

Post-traumatic stress disorder (PTSD) among Post-COVID Patients, Menoufia Governorate, Egypt.

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Abstract:

Background: Post-traumatic stress disorder (PTSD) is a common psychiatric disorder based upon stress experiences following traumatic events such as wars, natural disasters, and traffic accidents. The disorder is characterized by a host of post-traumatic stress symptoms (PTSS) including intrusive thoughts, vigilance, avoidance of trauma-related stimuli, emotional numbing, and physiological hyper-arousal. Exposure to infectious disease epidemics could result in psychological trauma and psychiatric problems like PTSD. **Objectives:** The study aimed to assess the prevalence and risk factors of post-traumatic stress disorders among post-COVID patients. **Methods:** A cross-sectional study was conducted from the 1st of September 2021 to the last of October 2023. Data were collected from 328 participants about the sociodemographic status, COVID and post-COVID symptoms severity, and post-COVID post-traumatic stress disorder (PTSD) symptoms illustrated through the post-traumatic checklist of the civilian version (PCL-C). **Results:** The PTSD prevalence was 8.5%. The multivariate regression revealed that a history of intensive care unit (ICU) admission, and prolonged hospital stay were more likely to be associated with PTSD. **Conclusion:** Post-COVID patients were susceptible to PTSD especially if had been hospitalized in a ward or intensive care unit due to COVID infection or suffered impaired activities of daily living (ADL).

Keywords: Activities of daily living, infection, sociodemographic.

Introduction

Post-traumatic stress disorder (PTSD) is a mental disorder that may develop after exposure to exceptionally threatening or horrifying events. Its main features are re-experiencing, avoiding traumatic memories, and the feeling of continuous threat to be

vigilant or over vigilant. ⁽¹⁾ Several studies showed that mental health problems could occur in SARS survivors during the SARS epidemic. ⁽¹⁾

Post-traumatic stress disorder (PTSD) and depressive disorders were the most

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prevalent long-term psychological condition. ⁽²⁾ PTSD patients suffer the following symptoms: persistent experiencing of the event and attempting to avoid stimuli, new negative alterations in mood or cognition, and new or increased arousal. ⁽³⁾

In March 2020, the WHO declared the COVID-19 outbreak could be characterized as a “pandemic” as the virus spreads increasingly worldwide. ⁽⁴⁾ In addition to physical damage, COVID-19 also had a serious impact on the mental health of the public. ⁽²⁾ Egypt reported slightly over 282,082 confirmed COVID-19 cases with 5085 deaths. ⁽⁵⁾

Post-COVID-19 syndrome is characterized by the fact that patients had signs and symptoms that developed during or after an infection and continued for more than four weeks after infection with SARS-CoV-2. They were not explained by an alternative diagnosis. ⁽⁶⁾

The underlying mechanism of persistent psychiatric symptoms among post-COVID-19 patients, including post-traumatic symptoms, depression, anxiety, and cognitive impairment, is likely to be multifactorial.

They might include the direct effects of viral infection, the immunological response,

corticosteroid therapy, intensive care unit stay, social isolation, and stigma. ⁽²⁾

Epidemiological studies have demonstrated a high prevalence of mental health problems among survivors of infectious diseases such as SARS and MERS. While most of these mental health problems will fade out after the epidemic, symptoms of PTSD may last for a prolonged time and result in serious distress and disability.

It has been reported that about 26% of SARS survivors met full diagnostic criteria for PTSD 30 months after treatment and all identified SARS infection as their index trauma. ⁽⁷⁾

Several post-COVID patients who suffered moderate to severe illness illustrated how COVID-19 illness constituted exposure to threatened death or serious injury, fulfilling the first diagnostic criteria for PTSD. ⁽⁸⁾

Methods:

Study design: A cross-sectional study.

Study setting and duration: The study was carried out in Menoufia University outpatient clinics that serve a large area of the Delta region. It was conducted from the 1st of September 2021 to the last of October 2023.

Study participants: They were randomly selected from post-COVID-19 patients attending the outpatient clinics of Menoufia University hospitals.

Inclusion criteria: Patients contracted COVID-19 infection at least 3 months from the beginning of the study.

Exclusion criteria: Patients who were diagnosed with depression, anxiety, PTSD, or any psychological disease before the study.

Sample size: It was calculated using EPI calc. The program, using the following equation: $n = (z^2 \times p \times q) / D^2$ based on past published research that revealed that the percentage of COVID-19 survivors who experienced moderate-to-severe PTSS was approximately 72% (80% CI and 5% statistical error).⁽⁹⁾ It was 307 and was increased to 328 participants to avoid 10 % dropout.

- Tools of the study: The study depended on a predesigned questionnaire sheet that was completed by the participants after an explanation of the questionnaire by the researcher. The questionnaire was composed of 3 sections:
- The first section included questions about socioeconomic status.⁽¹⁰⁾
- The second section included questions about post-COVID medical symptoms.

- The third section included questions about post-traumatic stress disorder symptoms using the PTSD Checklist – Civilian Version (PCL-C). The PCL-C comprises a total of three dimensions (re-experiencing dimension, avoidance dimension, hyper-arousal dimension). The PCL consists of 17 items that correspond to symptoms of PTSD. The target population was instructed to indicate how much they have been bothered by each symptom in the past month using a 5-point (1-5) scale. The anchors for the severity ratings range from "Not at all" to "Extremely.", so the intensity and frequency of PTSD symptoms are rated as 5 levels. Total PTSD scores were calculated by summing the scores for all items, with higher scores indicating more severe PTSD.⁽²⁾

- Interpretation of PCL-C:

Score of PCL-C	• Interpretation
38-49	• Some degree of PTSD.
50-85	• Definitive PTSD.

Ethical considerations: Menoufia University hospitals and the research ethics committee in the Faculty of Medicine in Menoufia University approved all procedures of the current study.

All patients provided information voluntarily, signed an Informed Consent



form, and gave their Consent in the presence of a witness. The information obtained was confidential, and we anonymized all individual data.

Our research group maintained the data confidential. We received the IRB approval from the Ethics Committee on Research in Humans. The ethical committee code number was 6/2021FAML13.

Statistical analysis

Data were coded and analyzed using the Statistical Package for the Social Sciences software program, version 26. Data was presented as range, mean, standard deviation, for quantitative variables, and frequency and percentage for qualitative variables.

Comparison for qualitative variables was performed using Chi-square. Binary logistic regression was used to predict the probability of PTSD in post-COVID-19 Patients based on one or more independent variables (risk factors) that can be either continuous or categorical. P value ≤ 0.05 was considered substantially significant.

Results

Table (1) illustrates the sociodemographic data of the studied participants as the mean age of the studied population was 41.31 ± 13.359 years, about 52% of them were females and 56% of the

study population lived in urban areas. Regarding marital status, 76% of the study population were married. While 15 % of the studied participants had a literate certificate, 16% had a postgraduate certificate.

Table (2) shows the medical data of the studied participants as about 23% of the participants had chronic diseases 10 % of the participants suffered impaired activities of daily living before COVID-19 infection and the percentage increased to 22% after contracting COVID-19 infection.

Regarding hospital admission about 19% of the studied patients were admitted to the hospital due to COVID-19 with durations varying from 2 to 20 days (mean = 9.222 ± 3.716), about 84% of hospital admitted patients needed O2 therapy, and 20% were admitted to ICU.

Table (3) shows the comparison of sociodemographic data as risk factors for PTSD between the studied groups of post-COVID patients attending outpatient clinics of Menoufia University hospitals.

It was found that there were no statistically significant differences between studied PTSD patients and non-PTSD patients regarding the sociodemographic data (age, sex, residence, marital status, educational level, working status, and sociodemographic standard).

Table (4) shows a comparison of medical data as risk factors for PTSD between the studied groups of patients. There was a statistically significant difference between the studied groups of patients regarding impaired activities of daily living as about 36% of PTSD patients suffered impaired activities of daily living compared to 21% of non-PTSD post-COVID patients.

Also, there were statistically significant differences between hospital-admitted PTSD and non-PTSD studied groups of patients regarding the duration of hospital stay and ICU admission (regardless of the duration) as the duration of hospital admission was longer (mean=3.75±6.478 day) in PTSD post-COVID patients compared to shorter duration in non-PTSD group of post-COVID patients (mean =1.526±3.564) and about 14% of PTSD group of patients were admitted to ICU compared to 3% in non-PTSD group.

Table (5) illustrates multivariate logistic regression analysis used to determine the risk factors for PTSD among the studied patients as it was found that impaired activities of daily living and ICU admission were more likely to be associated with PTSD (odds ratio:3.710,6.062 respectively) .

Figure (1) illustrates that the prevalence of PTSD among the studied post-COVID patients was 8.5%.

Discussion

In the current study, the prevalence of PTSD in post-COVID patients was 8.5% while according to Tarsitani *et al.*, 2021 the prevalence of PTSD at a 3-month follow-up after discharge from the hospital is 5%, while in a 30-month follow-up study, it was found as high as 25.6%.⁽¹¹⁾

In the current study, It was found that there were no statistically significant differences between studied PTSD patients and non-PTSD patients regarding the sociodemographic data (age, sex, residence, marital status, educational level, working status, and sociodemographic standard), in contrast to the study conducted by Wang *et al*, 2022 as PTSD symptoms were found in that household registration in rural areas 3.9% vs. 2.6% in an urban area and those with higher educational background 6.9% vs. 3.2% for lower educational background and this may be attributable to difference between the communities where the studies were conducted.⁽¹²⁾

One of the medical risk factors of PTSD was ICU admission as it was found in the current study about 14.3% of the PTSD group of patients were admitted to ICU compared to 2.7% in the non-PTSD group and this agrees with the fact that post-traumatic stress has been well-documented in survivors of ICU treatment proved by Taylor *et al*, 2019.⁽¹³⁾

There were statistically significant differences between hospital-admitted PTSD and non-PTSD studied groups of patients regarding the duration of hospital stay as the duration of hospital admission was longer (mean mean=3.75±6.478 day) in PTSD post-COVID patients compared to shorter duration in non-post-traumatic stress disorders group of post-COVID patients (mean =1.526±3.564).

This also agreed with Li *et al.*, 2021 who found that the clinical risk factors significantly associated with PTSD were ICU length of stay and hospital length of stay as clinically important PTSD symptoms occurred in 7–24% of ICU survivors. Also, high levels of PTSD symptoms were most likely to occur in patients with a longer length of ICU stay. ⁽¹⁴⁾

Another risk factor was impaired activities of daily living. Impaired activities of daily living and ICU admission were more likely to be associated with PTSD as about 35.7% of PTSD patients suffered impaired activities of daily living compared to 20.7% in non-PTSD ones and this agrees with the fact that ICU survivors and many survivors of mechanical ventilation may have significant functional disabilities and PTSD symptoms as concluded by Li *et al.*, 2021. ⁽¹⁴⁾

Limitation of the study: Fear of stigma of psychological disease among community members made patients hesitate to answer the questionnaire.

Conclusion

Post-COVID patients were susceptible to PTSD especially if had been hospitalized in a ward or intensive care unit due to COVID infection or suffered impaired activities of daily living (ADL). This raises the need for designing psychological rehabilitation programs for patients who were admitted to ICU especially during and after epidemics or pandemics.

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Table (1): Baseline sociodemographic data of the studied patients.

Parameters	No (%)
Age	
Mean \pm SD	41.31 \pm 13.359
Min- Max.	16-76
Gender	
Male	157(47.9)
Female	171(52.1)
Address	
Rural	145(44.2)
Urban	183(55.8)
Marital status	
Single	52(15.9)
Married	250(76.2)
Divorced	7(2.1)
Widow	19(5.8)
Working status	
Working	247(75.3)
Not working	81(24.7)
Educational level	
Basic educational level	136(41.5)
Secondary	53(16.2)
University and postgraduate	139(42.4)
The educational level of father/husband/wife	
Basic educational level	160(48.8)
Secondary	91(27.7)
University and postgraduate	77(23.5)
Socioeconomic status	
Low	103(31.4)
Middle	206(62.8)
High	19(5.8)

Min: minimum. Max: maximum. SD: standard deviation. No: number



Table (2): Medical data of the studied patients

Parameters	No 328 (100.0%)
Problems with ADL before COVID-19	
Yes	33(10.1)
To some extent	223(68.0)
No	72(22.0)
Present (post-COVID) problems with ADL*	
Yes	72(22.0)
To some extent	144(43.9)
No	112(34.1)
Chronic diseases	
Yes	76(23.2)
No	252(76.8)
Hospital admission due to COVID-19	
Yes	61(18.6)
No	267(81.4)
History of previously hospitalized patients (no=61)	
Duration of hospital stay (in days)	
Mean \pm SD	9.229 \pm 3.716
Min- Max.	2-20
Need oxygen therapy	
Yes	51(83.6)
No	10(16.4)
Intensive care unit admission	
Yes	12(19.7)
No	49(80.3)

ADL: activities of daily living SD: standard deviation. No: number.

Min: minimum.

Max: maximum.



Table (3): Comparison of sociodemographic data as risk factors of post-traumatic stress between the studied groups of patients

Parameters	No PTSD		PTSD		Test of significance	P value
	No 300	91.5 %	No 28	8.5 %		
Age Mean \pm SD	41.3 \pm 13.439		41.428 \pm 12.7		t=0.051	0.960
Residence Rural Urban	130 170	43.3 56.7	15 13	53.6 46.4	1.088	0.297
Marital status Single Married Divorced Widow	44 234 6 16	14.7 78.0 2.0 5.3	8 16 1 3	28.6 57.1 3.6 10.7	6.161	0.104
Gender Male Female	144 156	48.0 52.0	13 15	46.4 53.6	0.025	0.874
Working status Working Not working	226 74	75.3 24.7	21 7	75.0 25.0	0.002	0.969
Educational level Basic educational level Secondary University and postgraduate	123 47 130	41.0 15.7 43.3	13 6 9	46.4 21.4 32.1	1.465	0.481
Socioeconomic status Low Middle High	92 190 18	30.7 63.3 6.0	11 16 1	39.3 57.1 3.6	1.023	0.600

PTSD: post-traumatic stress disorder.

t= t test.

No: number.

Table (4): Comparison of medical data as risk factors of post-traumatic stress disorders between the studied groups of patients

Parameters	No PTSD		PTSD		Test of significance (<i>P</i> value)	Unadjusted OR (LL – UL 95% C. I)
	No 300	91.5 %	No 28	8.5 %		
Present problems with ADL						
Yes	62	20.7	10	35.7	6.844	3.7(1.29-10.66)
To some extent	100	33.3	12	42.9	(0.033)	2.76(1.0-7.602)
No	138	46.0	6	21.4		
Chronic diseases						
Yes	67	22.3	9	32.1	1.384	
No	233	77.7	19	67.9	(0.239)	
Hospital admission due to COVID-19						
Yes	53	17.7	8	28.6	2.012	1.86
No	247	82.3	20	71.4	(0.156)	(0.78-4.46)
Length of hospital stay, days						
Mean ±SD	1.526±3.564		3.75±6.478		U= 2.893 (0.004)	---
Need oxygen therapy						
Yes	74	24.7	13	46.4	6.223	2.6
No	226	75.3	15	53.6	(0.013)	(1.20-5.819)
Intensive care unit admission						
Yes	8	2.7	4	14.3	9.764	6.06
No	291	97.3	24	85.7	(0.002)	(1.7-21.59)

PTSD: post-traumatic stress disorder.

U: Mann-Whitney test.

SD: standard deviation.

No: number.



Table (5): Logistic regression analysis for the risk factors of post-traumatic stress (PTSD) disorder in the studied patients

Parameter	Multivariable	
	p	Adjusted OR (LL – UL 95% C. I)
Present problems with ADL		
Yes	0.069	2.879(0.923-8.98)
To some extent	0.087	2.484(0.876-7.04)
Length of hospital stay, days	0.038	1.306(1.014-1.683)
ICU admission	0.039	5.291(1.085-25.803)

OR: Odd's ratio

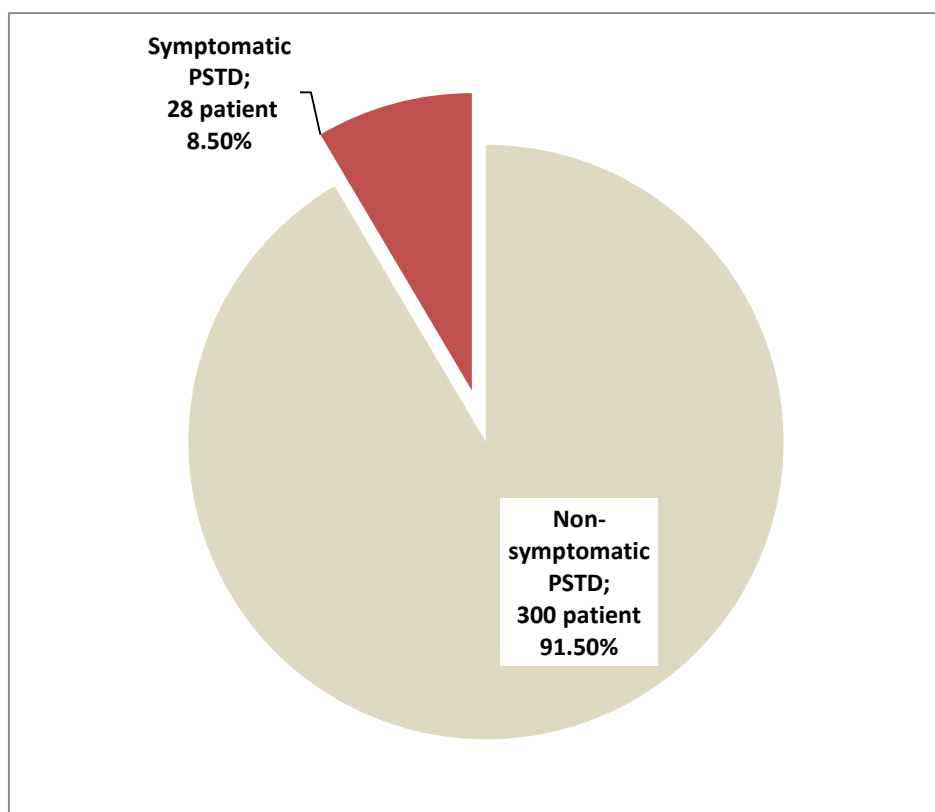
C.I: Confidence interval

LL: Lower limit

UL: Upper Limit

#: All variables with $p < 0.05$ were included in the multivariate

*: Statistically significant at $p \leq 0.05$



PTSD: post-traumatic stress disorder.

Figure (1): Prevalence of post-traumatic stress disorder among the studied group of patients

الملخص العربي

اضطراب ما بعد الصدمة بين مرضى ما بعد فيروس كورونا، محافظة المنوفية، مصر

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الخلفية: يُعد اضطراب ما بعد الصدمة من الاضطرابات النفسية الشائعة، وينتج عن تجارب توتيرية تتبع الأحداث المؤلمة مثل الحروب، والكوارث الطبيعية، وحوادث السير. يتميز هذا الاضطراب بمجموعة من الأعراض التي تشمل الأفكار المتطفلة، وزيادة اليقظة، وتجنب المحفزات المرتبطة بالصدمة، والخدر العاطفي، وفرط الإثارة الفسيولوجية. وقد تساهم الأوبئة في إحداث صدمات نفسية تؤدي إلى مشاكل مثل اضطراب ما بعد الصدمة. **الهدف:** هدفت هذه الدراسة إلى تقييم مدى انتشار اضطراب ما بعد الصدمة وعوامل التنبؤ به بين مرضى ما بعد الإصابة بفيروس كورونا المستجد. **الطريقة:** أجريت دراسة مقطعية شملت ٣٢٨ مشاركاً، حيث تم جمع بياناتهم حول الحالة الاجتماعية والديموغرافية، وشدة أعراض كوفيد وأعراض ما بعد كوفيد، وأعراض اضطراب ما بعد الصدمة. **النتائج:** بلغ معدل انتشار اضطراب ما بعد الصدمة ٨,٥%. وكشفت نتائج الانحدار متعدد المتغيرات أن المشاركين ذوي التاريخ المرضي المتضمن دخولهم للعناية المركزة، وذوي اضطرابات أنشطة الحياة اليومية، كانوا أكثر عرضة للإصابة باضطراب ما بعد الصدمة. **الاستنتاج:** يُظهر مرضى ما بعد فيروس كورونا ميلاً للإصابة باضطراب ما بعد الصدمة، خاصةً في حال دخولهم المستشفى أو العناية المركزة بسبب العدوى، أو إذا عانوا من اضطرابات في أنشطة الحياة اليومية.