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Psychiatric impact of the novel coronavirus disease 2019 on previously mentally healthy survivors

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Abstract

Background The prolonged psychiatric disorders rate following coronavirus disease 2019 (COVID-19) could surpass that of severe acute respiratory syndrome (SARS) as well as Middle East Respiratory Syndrome (MERS) as a result of variations in viral disease treatment as well as societal circumstances throughout the outbreaks. This work aimed to investigate the COVID-19 prolonged psychiatric effects on survivors without psychiatric diseases before infection.

Methods This cross-sectional research was conducted on 1254 patients of which 700 patients (55.8%) were positive for psychiatric complications based on the general health (GHQ-28) questionnaire and 554 patients (44.1%) were negative, aged above 18 years old who had been infected with COVID19 (PCR swab confirmed) and recovered since less than 6 months without previous history of any psychiatric disease.

Results Smoking, medical comorbidities, hospitalization, and cortisone in treatment were significantly higher in GHQ-28 positive than GHQ-28 negative ($p < 0.05$). Psychiatric disorders and Beck's Depression Inventory (BDI) grades showed a significant association between smoking and hospitalization and Taylor Manifest Anxiety scales and smoking, hospitalization, and treatment with cortisone). Smoking, medical comorbidities, hospitalization, and cortisone in treatment were the most significant predictors of positive GHQ-28. However, multivariate analysis demonstrated that medical comorbidities, hospitalization, and cortisone in treatment were the best independent predictors of GHQ-28 positive ($p = 7.055$, $p = 0.007$, $p = 0.043$, $p = 0.047$, respectively).

Conclusions COVID-19 cases without pre-existing psychological disorders exhibited a significant increase in psychiatric disorders occurrence 6 months following recovery. Anxiety disorders represented the predominant mental diagnoses documented.

Keywords Psychiatric Impact, COVID-19, Mentally healthy survivors, SCID-I, GHQ-28

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Introduction

Severe acute respiratory syndrome severe-acute-respiratory-syndrome-related coronavirus (SARSr-CoV) represents a highly contagious virus. Coronavirus disease 2019 (COVID-19) is a very fatal illness that has become a global epidemic in 2020 [1, 2].

Individuals developing preexisting psychiatric illnesses may be more vulnerable to COVID-19 because of challenges in maintaining proper hygiene along with social distancing, as well as difficulty in recognizing the risks linked to infection [3].

Since the COVID-19 epidemic onset, existing concerns addressed that survivors could exhibit a higher chance for psychological complications [4]. Information as regards COVID-19 has quickly evolved, with interim recommendations from various organizations being regularly updated as well as extended [1]. Nevertheless, there is little evidence of mental disease among COVID-19 cases [5].

Negative psychological effects involve a range of emotions like fury, anxiety, boredom, confusion, fear, sadness, emotional fatigue, annoyance, impatience, and stress. Additional negative consequences involved avoidance behaviors, social detachment, subclinical symptoms of alcohol use disorder and posttraumatic stress disorder (PTSD), excessive focus on distressing symptoms, stigma, and domestic violence, along suicidal thoughts and actions [6].

Critical illness along with subsequent hospitalizations within the intensive care unit (ICU) can subject cases to severe physiological as well as psychological stresses that could be fatal and traumatic, leading to chronic mental disorders. Individuals severely affected by COVID-19 may be prone to exhibiting psychological disorder [7].

Research on COVID-19 cases admitted to hospitals revealed that about 60% exhibited neuropsychiatric symptoms, involving anxiety, delirium, sadness, dizziness, dysgeusia, headache, insomnia, and myalgias [8]. The symptoms manifested either during the illness or in the weeks or months after recovery [9]. The COVID-19 psychiatric consequences seem to be common, lasting for at least 6 months and perhaps much longer [9]. The prolonged psychiatric disorders rate following COVID-19 could surpass that of SARS as well as Middle East Respiratory Syndrome (MERS) as a result of differences in viral disease treatment as well as societal circumstances throughout the outbreaks [10].

This work was aimed at investigating the COVID-19 prolonged psychiatric effects on survivors without psychiatric diseases before infection.

Patients and methods

Our cross-sectional research involved 1254 patients which 700 were GHQ-28 positive and 554 were GHQ-28 negative aged above 18 years old who had been

infected with COVID-19 (PCR swab confirmed) and recovered since less than 6 months without previous history of any psychiatric disease. It commenced following the Ethical Committee's Approval at Ain Shams University Hospital (approval code: FMASU MS 722/2021), Cairo, Egypt. Participants were allowed to sign an informed consent.

The exclusion criteria were patients who were less than 18 years old, history of psychiatric diseases before COVID-19 infection, had infection with COVID-19 within ≤ 6 months at the start of the study, and who were unable to consent.

All cases were subjected to history taking, the Arabic version of the General Health Questionnaire (GHQ-28), the Arabic version of Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), the Arabic version of the Taylor Manifest Anxiety Scale, the Arabic version of Beck Depression Inventory (BDI), and the Arabic version of Positive as well as Negative Syndrome Scale (PANSS).

The Arabic version of the GHQ-28

It is a condensed version of the 60-item questionnaire. This is a self-administered tool utilized for assessing existing psychological conditions among the general population. Questions are categorized into four subscales: somatic problems, anxiety/insomnia, social dysfunction, and severe depression [11]. This research utilized the Arabic version via the sample scorer approach, namely (0–0–1–1) [12]. The GHQ cut-off point reached seven based on comparable prior national studies to reduce the potential errors linked to the initial low threshold score [13]. Those who got a high GHQ-28 score were involved in subsequent tools, whereas those who did not were excluded.

The Arabic version of SCID-I

It represents a structured interview performed by clinicians for psychological cases. It offers extensive coverage for psychological axis I diagnosis based on DSM IV criteria. It exhibits nine diagnostic modules: mood episode, psychotic signs, psychotic condition differential, mood disorder differential, drug use, anxiety, somatoform condition, eating conditions, and adjustment disorder. The standardized interview is often utilized for confirming diagnoses within clinical trials, which is widely employed within psychiatric research. It was created to be more effective as well as user-friendly as opposed to other current tools, resulting in reduced training along with administration time [14]. The Arabic translation has shown adequate validity as well as reliability [15]. Participants proceeded to one or more of the following scales/inventories based on their findings.

The Arabic version of the Taylor Manifest Anxiety Scale

It serves as a broad measure of anxiety as a characteristic of one’s personality. This is not meant to be a precise indicator of anxiety as a clinical condition. The instrument is based on the Minnesota Multiphase Personality Inventory, which is available in two versions: a long version with 50 items as well as a short version with 28 items. This research utilized an Arabic translation of the long version of the scale. Each item required an answer of either true or false. Scores were assigned on a scale falling between 0 and 50. The interpretation was as follows: 0–16: normal, 17–24: mild, 25–35: moderate, and 36–50: severe [16]. The Arabic version exhibited adequate validity as well as reliability [17].

The Arabic version of the BDI

The assessment consists of 21 items that assess the severity or intensity of self-reported depression experienced within the last 2 weeks. The items are rated on a scale falling between 0 (symptoms absence) and 3 (strong presence of symptom). The BDI total scores falling between 0 and 13 exhibit normal to little depression, scores falling between 14 and 19 exhibit mild depression, scores falling between 20 and 28 exhibit moderate depression, and scores falling between 29 and 63 exhibit severe depression [18]. The Arabic version exhibits adequate validity as well as reliability [19].

The Arabic version of the PANSS

It was created and standardized for the typological as well as dimensional evaluation of schizophrenia. PANSS has 30 elements evaluated on a 7-point scale, representing a precise and operationalized approach, assessing positive, negative, and other symptom dimensions utilizing a formal semi-structured clinical interview and information from caregivers as well as nursing personnel. The positive scale assesses seven symptoms that are additional to a normal mental state, whereas the negative scale evaluates characteristics that are lacking in it. A bipolar composite scale determines the preponderance of one symptom over another according to the difference between these scales. The general psychopathology scale, as the fourth index, measures schizophrenia disease’s overall severity by adding together the remaining 16 items [20]. The Arabic scale version was employed [21].

Statistical analysis

Data underwent a statistical analysis utilizing SPSS v26 (IBM Inc., Chicago, IL, USA). Quantitative variables were displayed as mean as well as SD, and a comparison among three groups was carried out utilizing the ANOVA (F) test with post hoc test (Tukey). Qualitative variables were displayed as frequency as well as

percentage (%) and then underwent analysis with the chi-square test. Univariate regression was utilized for measuring the association among a dependent variable as well as one independent variable. Additionally, multivariate regression was employed for estimating the association among a dependent variable as well as more independent variables. A two-tailed *p*-value of below 0.05 was deemed to show statistical significance.

Results

Patients’ characteristics are demonstrated in this table. Medical comorbidities were present in 292 (23.3%) patients. The history of cortisone in treatment was in 154 (12.3%) patients. Seven-hundred (55.8%) patients had an incidence of GHQ-28 positive, and 554 (44.2%) patients were GHQ-28 negative among patients’ group (Table 1).

There were 291 (41.6%) patients suffered from anxiety, 262 (37.4%) patients suffered from mood disorder, while 58 (8.3%) patients showed substance abuse, 17 (2.4%) patients presented with eating disorder, and 29 (4.1%) patients presented with adjustment disorder. Five (1.7%) patients had mild anxiety, 208 (71.5%) patients

Table 1 Association between GHQ-28 “positive and negative” with demographic data and risk factors and incidence of GHQ-28 “positive

		N = 1254	
Age (years)		40.54 ± 12.80	
Sex	Male	664 (53.0%)	
	Female	590 (47.0%)	
Residence	Rural	554 (44.2%)	
	Urban	700 (55.8%)	
Marital status	Married	989 (78.9%)	
	Single	219 (17.5%)	
	Divorced	25 (2.0%)	
	Widow	21 (1.7%)	
Education	Illiterate	101 (8.1%)	
	Basic education	341 (27.2%)	
	Secondary education	453 (36.1%)	
	Higher education	359 (28.6%)	
	Occupation	Not working	310 (24.7%)
		Worker	431 (34.4%)
Skilled		378 (30.1%)	
Employee		135 (10.8%)	
Smokers		354 (28.2%)	
Medical comorbidities		292 (23.3%)	
Hospitalization		245 (19.5%)	
Cortisone in treatment		154 (12.3%)	
GHQ-28 positive		700 (55.8%)	

Data are presented as mean ± SD or frequency (%)

GHQ General Health Questionnaire

had moderate anxiety, and 78 (26.8%) patients had severe anxiety. Four (1.5%) patients had minimal depression, 18 (6.9%) patients had mild depression, 204 (77.9%) patients had moderate depression, and 36 (13.7%) patients had severe depression. Seventeen (29.3%) patients had hash abuse, 9 (15.5%) patients had heroin abuse, 28 (48.3%) patients had strox powder abuse, and 4 (6.9%) patients had tramadol abuse. Of these substance abusers, 26 (44.8%) patients were dependent, and 32 (55.2%) patients were tolerant. As regards frequency, 13 (22.5%) patients abused substances daily, 38 (65.5%) patients abused substances weekly, and 7 (12%) patients abused substances monthly. Twenty-four (55.8%) patients of the somatic disorder patients had somatic symptoms, and 19 (44.2%) patients had illness anxiety (Table 2).

Smoking, medical comorbidities, hospitalization, and cortisone in treatment were significantly higher in GHQ-28 positive than GHQ-28 negative ($p < 0.05$), whereas the remaining parameters exhibit insignificance ($p > 0.05$) (Table 3).

Psychiatric disorders and BDI grades showed a significant association between smoking and hospitalization and Taylor Manifest Anxiety scales and smoking, hospitalization, and treatment with cortisone) (Table 4).

Depression and anxiety were insignificantly associated with other studied parameters (smoking, medical comorbidities, hospitalization, hospitalization time, COVID duration, and treatment with cortisone) (Table 5).

Univariate analysis addressed the predominant GHQ-28-positive predictors involved smoking, medical comorbidities, hospitalization, and cortisone in treatment. However, multivariate analysis demonstrated that medical comorbidities, hospitalization, and cortisone in treatment were the best independent predictors of GHQ-28 positive with [or (c.i.95%), p -value] [7.055 (2.624–13.620), $p = 0.007$; 2.236 (1.672–2.991), $p = 0.043$; 1.459 (1.351–1.575), $p = 0.047$], respectively (Table 6).

Discussion

The COVID-19 pandemic has been identified as a significant danger to mental health since prior research has shown a deep and extensive spectrum of psychosocial effects on people, groups, and nations during earlier infectious disease epidemics [22].

The individuals impacted by COVID-19 are facing increased risk because of the continued possibility of negative consequences. During times of travel restrictions as well as event cancellations, individuals in quarantine could exhibit emotions, involving anger, loneliness, boredom, and anxiety. Physical symptoms like cough,

Table 2 SCID-I distributions, somatic disorders, and substance use among the GHQ-28 positive group and Taylor Manifest Anxiety Scale and BDI distributions among the GHQ-28 positive group according SCID-I

		N = 700
SCID-I	Depression	262 (37.4%)
	Substance	58 (8.3%)
	Anxiety	291 (41.6%)
	Somatic	43 (6.1%)
	Eating disorder	17 (2.4%)
	Adjustment disorder	29 (4.1%)
	Somatic symptoms and other related disorder disorders	43 (6.1%)
Somatic symptoms disorder	24 (55.8%)	
Illness anxiety disorder	19 (44.2%)	
		N = 291
Taylor Manifest Anxiety	Normal	0 (0.0%)
	Mild	5 (1.7%)
	Moderate	208 (71.5%)
	Severe	78 (26.8%)
		N = 262
BDI	Normal	0 (0.0%)
	Minimal	4 (1.5%)
	Mild	18 (6.9%)
	Moderate	204 (77.9%)
	Severe	36 (13.7%)
		N = 58
Substance	Hash	58 (8.3%)
	Heroin	17 (29.3%)
	Strox powder	9 (15.5%)
	tramadol	28 (48.3%)
		4 (6.9%)
Use	Dependence	26 (44.8%)
	Tolerance	32 (55.2%)
Frequency	Daily	13 (22.5%)
	Weekly	38 (65.5%)
	Monthly	7 (12%)

Data are presented as frequency (%)

GHQ General Health Questionnaire, SCID severe combined immunodeficiency, BDI Beck Depression Inventory

fever, myalgia, and fatigue can also lead to emotional distress along with contracting COVID-19 fear [23].

In the current study, univariate analysis addressed, the predominant GHQ28-positive predictors involved smoking, medical comorbidities, hospitalization, and cortisone in treatment. However, multivariate analysis demonstrated that medical comorbidities, hospitalization, and cortisone in treatment were the best independent predictors of GHQ-28 positive. Nakamura

Table 3 Association between GHQ-28 “positive and negative” with demographic data and risk factors

		GHQ-28 positive (n = 700)	GHQ-28 negative (n = 554)	P
Age (years)		40.57 ± 12.7	40.50 ± 12.9	0.923
Sex	Male	367 (52.40%)	297 (53.60%)	0.719
	Female	333 (47.60%)	257 (46.40%)	
Residence	Rural	30 (4.30%)	249 (44.90%)	0.667
	Urban	395 (56.40%)	305 (55.10%)	
Marital status	Married	562 (80.30%)	427 (77.10%)	0.298
	Single	116 (16.60%)	103 (18.60%)	
	Divorced	10 (1.40%)	15 (2.70%)	
	Widow	12 (1.70%)	9 (1.60%)	
Education	Illiterate	58 (8.30%)	43 (7.80%)	0.938
	Basic education	190 (27.10%)	151 (27.30%)	
	Secondary education	256 (36.60%)	197 (35.50%)	
	Higher education	196 (28%)	163 (29.40%)	
Occupation	Not working	174 (24.90%)	136 (24.50%)	0.567
	Worker	247 (35.30%)	184 (33.20%)	
	Skilled	211 (30.10%)	167 (30.20%)	
	Employee	68 (9.70%)	67 (12.10%)	
Smoking		216 (30.90%)	138 (24.9%)	0.024*
Medical comorbidities		98 (14%)	194 (35.0%)	< 0.001*
Hospitalization		106 (15.10%)	139 (25.1%)	< 0.001*
Cortisone in treatment		104 (14.90%)	50 (9.0%)	< 0.001*

Data are presented as mean ± SD or frequency (%)

* Significant as P-value < 0.05. GHQ General Health Questionnaire

et al. [24] reported that more than 30% of COVID-19 hospitalized cases could exhibit lasting cognitive impairment and sadness, along anxiety following their discharge.

Our study’s clinical findings showed that 41.6% of the patients suffered from anxiety, 37.4% of the patients suffered from mood disorder, 8.3% showed substance abuse, 2.4% presented with eating disorder, and 4.1% presented with adjustment disorder. A total of 1.7% exhibited mild anxiety, 71.5% exhibited a moderate degree of anxiety, and 26.8% developed severe anxiety. A total of 1.5% of cases developed minimal depression, 6.9% exhibited mild depression, 77.9% had moderate depression, and 13.7% had severe depression. Also, Tian et al. [25] addressed the depression as well as anxiety prevalence was 45.6% and 20.7%, respectively. Lai et al. [26] also addressed a depression rate of 50.4%, while anxiety reached 44.6%, and insomnia exhibited 34.0%. Our findings disagree with Chew et al. [27] observing anxiety among 142 (15.7%), 96 cases (10.6%) exhibited depression, while 47 cases (5.2%) developed stress.

The current research addressed a statistically significant association among psychiatric disorders, smoking,

and hospitalization, and no statistically significant correlation was documented among psychiatric disorders with comorbidities, treatment with cortisone, and COVID-19 duration. In agreement with the current study results, both Bo H-X et al. [28], van den Borst et al. [29], Huang et al. [30], and Veazie et al. [31] reported the emergence of psychiatric symptoms after hospitalization for COVID-19 highlighting several disorders occurrence including post-traumatic stress symptoms, anxiety, and depression. However, De Lorenzo et al. [32] addressed hospitalization as a protective measure of PTSD, but this study’s inclusion criteria were different as they included only the hospitalized patients. Also, our result supported by Iqbal et al. [33] revealed no correlation between disease recovery time as well as psychological symptoms. Our findings showed a significant association among Taylor Manifest Anxiety scales with smoking, hospitalization, and treatment with cortisone. Also, there was a significant association between BDI grades with smoking and hospitalization. No significant correlation was documented among depression as well as smoking, medical comorbidities, hospitalization time, COVID-19 duration,

Table 4 Comparison between SCID-I, Taylor Manifest Anxiety Scale, and BDI and descriptive data of GHQ-28-positive group

	Mood (n = 262)	Substance (n = 58)	Anxiety (n = 291)	Somatic (n = 43)	ED (n = 17)	AD (n = 29)	P
Smoking	83 (31.7%)	24 (42.1%)	92 (31.6%)	6 (14%)	1 (5.9%)	10 (34.5%)	0.013
Comorbidities	33 (12.6%)	9 (15.5%)	50 (17.2%)	0	(17.6%)	3 (10.3%)	0.62
Hospitalized	47 (17.9%)	15 (25.9%)	39 (14.3%)	3 (7%)	1 (5.9%)	1 (3.4%)	0.016
Treated with cortisone	51 (19.5%)	6 (10.3%)	36 (12.4%)	6 (14%)	3 (17.6%)	2 (6.9%)	0.139
Hospitalization time (days)	6.47 ± 3.3	6.4 ± 2.92	6.32 ± 2.7	5.33 ± 0.577	5	8	0.967
Covid duration	12.78 ± 4.83	12.22 ± 5.48	12.92 ± 5.18	12.1 ± 4.1	14.94 ± 6.8	12.83 ± 5.43	0.431
Taylor Manifest Anxiety Scale							
	Normal (n = 153)	Minimal (n = 0)	Mild (n = 152)	Moderate (n = 313)	Severe (n = 82)		P
Smoking	64 (41.8%)	–	38 (25%)	80 (25.6%)	34 (41.5%)	–	0.001*
Comorbidities	26 (17%)	–	15 (9.9%)	41 (13.1%)	16 (19.5%)	–	0.134
Hospitalized	48 (31.4%)	–	13 (8.6%)	31 (9.9%)	14 (17.1%)	–	0.001*
Treated with cortisone	33 (21.6%)	–	24 (15.8%)	39 (12.5%)	8 (9.8%)	–	0.034
Hospitalization time (days)	6.41 ± 3.14	–	6.57 ± 2.98	6.76 ± 2.98	5.14 ± 0.79	–	0.382
Covid duration	12.88 ± 4.94	–	12.43 ± 4.65	13.16 ± 5.49	11.99 ± 4.32	–	0.212
BDI							
	n = 18	n = 234	n = 176	n = 233	n = 39	–	
Smoking	12 (66.7%)	50 (21.5%)	62 (35.2%)	72 (30.9%)	20 (51.3%)	–	0.001*
Comorbidities	5 (27.8%)	31 (13.2%)	18 (10.2%)	41 (17.6%)	3 (7.7%)	–	0.066
Hospitalized	4 (22.2%)	23 (9.8%)	24 (13.6%)	41 (17.6%)	14 (35.9%)	–	0.001*
Treated with cortisone	1 (5.6%)	30 (12.8%)	22 (12.5%)	46 (19.7%)	5 (12.8%)	–	0.121
Hospitalization time (days)	6 ± 2.58	6.56 ± 2.29	6.83 ± 2.97	5.93 ± 2.65	6.71 ± 4.65	–	0.757
Covid duration	9.5 ± 2.48	13.15 ± 5.31	12.59 ± 4.88	12.81 ± 5.01	13.13 ± 5.35	–	0.055

Data are presented as mean ± SD or frequency (%)

SCID severe combined immunodeficiency, GHQ General Health Questionnaire, BDI Beck Depression Inventory, ED emergency department, AD adjustment disorder

* Significant as P-value < 0.05

and treatment with cortisone. Our result supported by Shoar et al. [34] reported that depression as well as anxiety are linked to prolonged hospitalization. Chew et al. [27] reported that occurrence of comorbidities, the psychological outcomes depression (OR 2.79, 95% CI 1.54–5.07, p = 0.001), anxiety (OR 2.18, 95% CI 1.36–3.48, p = 0.001), stress (OR 3.06, 95% CI 1.27–7.41, p = 0.13), whereas PTSD (OR 2.20, 95% CI 1.12–4.35, p = 0.023) exhibited a significant correlation with physical symptoms within the previous month.

Linear regression addressed a correlation between physical symptoms and greater mean scores as regards IES-R, DASS-21 anxiety, and stress, along depression subscales. Also, Du et al. [35] reported that risk factors involved higher stress, worse sleep quality, and a lack of perceived psychological preparedness. Moreover, Parchani et al. [36] reported that anxiety exhibited greater values among quarantined individuals; the isolated along with home quarantine individuals showed greater stress levels.

A statistically significant variation was documented among the experimental group’s mean pretest as well

Table 5 Logistic regression to identify factors associated with depression and anxiety

	OR	SE	Wald	P	95% CI
Depression					
Smoking	0.810	0.397	0.283	0.595	0.372–1.763
Medical comorbidities	0.846	0.427	0.154	0.695	0.366–1.952
Hospitalized	0.660	1.013	0.169	0.681	.091–4.805
Hospitalization time	0.968	.069	0.222	0.638	0.845–1.109
Covid duration	0.972	.039	0.527	0.468	0.901–1.049
Treated with cortisone	1.427	0.442	0.645	0.422	0.599–3.396
Anxiety					
Smoking	1.05	0.414	.014	0.906	0.466–2.364
Medical comorbidities	2.328	0.434	3.790	.052	0.994–5.453
Hospitalized	0.458	1.029	0.575	0.448	.061–3.443
Hospitalization time	0.990	.073	.018	0.895	0.858–1.143
Covid duration	1.029	.041	0.513	0.474	0.951–1.115
Treated with cortisone	1.457	0.456	0.682	0.409	0.596–3.564

CI confident interval

Table 6 Univariate and multivariate regression analysis to risk factors as predictors of positive GHQ-28 among the study group

	Univariate analysis				Multivariate analysis			
	OR	Lower	Upper	P	OR	Lower	Upper	P
Age (years)	2.216	1.984	2.472	0.373				
Sex (female)	2.413	1.870	3.110	0.231				
Residence (urban)	1.857	1.768	1.949	0.386				
Marital status								
Single (reference)	1.00							
Married	2.504	1.555	3.570	0.305				
Divorced	0.675	0.272	1.675	0.396				
Widow	1.929	0.678	3.945	0.567				
Education								
Illiterate (reference)	1.00	–	–	–				
Basic education	1.901	1.759	2.052	0.231				
Secondary education	0.906	0.179	2.086	0.149				
Higher education	3.609	2.115	6.154	0.709				
Occupation								
Not working (reference)	1.00	–	–	–				
Worker	1.281	0.819	6.443	0.120				
Skilled	2.764	2.067	3.697	0.374				
Employee	2.327	2.083	2.596	0.392				
Smoking	2.987	1.750	4.561	0.005*				
Medical comorbidities	6.773	2.519	11.713	0.013*	7.055	2.624	13.620	0.007*
Hospitalization	2.147	1.605	2.572	0.021*	2.236	1.672	2.991	0.043*
Cortisone in treatment	1.401	1.297	2.215	0.026*	1.459	1.351	1.575	0.047*

* Significant *p*-value < 0.05

as posttest SAS scores. No significant differences were documented as regards the mean pretest as well as posttest SAS scores among controls.

Limitations of this study included a small sample size, so further research is recommended done with a larger sample size.

Conclusions

COVID-19 cases without pre-existing psychological disorders exhibited a significant increase in psychiatric disorders occurrence 6 months following recovery. Anxiety disorders represented the predominant mental diagnoses documented.

Abbreviations

COVID-19	Coronavirus disease 2019
SARS	Severe acute respiratory syndrome
MERS	Middle East Respiratory Syndrome
GHQ-28	General health questionnaire
BDI	Beck's Depression Inventory
PTSD	Posttraumatic stress disorder
ICU	Intensive care unit
PANSS	Positive as well as Negative Syndrome Scale
SCID-I	Structured Clinical Interview for DSM-IV Axis I Disorders

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Authors' contributions

SAM conceptualized the project, reviewed the literature, collected the data, analyzed the data, and wrote the manuscript. RMN conceptualized the project, reviewed the literature, collected the data, and analyzed the data. GRA, DE, and HAHN conceptualized the project and reviewed the literature. All authors read and approved the final manuscript.

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Availability of data and materials

The data used to support the findings of this study are available from the corresponding author upon request.

Declarations

Ethics approval and consent to participate

The study was approved by the local Institutional Ethical Committee Faculty of Medicine, Ain Shams University, Cairo, Egypt (approval code: FMASU MS 722/2021). No data were collected before detailed information was given to the patient, and a written consent was obtained.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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