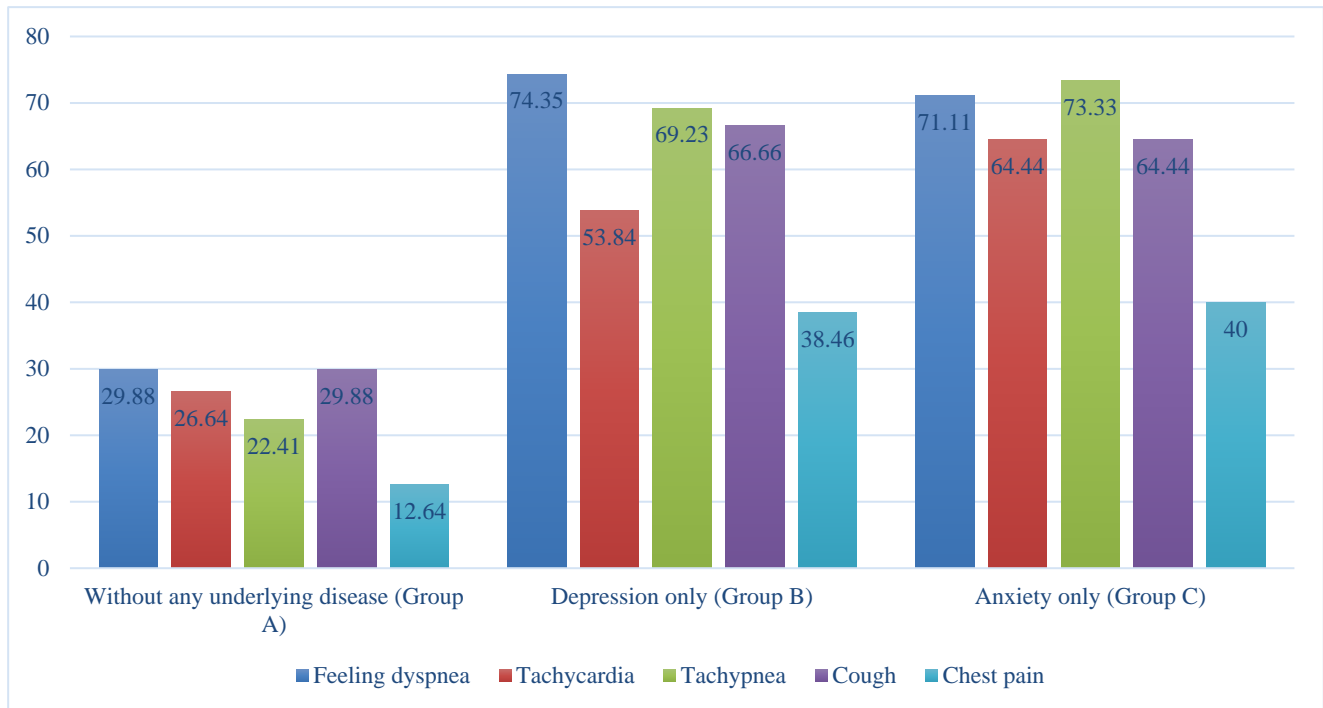

Figure 2: Percentage and frequency of feeling dyspnea, tachycardia, tachypnea, cough and chest pain presentation among three groups.

Table 2: Statistically significant levels of common manifestations and chief complaints in three groups (A, B and C) among the COVID-19 patients.

Chief Compliant and clinical manifestation	Group A (without any comorbidities)	Group B (depression)	Group C (anxiety)	P value
Fever (BT>37.2 C)	39.65%	38.46%	42.22%	0.933
Feeling dyspnea	29.88%	74.35%	71.11%	<0.001
Tachycardia (PR>100)	26.43%	53.84%	64.44%	<0.001
Tachypnea (RR>22)	22.41%	69.23%	73.33%	<0.001
Cough	29.88%	66.66%	64.44%	<0.001
Myalgia	22.98%	25.64%	20%	0.826
Vertigo	20.11%	20.51%	20%	0.998
Headache	17.24%	17.94%	20%	0.911
Nausea	13.21%	15.38%	11.11%	0.846
Vomiting	9.77%	10.25%	8.88%	1.000
Diarrhea	3.44%	5.12%	6.66%	0.568
Abdominal pain	3.44%	5.12%	4.44%	0.695
80% < O_2 saturation < 90%	16.09%	15.38%	15.55%	0.992
O_2 saturation < 80%	9.19%	10.25%	13.33%	0.672
Chest pain	12.64%	38.46%	40%	<0.001
Sweating	10.34%	15.38%	13.33%	0.587
Decreased sense of smell or taste	6.89%	7.69%	8.88%	0.822
Fatigue	19.54%	23.07%	24.44%	0.723
Sore throat	22.98%	20.51%	24.44%	0.911
Sneezing	11.49%	10.25%	11.11%	1.000

DISCUSSION

Co-morbidity of mental illnesses, especially depression and anxiety in COVID-19 patients may affect the chief complaints and clinical manifestations which most of them related with respiratory symptoms such as cough, tachypnea and feeling dyspnea. Tachycardia and chest pain are the other clinical manifestations in COVID-19 patients, which are more common in patients with comorbidity of anxiety and depression. The following findings have been concluded according to the study's data analysis and other papers:

In reviewing the data of participants, we found that about 70 percent of patients have an underlying medical or mental condition and about 29% of all participants had mental illness history for at least one year which shows the importance of evaluation of mental illnesses in COVID-19 patients (Table 1)

In group A subjects, we observed that the prevalence of respiratory symptoms, tachycardia and tachypnea were related with decreased blood O2 saturations in the patients. Moreover, in group A subjects, patients with decreased blood O2 saturations, have been manifested with respiratory symptoms. But in groups B and C subjects, there were significantly high percent of patients with respiratory symptoms, tachypnea and tachycardia relative to the percent of patients with decreased blood O2 saturations. It represents that the high occurrence of respiratory symptoms without decreased blood O2 saturations in groups B and C may be due to their underlying disease i.e. mental illness.

Low serum iron levels are related with mental illnesses which is also observed in COVID-19 patients.[28-30] Consequently, it may aggravate psychological and medical statues in COVID-19 patients.

The rapid spread of the SARS-Cov-2 viruses, lead to increasing mental illnesses statistics which affects the condition of COVID-19 patients. Consequently, an important attention must be paid to control mental illnesses.[31-33]

CONCLUSION

Mental illnesses such as depression and anxiety may affect the manifestation of COVID-19 patients, especially by increasing the frequency of respiratory symptoms, tachycardia and chest pain. The effects of mental illnesses on duration of hospitalization, morbidity and mortality in patients with COVID-19 remain unclear and required further studies.

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