Psychological Impact and Risk of Suicide in Hospitalized COVID-19 Patients, During the Initial Stage of the Pandemic: A Cross-Sectional Study

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Objectives: This study aimed to assess the psychological impact and risk of suicide in patients hospitalized for COVID-19.

Methods: A cross-sectional study was conducted on a representative sample of patients hospitalized for COVID-19 at the "San Cecilio" University Hospital (Granada, Spain) between March and May 2020. Sociodemographic and clinical variables were collected. All participants were evaluated using the Gijon's Social-Familial Evaluation Scale to assess social problems, the Impact of Event Scale-6 and the Hospital Anxiety-Depression Scale to assess psychological impact, the Columbia Suicide Severity and Beck Hopelessness scales to assess risk of suicide, and the List of Threatening Experiences questionnaire to control for confounding bias.

Results: Thirty-six COVID-19 patients were evaluated. Of them, 33.3% had a significant psychological impact; 13.9% showed symptoms of anxiety; 13.9% showed symptoms of depression, and 47.2% showed symptoms of anxiety-depression. Moderate and severe risk of suicide were found in 75% and 2.8% of the patients, respectively. Suicidal ideation was observed in 16.7% and suicide behaviors in 5.6% of the patients. Psychological impact was associated with previous psychological treatment, a greater degree of functional dependency, and increased social-familial risk. In addition, the risk of suicide was mainly associated with active treatment of a psychiatric illness and active smoking. No significant correlation was found between psychological impact and risk of suicide.

Conclusions: Psychological impact and risk of suicide were significant in patients admitted for COVID-19. Although the risk of suicide was not associated with increased psychological impact, both should be assessed, especially in patients at higher risk based on significantly associated factors.

Key Words: psychological impact, suicide, stress, COVID-19

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On March 11, 2020, the World Health Organization declared the COVID-19 infection a pandemic.[1] By then, a total of 118,319 cases had been reported in 113 countries since the initial detection of 27 cases in the Chinese city of Wuhan on December 31, 2019,[2] despite track studies are still ongoing and "patient zero" yet to be determined. In Spain, the figures reached 1639 confirmed cases and 36 deaths. Since then, it has become one of the most affected countries; between January 31 and May 31, 2020, 247,542 confirmed cases and 29,618 deaths have been reported, with a peak incidence of 9222 confirmed cases on April 1 and 950 deaths on April 3.[3]

Like previous outbreaks of coronavirus[4] and other epidemics or pandemics,[5,6] the COVID-19 pandemic is proving to be a major stressor in the general population, with significant emotional impact and linked risk factors that could increase suicide risk. The main reasons for such psychological distress and suicide risk include the perceived severity of the disease, which lacks effective vaccines or treatments (in that moment), the containment and quarantine measures adopted to prevent its spread,[7] and increased alcohol consumption,[8,9] all of which could be amplified by media if nonreliable information is communicated in a sensationalist way.[10,11]

As a result, feelings of loneliness, hopelessness, grief, stigma, guilt, or fear can be developed, especially in subjects vulnerable because of predisposing factors such as history of psychiatric illness[12] or social and occupational risk. Recent studies conducted in Spanish general population analyzed the perception of threat during confinement,[13] the psychological impact,[14] and mental health consequences[15] during the early stages of the COVID-19 pandemic.[14] According to these studies, women with children in their care and with low educational level,[13] young women, and those who lost their job during the health crisis[14] are particularly vulnerable. In these groups, the stress associated with the COVID-19 pandemic can induce psychological changes and increase the likelihood of triggering mental disorders such as schizophrenia, reactive psychosis,[16] depression, anxiety, or post-traumatic stress disorder,[17] as well as the risk of suicide, both in the short and long terms.[18,19]

In patients admitted to the hospital for COVID-19 infection, the perceived severity of the disease becomes a real threat. Confinement measures involve extreme isolation of patients due to a number of reasons, including the use of personal protective equipment, minimization of physical contact with healthcare staff, and prohibition of visits by family members. In addition, treatments for COVID-19 have potential neuropsychiatric adverse effects.[20,21] Particularly, the use of hydroxychloroquine was associated with an increased risk of reporting psychiatric disorders, ranging from sleep disorders, anxiety, and depression, to mania and psychotic disorders, which might be complicated by suicidal attempts and death by suicide; in fact, completed suicide was reported to be the main cause of death among all adverse drug reactions with hydroxychloroquine,[22] especially in women and elderly.[23] Furthermore,

discharge from hospital can lead to feelings of grief or stress resulting from fear of recurrence of the disease or infecting others, and stigma.[24] Therefore, hospital admission can be a precipitating stressor that triggers suicidal ideation in patients who are vulnerable because of predisposing factors (in an environment with access to harmful means).[25,26]

The incidence of suicide in the general (i.e., nonpsychiatric) hospital population is 4 to 5 times higher than in the general population, with an estimated prevalence of 1.8 cases per 100,000 admissions.[27] The main factors associated with suicide are chronicity, severity of symptoms, personality of the patient, and psychiatric comorbidity.[27] In the United States, suicide is the 10th most frequent cause of death in hospitalized patients[28]; thus, suicide prevention is a strategic goal in quality care systems.[29] However, little research on the risk of suicide in patients admitted for COVID-19 has been conducted.

The aim of this study was to conduct a cross-sectional analysis of the emotional impact and risk of suicide in a sample of patients admitted to our hospital for COVID-19 infection. The secondary objective was to determine which sociodemographic and clinical factors were associated with greater psychological impact and a higher risk of suicide.

METHODS

Study Design and Flow Diagram of Participants

A cross-sectional study was conducted on a representative sample of patients hospitalized for COVID-19 at the Hospital Clínico San Cecilio of Granada (Granada, Spain) between March and May, 2020. Participants were consecutively included in the study after obtaining appropriate informed consent. Each patient was assessed by completing an electronic questionnaire (Google Forms). The study was approved by the Research Ethics Committee of Hospital Clínico San Cecilio of Granada.

Sample Size

Our target population comprised 524 patients. The sample size, calculated with the StatGraphics Centurion software (version XVII), resulted in 36 patients, corresponding to a 95% confidence level in the estimation of event occurrence and an absolute error of 0.713. The estimated event occurrence in the sample (a priori unknown) was set at 50%, that is, the most unfavorable value that, accordingly, justified the sample size with the established parameters for the estimation of any event. Data were facilitated by the Clinical Documentation Unit of our institution.

Inclusion Criteria

A. Patients admitted to the Hospital Clínico San Cecilio of Granada for COVID-19 infection (diagnosed by Polymerase Chain Reaction) between March and May, 2020.

B. Age equal to or greater than 18 years.

C. Voluntary participation and providing informed consent for the study.

Exclusion Criteria

A. Moderate-severe cognitive impairment.

B. Inability to complete the evaluation form.

Variables and Instruments

Sociodemographic Data

Information was obtained regarding sex, age, family and personal history of psychiatric illness, and social-familial risk, measured by the Gijon's Social-Familial Evaluation Scale (GSFES).[30] The GSFES allows the detection of situations of social problems or high social risk. It can specifically measure social functioning and be implemented in the practice of professionals working in social or health care. It is an interviewer-administered scale for evaluating social and familial risk. The scale consists of 5 items or variables (family, economy, residence, social contacts, and social support) with 5 categories for each of them, resulting in a gradient that ranges from the ideal social situation (i.e., absence of social problems) to the evidence of social problems or needs. The cutoff for social risk detection is 16 points.[30]

Clinical Data

Information on smoking, alcohol use, and level of physical function based on the Barthel Index was obtained.[31]

The severity of COVID-19 was categorized according to 4 criteria: (*a*) pattern of pneumonia in the computed tomography (CT) scan, that is, mild, moderate, moderate-severe, and severe; (*b*) presence of cytokine release syndrome (CRS) produced by COVID-19[32]; (*c*) corticosteroid treatment; and (*d*) admission to the intensive care unit (ICU).

The Psychological Impact Was Assessed by the Impact of Event Scale-6 and the Hospital Anxiety and Depression Scale

The Impact of Event Scale-6

The Impact of Event Scale-6 (IES-6)[33] is an abbreviated version designed for fast identification and quantification of the psychological impact resulting from a stressful event. Compared with the 22-item version,[34] this instrument has been simplified into a 6-question scale assessing cognitive and affective symptoms that usually occur as posttraumatic stress reactions. The score for each item ranges from 0 (the symptom is not present) to 4 (the symptom is extremely present) points. The cutoff was set at 8 points, which showed a good level of sensitivity (0.92) and specificity (0.84).

The Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS)[35] has been the most widely used self-rating instrument to assess symptoms of anxiety and depression in hospitalized patients in Spain.[36] It consists of 14 items distributed in 2 subscales, one for anxiety (7 items) and another one for depression (7 items). Each item score ranges from 0 (symptom not present) to 3 (symptom markedly present). A score greater than 10 on the HADS total score and each of the HADS subscales indicates a likely case.

The Risk of Suicide Was Assessed by the Beck Hopelessness Scale and the Columbia-Suicide Severity Rating Scale

Beck Hopelessness Scale

The Beck Hopelessness Scale (BHS)[37] is one of the few instruments for assessing the risk of suicide that has been validated in Spanish.[38] It consists of 20 "true or false" questions related to negative expectations regarding the immediate and long-term future. Items indicating hopelessness are scored as 1 point, and the rest are scored as 0 points; thus, the overall score ranges from 0 to 20 points. Accordingly, 4 ranges of hopelessness intensity can be established: minimal or normal (0–3 points), mild (4–8 points), moderate (9–14 points), and severe (15–20 points). Although the main purpose of the scale is to provide a measurement of hopelessness, studies have shown that this instrument is a good predictor of risk of suicide and completed suicide.[39]

The Columbia-Suicide Severity Rating Scale

To assess the risk of suicide, an exploratory version of the Columbia-Suicide Severity Rating Scale (C-SSRS),[40] which has been translated and validated in Spanish, was used.[41] This instrument includes 6 questions on ideation and behaviors related to suicide. The first question asks if the respondent had wished to be dead during hospital stay. The second question, which is more direct, asks if the respondent had wished to commit suicide during hospitalization. If the answer to the second question is affirmative, the respondent must answer the last 4 questions of the C-SSR; otherwise, they move directly to the last question. The questionnaire uses clear and direct language, which has proven to be the most effective method for obtaining honest answers and therefore identifying and preventing suicidal ideation and behaviors.[41]

The Brugha's List of Threatening Experiences Questionnaire Was Introduced to Control Confounding Bias

The Brugha's List of Threatening Experiences (BLTE)[42] is an instrument designed and validated to evaluate stressful life experiences that can be considered as risk factors for the development of psychological disorders such as depression or suicide.[43] The questionnaire contains a section with a list of 12 stressful experiences with "yes or no" answer options, depending on whether or not the subject has experienced them. It also contains a section with questions about personal and family history of psychiatric illness.

Statistical Analysis

First, a descriptive analysis of the sample and a frequency analysis of the psychological impact and risk of suicide were carried out. Then, correlation analyses between the scales measuring the psychological impact and risk of suicide were performed using the Pearson correlation coefficient. In addition, the association between the psychological impact and risk of suicide with sociodemographic and clinical factors was analyzed using the Pearson χ^2 test of independence. In those factors for which the test was significant (taking the standard significance reference value of 5%), analysis of variance (ANOVA) tests were subsequently performed. Finally, a binary logistic regression model was constructed according to the following formula:

$$p = e^{b_0 + b_1 x_1 + b_2 x_2 + ...} / 1 + e^{b_0 + b_1 x_1 + b_2 x_2 + ...}$$

where p is the probability of obtaining a value of 1 in the different scales, indicating psychological impact, anxiety, depression, risk of suicide, suicidal ideation, and suicide attempt, respectively; b_0 is the constant coefficient of the model; and the rest of the b_i coefficients are the different values that multiply the value of each variable in the model. All data were collected and analyzed using SPSS (Statistical Package for the Social Sciences) v. 23.0.

RESULTS

Descriptive Analysis of the Sample

Thirty-six patients were included (Table 1), with a mean age of 69.8 years and an SD of 14.3 years (range, 38–92 years). Seventeen patients (47.2%) were women. Twenty-nine patients (88.5%) had no family history of psychiatric illness, 25 (69.4%) had not previously received treatment for psychiatric illness, 32 (88.9%) were not currently receiving treatment for psychiatric illness, and 33 (91.7%) had never made a suicide attempt. The social-familial evaluation (GSFES) showed an average (SD) score of 9.4 (3.28) points, with 35 patients (97%) not being at significant social-familial risk.

TABLE 1. Demographic and Clinical Characteristics of the Sample

Variable	Results
Age, y	
Mean (SD)	69.8 (14.31)
Sex, n (%)	
Male	19 (52.78)
Female	17 (47.22)
Family history of psychiatric illness, n (%)	
No	29 (88.55)
Yes	7 (19.44)
Personal history of psychiatric illness, n (%)	
Previous treatment for psychiatric illness	
No	25 (69.44)
Yes	11 (30.56)
Current treatment for psychiatric illness	
No	32 (88.89)
Yes	4 (11.11)
Previous attempt of suicide	
No	33 (91.67)
Yes	3 (8.33)
GSFES	
Total score, mean (SD)	9.41 (3.28)
<16 points, n (%)	35 (97.22)
≥16 points, n (%)	1 (2.78)
History of smoking, n (%)	
Never smoked	25 (69.44)
Ex-smoker >5 y	7 (19.44)
Ex-smoker <5 y	2 (5.56)
Active smoker	2 (5.56)
History of alcohol use, n (%)	
Never or moderate user	30 (83.33)
Ex-alcohol user <5 y	2 (5.56)
Ex-alcohol user >5 y	3 (8.33)
Active alcohol user	1 (2.78)
Barthel Index for activities of daily living, n (%)	
Score >90	29 (80.56)
Score 60–90	7 (19.44)
Score <60	0
Duration of symptoms before admission, d	
Mean (SD)	6.22 (3.88)
Interquartile range	3.25
CRS, n (%)	
Yes	24 (66.67)
No	12 (33.33)
CT severity index, n (%)	
Not performed	18 (50)
Not compatible	2 (11.11)
Mild	1 (5.56)
Moderate	3 (16.67)
Moderate-severe	7 (38.89)
Severe	5 (27.78)
Corticosteroids, n (%)	
Yes	26 (72.22)
No	10 (27.78)

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TABLE 1. *(Continued)*

Variable	Results
ICU admission, n (%)	
Yes	10 (27.78)
No	26 (72.22)

n, number; %, percentage of cases with respect to the total sample size.

Regarding the clinical factors, 34 patients (94.5%) never smoked or were ex-smokers, and 35 (97%) had no history of alcohol use, consumed alcohol in moderation, or were ex-alcohol users. Twenty-nine patients (80.6%) were independent (Barthel). The average (SD) duration of symptoms before hospital admission was 6.2 (3.9) days. Twenty-four patients (66.7%) presented CRS, 26 (72.2%) underwent corticoid treatment, and 10 (27.8%) were admitted to the ICU. Computed tomography was performed in half of the cases, identifying mainly patients with moderate to severe forms of COVID-19.

Frequency Analysis of the Psychological Impact and Risk of Suicide

Regarding the psychological impact, 33.3% of patients had significant psychological impact according to the IES-6. In addition, 13.9% of patients showed anxiety symptoms according to the HADS-Anxiety subscale, and 13.9% had depression symptoms according to the HADS-Depression subscale. Overall, 47.2% of the patients presented anxiety-depression symptoms according to the total HADS score.

With regard to the risk of suicide, according to the BHS, 75% and 2.8% of patients had a moderate and severe risk of suicide, respectively. According to the C-SSRS, 16.7% of patients had suicidal ideation and 5.6% had active suicidal thoughts.

According to the BLTE questionnaire, at least one confounding factor was present in almost 70% of patients.

Correlation Analyses Between the Scales of Psychological Impact (IES-R6 and HADS) and Risk of Suicide (BHS and C-SSRS)

Pearson linear correlation coefficients related to psychological impact showed a positive correlation between all the HAD scales (HADS-Total/HADS-Anxiety: $r = 0.91$, $P < 0.001$; HADS-Total/HADS-Depression: $r = 0.91$, $P = 0.00$; HADS-Anxiety/HADS-Depression: $r = 0.66$, $P = 0.00$) and a positive correlation between the HADS and the IES-6 (HADS-Total/IES-6: $r = 0.55$, $P = 0.00$; HADS-Depression/IES-6: $r = 0.52$, $P = 0.001$; HADS-Anxiety/IES-6: $r = 0.48$, $P = 0.003$).

The C-SSRS of suicidal ideation or behavior showed a negative correlation with the IES of psychological impact ($r = -0.410$, $P = 0.013$). The BHS did not significantly correlate with any other scale.

Analysis of Dependence Between the Psychological Impact (IES-6 and HADS) and Sociodemographic and Clinical Factors

Regarding the IES-6 (Table 2), having received previous psychological treatment was the only significantly influential factor according to the ANOVA results ($P = 0.010$).

TABLE 2. Analysis of Dependence Between the Psychological Impact (IES-6 and HADS) and Sociodemographic and Clinical Factors

		HADS		
	IES, χ^2 (*P* Value)	Total, χ^2 (*P* Value)	HADS Anxiety, χ^2 (*P* Value)	HADS Depression, χ^2 (*P* Value)
Sociodemographic factors				
Age	0.058 (0.809)	1.217 (0.270)	0.872 (0.350)	0.003 (0.956)
Sex	2.731 (0.098)	0.472 (0.492)	2.503 (0.114)	0.122 (0.727)
Family history of psychiatric illness				
Father	2.057 (0.151)	1.150 (0.284)	6.377 (0.012)	6.377 (0.012)
Mother	2.057 (0.151)	0.920 (0.337)	0.166 (0.684)	0.166 (0.684)
Spouse	0.514 (0.473)	0.920 (0.337)	0.166 (0.684)	0.166 (0.684)
Sibling	1.636 (0.201)	0.253 (0.615)	1.035 (0.309)	0.528 (0.468)
Children	0.116 (0.733)	0.122 (0.727)	0.181 (0.670)	3.310 (0.069)
No. relatives with history of psychiatric illness	5.775 (0.056)	4.847 (0.089)	10.44 (0.005)	10.44 (0.005)
Personal history of psychiatric illness				
Previous psychological treatment	6.545 (0.011)	0.341 (0.559)	6.690 (0.010)	0.244 (0.621)
Current psychological treatment	0.563 (0.453)	0.014 (0.906)	4.906 (0.027)	0.465 (0.496)
Suicide attempt	1.636 (0.201)	0.253 (0.615)	0.528 (0.468)	0.528 (0.468)
GSFES	2.057 (0.151)	1.150 (0.284)	6.377 (0.012)	6.377 (0.012)
Clinical factors				
Smoking	2.893 (0.408)	1.218 (0.749)	2.555 (0.465)	3.725 (0.293)
Alcohol use	4.650 (0.199)	3.366 (0.339)	1.161 (0.762)	7.014 (0.071)
Barthel	0.12 (0.912)	0.054 (0.817)	7.543 (0.006)	2.146 (0.143)
Duration of symptoms, d	12.536 (0.251)	7.555 (0.672)	18.23 (0.051)	17.19 (0.070)
CRS	0.563 (0.453)	0.223 (0.637)	1.858 (0.173)	0.116 (0.733)
CS	0.277 (0.599)	0.043 (0.836)	3.005 (0.083)	0.432 (0.511)
ICU	0.277 (0.599)	0.290 (0.590)	2.233 (0.135)	0.175 (0.676)
CT	3.686 (0.595)	4.654 (0.325)	7.930 (0.160)	8.394 (0.136)

CS, corticosteroids.

Age was the only factor associated with the total HADS score (ANOVA; $P = 0.009$). Results of the HADS-Anxiety subscale were associated with the following: father's history of psychiatric illness (ANOVA; $P = 0.011$), number of relatives with history of psychiatric illness (ANOVA; $P = 0.004$), having received previous psychological treatment (ANOVA; $P = 0.009$), receiving psychological treatment currently (ANOVA; $P = 0.027$), social risk measured by the GSFES (ANOVA; $P = 0.011$), and the Barthel Index (ANOVA; $P = 0.005$). Results of the HADS-Depression subscale were associated with the following: age (ANOVA; $P < 0.001$), father's history of psychiatric illness (ANOVA; $P = 0.011$), number of relatives with history of psychiatric illness (ANOVA; $P = 0.004$), and the GSFES (ANOVA; $P = 0.011$).

Analysis of Dependence Between the Risk of Suicide (BHS and C-SSRS) and Sociodemographic and Clinical Factors

The analysis of dependence between the risk of suicide and sociodemographic and clinical factors using test of independence based on the Pearson χ^2 statistic (Table 3) showed that, for the BHS, the risk of suicide was only associated with having received previous psychological treatment (ANOVA; $P = 0.013$). In addition, the only factor associated with the CSSRS was smoking (ANOVA; $P = 0.047$), although a trend toward significance was found for the variable "receiving psychological treatment currently" (ANOVA; $P < 0.1$). Overall, the following associations

TABLE 3. Analysis of Dependence Between the Risk of Suicide (BHS and C-SSRS) and Sociodemographic and Clinical Factors

	BHS, χ^2 (*P* Value)	C-SSRS, χ^2 (*P* Value)
Sociodemographic factors		
Age	1.636 (0.441)	0.184 (0.912)
Sex	2.935 (0.231)	0.557 (0.757)
Family history of psychiatric illness		
Father	0.343 (0.842)	0.294 (0.863)
Mother	0.343 (0.842)	5.143 (0.076)
Spouse	0.343 (0.842)	0.294 (0.863)
Sibling	1.091 (0.580)	5.922 (0.052)
Children	1.935 (0.380)	2.455 (0.293)
No. relatives with history of psychiatric illness	3.429 (0.489)	6.105 (0.191)
Personal history of psychiatric illness		
Previous psychological treatment	6.327 (0.042)	1.833 (0.400)
Current psychological treatment	1.500 (0.472)	11.049 (0.04)
Suicide attempt	0.303 (0.859)	5.922 (0.052)
GSFES	0.343 (0.842)	0.294 (0.863)
Clinical factors		
Smoking	3.360 (0.762)	20.235 (0.003)
Alcohol use	1.639 (0.950)	13.943 (0.030)
Barthel	0.408 (0.815)	1.624 (0.444)
Duration of symptoms, d	20.068 (0.454)	4.420 (0.110)
CRS	0.917 (0.632)	1.071 (0.585)
CS	0.462 (0.794)	0.870 (0.647)
ICU	0.808 (0.668)	0.870 (0.647)
CT	3.429 (0.489)	3.536 (0.896)

CS, corticosteroids.

of sociodemographic and clinical factors with the scales of psychological impact and risk of suicide were found (Table 4).

The binary logistic regression models for each scale based on the associated factors, with at least one statistically significant coefficient, were the following (Table 5): in the IES-6, previous psychological treatment was significant for the model (odds ratio [OR], 7 [95% confidence interval {CI}, 1.454–33.696]; $P = 0.015$). In the HADS-Anxiety subscale, the significant variables for the model were previous psychological treatment (OR, 16 [95% CI, 1.105–231.571]; $P = 0.042$) and the Barthel Index (OR, 13.5 [95% CI, 0.987–184.577]; $P = 0.051$; although slightly higher than the 0.05 limit for the b_2 coefficient, this variable was included in the model because of its large contribution to the percentage of variability explained and for not exceeding the Wald's stepwise regression criteria, being significant at a 10% level). In the HADS-Depression subscale, the GSFES was significant for the model (OR, 1.609 [95% CI, 1.028–2.519]; $P = 0.038$), and a trend toward significance was found for the variable "number of relatives with psychological history" (OR, 5.060 [95% CI, 0.827–30.972]; $P = 0.079$), being significant at a 10% level and therefore included in the model. In the BHS, the coefficient of the only independent variable in the model was not significant, so it is not possible to predict the probability of risk of suicide according to the binary logistic regression model. In the C-SSRS, the resulting variables in the model were current psychological treatment (OR, 59.089 [95% CI, 3.046–1146.231]; $P = 0.007$) and smoking (OR, 6.462 [95% CI, 1.589–26.278]; $P = 0.009$).

DISCUSSION

Our results show that 33.33% of the patients had significant psychological impact according to the IES-6 and 47.2% showed symptoms of anxiety-depression according to the HADS-Total score, with 13.89% having symptoms of anxiety according to the HADS-Anxiety subscale and 13.89% having symptoms of depression according to the HADS-Depression subscale. Similar results were obtained in 2 studies[14,15] conducted on Spanish general adult population during the early stages of the outbreak, although higher levels of anxiety and depression symptoms were reported. This was probably because depression and anxiety were evaluated using a different scale. Specifically, we used the HADS, whereas the authors from the aforementioned study used the Depression, Anxiety, and Stress Scales[14] and the other study used the Patient Health Questionnaire-2 and the Generalized Anxiety Disorder Scale-2.[15] Furthermore, their target population differs from our study (i.e., general population versus in-hospital COVID-19 patients). Comparable results were also observed in previous pandemics with instruments similar to those used in our study, for example, the HADS or the IES-6.[44] For instance, in the previous severe acute respiratory syndrome pandemic, high levels of anxiety and depression[45] and increased number of suicides[46] were reported. In our study, 75% and 2.8% of the patients were at moderate and severe risk of suicide, respectively, according to the BHS. In addition, 16.67% of the patients had suicidal ideation and 5.6% had suicide behaviors according to the C-SSRS.

Regarding the sociodemographic and clinical factors, previous psychological treatment, a greater degree of dependency (Barthel), and increased social-familial risk (GSFES) were associated with a greater psychological impact. These findings reinforce the idea that the psychological impact is increased in patients who are more vulnerable, less resilient, and with difficulties to connect with others.[47]

The development of suicidal ideation or behavior was not exceptional and agrees with the predictions made by several authors.[18,19] Our results indicate that such thoughts are not related to the type of infection or the duration of the disease or hospital

TABLE 5. Binary Logistic Regression Models for Each Scale Based on the Associated Factors

Scales	Factors	Coefficients (P Value)	OR (95% CI)	Nagelkerke's R^2 Value
IES-6	Previous psychological treatment	$b_0 = -1.386$ (0.006) $b_1 = 1.946$ (0.015)	OR_{b1}: 7.000 (1.454–33.696)	0.226
HADS-Anxiety	1. Previous psychological treatment 2. Barthel Index	$b_0 = -3.989$ (0.002) $b_1 = 2.773$ (0.042) $b_2 = 2.603$ (0.051)	OR_{b1}: 16.000 (1.105–231.571) OR_{b2}: 13.500 (0.987–184.577)	0.489
HADS-Depression	1. Number of relatives with psychological history 2. GSFES	$b_0 = -7.627$ (0.011) $b_1 = 1.621$ (0.079) $b_2 = 0.476$ (0.038)	OR_{b1}: 5.060 (0.827–30.972) OR_{b2}: 1.609 (1.028–2.519)	0.342
C-SSRS	1. Current psychological treatment 2. Smoking	$b_0 = -3.286$ (0.001) $b_1 = 4.079$ (0.007) $b_2 = 1.866$ (0.009)	OR_{b1}: 59.089 (3.046–1146.231) OR_{b2}: 6.462 (1.589–26.278)	0.584

admission, but rather to being treated for a psychiatric illness and active smoking. Accordingly, special care should be taken with this population group, particularly in the elderly.[26] The development of thoughts of hopelessness was not related to any of the variables analyzed in this study, perhaps because the development of such feelings and cognitive distortions is mediated by certain personality traits that could not be addressed in the present work.[48]

No significant correlation was found between psychological impact scales and suicide risk scales. In fact, the scale of suicidal ideation and behavior (C-SSRS) showed a negative correlation with the scale of psychological impact (IES-6; $r = -0.410$), indicating that patients with higher suicidal behavior did not show significant psychological impact because of the disease. These findings, along with the fact that smoking (an addictive disorder) was associated with an increased risk of suicide, seem to fit better into a model of suicidal impulsivity than a stress-diathesis psychological model.[25]

In addition to the known adverse effects of treatment and the psychological impact of treatment on vulnerable and predisposed patients, a primary effect of the disease itself could be supported and partially explain the lack of correlation found between psychological impact and suicide scales. Described pathogenic mechanisms involving the central nervous system include lung damage causing subsequent neuronal insult, hematogenous, and neural virus dissemination from the olfactory nerve via olfactory bulb and orofacial sensory fibers via cranial ganglia, causing neuroinflammation, endothelial injury, and/or coagulopathy that might lead to neuropsychiatric manifestations, even reaching the behavior-related limbic area.[49,50]

Finally, on the one hand, because patients are retired, already infected, and at the hospital, concerns about job or financial losses,[8,9] the fear of being infected, and social isolation related to quarantine, reported[6] as main factors associated with suicide, might not be that prominent in our targeted population. On another hand, our study is framed in the early months of the COVID-19 pandemic, where no risk of suicide has been found in previous studies, attributed to protective measures such as good health care response and factors as the *pulling-together* effect,[18,51] both of which are also present in our healthcare system and society.

Our article can be also useful to highlight that having reliable knowledge about psychological interventions was a protective factor against the severity of suicidal ideation (during the COVID-19 pandemic)[11] and to make sure that we communicate our findings to governments and communities in safe, nonsensationalist ways.[10]

TABLE 4. Associations of Sociodemographic and Clinical Factors With the Scales of Psychological Impact and Risk of Suicide

Scale	Factor	χ^2 (P Value)	Pearson r Coefficient (P Value)
IES-6	Previous psychological treatment	6.545 (0.011)	
HADS-Total	Age		0.345 (0.039)
HADS-Anxiety	Father with history of psychiatric illness	6.377 (0.012)	
	No. relatives with history of psychiatric illness	10.44 (0.005)	
	Previous psychological treatment	6.690 (0.010)	
	Current psychological treatment	4.906 (0.027)	
	GSFES	6.377 (0.012)	
	Barthel Index	7.543 (0.006)	
HADS-Depression	Age		0.519 (0.001)
	Father with history of psychiatric illness	6.377 (0.012)	
	No. relatives with history of psychiatric illness	10.44 (0.005)	
	GSFES	6.377 (0.012)	
BHS	Previous psychological treatment	6.327 (0.042)	
C-SSRS	Current psychological treatment	11.049 (0.04)	
	Smoking	20.235 (0.003)	
	Alcohol use	13.943 (0.030)	

Strengths and Limitations

The high number of recent articles pointing to the growing impact that the COVID-19 pandemic would have on mental health[52] warranted a study to analyze the psychological impact of COVID-19 in patients admitted to the hospital. To our knowledge, this is one of the few—if not the only—publications analyzing psychological impact in a sample of patients hospitalized for COVID-19. So far, we only found case reports in the literature,[53–56] but no actual sample-based studies. The main strength of this study lies in having collected a sample of patients admitted to the hospital for COVID-19 with psychological impact and risk of suicide. The fact that the data were analyzed using multivariate analyses, which allow adjustments for a number of confounding variables, is another strength that should be highlighted.

Nevertheless, this study has some limitations. It is a single-center study with a small sample size and a cross-sectional design without control group, which prevents from making causal inferences. The results found may have internal validity but may not be extrapolated to other clinical samples with different characteristics. Moreover, because job loss and economic impairment are known to be relevant factors in psychological impact and suicide, it should be noted that data were collected in the early stages of the pandemic, when unemployment and the economic situation were not as bad as they are now in Spain.

Conclusions and Future Perspectives

The COVID-19 infection has been a real challenge for public health systems of all countries affected by the pandemic. The psychological impact on patients admitted for COVID-19 must be considered, with special focus on depression in those at increased social-familial risk (GSFES) and on anxiety in those who have previously received psychological treatment and are more dependent (Barthel). Risk of suicide should be assessed in patients who are actively receiving psychological treatment and are smokers, regardless of the perceived psychological impact, because suicidal ideation and behavior would not be directly related to an increased risk of suicide.

The development of specific psychological strategies that prove to be effective in preventing and detecting mental health problems that patients may have is required to relieve their mental suffering.[57,58] Our research group intends to carry out a longitudinal follow-up of all patients who have been admitted to our hospital for COVID-19.

REFERENCES

1. World Health Organization. *Coronavirus Disease 2019 (COVID-19) Situation Report—51*. Geneva, Switzerland: World Health Organization; 2020. Available at: https://apps.who.int/iris/bitstream/handle/10665/331475/nCoVsitrep11Mar2020-eng.pdf?sequence=1&isAllowed=y. Accessed December 1, 2021.

2. Lu H, Stratton CW, Tang Y. Outbreak of pneumonia of unknown etiology in Wuhan, China: the mystery and the miracle. *J Med Virol*. 2020;25678.

3. World Health Organization. Available at: https://covid19.who.int/region/euro/country/es. Accessed December 1, 2021.

4. Rogers JP, Chesney E, Oliver D, et al. Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: a systematic review and meta-analysis with comparison to the COVID-19 pandemic. *Lancet Psychiatry*. 2020;7:611–627.

5. Brown E, Gray R, Lo Monaco S, et al. The potential impact of COVID-19 on psychosis: a rapid review of contemporary epidemic and pandemic research. *Schizophr Res*. 2020;S0920-9964:30257–30257.

6. Leaune E, Samuel M, Oh H, et al. Suicidal behaviors and ideation during emerging viral disease outbreaks before the COVID-19 pandemic: a systematic rapid review. *Prev Med*. 2020;141:106264.

7. Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020;395:912–920.

8. Gunnell D, Appleby L, Arensman E, et al, COVID-19 Suicide Prevention Research Collaboration. Suicide risk and prevention during the COVID-19 pandemic. *Lancet Psychiatry*. 2020;7:468–471.

9. Moutier C. Suicide prevention in the COVID-19 era: transforming threat into opportunity. *JAMA Psychiatry*. 2020. Available at: https://doi.org/10.1001/jamapsychiatry.2020.3746. Accessed December 1, 2021.

10. Hawton K, Marzano L, Fraser L, et al. Reporting on suicidal behaviour and COVID-19-need for caution. *Lancet Psychiatry*. 2021;8:15–17.

11. Shi L, Que JY, Lu ZA, et al. Prevalence and correlates of suicidal ideation among the general population in China during the COVID-19 pandemic. *Eur Psychiatry*. 2021;64:e18.

12. Hao F, Tan W, Jiang L, et al. Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry. *Brain Behav Immun*. 2020;S0889-1591:30626–30627.

13. Molero Jurado MdM, Herrera-Peco I, Pérez-Fuentes MdC, et al. Análisis de la amenaza percibida por la COVID-19 en población española. *Aten Primaria*. 2020. Available at: https://doi.org/10.1016/j.aprim.2020.05.001. Accessed December 1, 2021.

14. Rodríguez-Rey R, Garrido-Hernansaiz H, Collado S. Psychological impact and associated factors during the initial stage of the coronavirus (COVID-19) pandemic among the general population in Spain. *Front Psychol*. 2020;11:1540.

15. González-Sanguino C, Ausín B, Castellanos MÁ, et al. Mental health consequences during the initial stage of the 2020 coronavirus pandemic (COVID-19) in Spain. *Brain Behav Immun*. 2020;87:172–176.

16. Valdes-Florido MJ, López-Díaz A, Palermo-Zeballos FJ, et al. Reactive psychoses in the context of the COVID-19 pandemic: clinical perspectives from a cases series. *Rev Psiquiatr Salud Ment*. 2020;S1888-9891:30034–30033.

17. Dutheil F, Mondillon L, Navel V. PTSD as the second tsunami of the SARS-Cov-2 pandemic. *Psychol Med*. 2020;1–2.

18. Reger MA, Stanley IH, Joiner TE. Suicide mortality and coronavirus disease 2019—a perfect storm? *JAMA Psychiatry*. 2020;77:1093–1094.

19. Sher L. The impact of the COVID-19 pandemic on suicide rates. *QJM*. 2020;113:707–712.

20. Bilbul M, Paparone P, Kim AM, et al. Psychopharmacology of COVID-19. *Psychosomatics*. 2020;61:411–427.

21. Borah P, Deb PK, Chandrasekaran B, et al. Neurological consequences of SARS-CoV-2 infection and concurrence of treatment-induced neuropsychiatric adverse events in COVID-19 patients: navigating the uncharted. *Front Mol Biosci*. 2021;8:627723.

22. Garcia P, Revet A, Yrondi A, et al. Psychiatric disorders and hydroxychloroquine for coronavirus disease 2019 (COVID-19): a VigiBase study. *Drug Saf*. 2020;43:1315–1322.

23. Talarico F, Chakravarty S, Liu YS, et al. Psychiatric side effects induced by chloroquine and hydroxychloroquine: a systematic review of case reports

and population studies. *medRxiv*. 2020.10.05.20207423. Available at: https://doi.org/10.1101/2020.10.05.20207423. Accessed December 1, 2021.

24. Morioka S, Saito S, Hayakawa K, et al. Psychiatric burdens or stress during hospitalization and concerns after discharge in patients with severe acute respiratory syndrome coronavirus-2 isolated in a tertiary care hospital. *Psychiatry Res*. 2020;289:113040.

25. Fazel S, Runeson B. Suicide. *N Engl J Med*. 2020;382:266–274. Erratum in: *N Engl J Med*. 2020;382:1078. PMID: 31940700; PMCID: PMC7116087.

26. Wand APF, Zhong BL, Chiu HFK, et al. COVID-19: the implications for suicide in older adults. *Int Psychogeriatr*. 2020;1–6. doi:. Available at: https://doi.org/10.1017/S1041610220000770. Accessed December 1, 2021.

27. Martelli C, Awad H, Hardy P. In-patients suicide: epidemiology and prevention. *Encephale*. 2010;36(Suppl 2):D83–D91.

28. Joint Commission. Sentinel Event Statistics Data—Event Type by Year. Available at: https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/sentinel-event/most-frequently-reviewed-event-types-2020.pdf. Accessed December 1, 2021.

29. National Patient Safety Goal for Suicide Prevention. R3 Report. *Joint Commission*. 2018;18:2.

30. García González JV, Díaz Palacios E, Salamea García A, et al. An evaluation of the feasibility and validity of a scale of social assessment of the elderly. *Aten Primaria*. 1999;23:434–440.

31. Mahoney FI, Barthel DW. Functional evaluation: the Barthel Index. *Md State Med J*. 1965;14:61–65.

32. Ye Q, Wang B, Mao J. The pathogenesis and treatment of the 'cytokine storm' in COVID-19. *J Infect*. 2020;80:607–613.

33. Thoresen S, Tambs K, Hussain A, et al. Brief measure of posttraumatic stress reactions: Impact of Event Scale-6. *Soc Psychiatry Psychiatr Epidemiol*. 2010;45:405–412.

34. Wilson JP, Keane TM. *Assessing Psychological Trauma and PTSD*. New York, NY: Guilford Press; 2004.

35. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand*. 1983;67:361–370.

36. Terol-Cantero MC, Cabrera-Perona V, Martín-Aragón M. Revisión de estudios de la Escala de Ansiedad y Depresión Hospitalaria (HAD) en muestras españolas. *Ann Psychol*. 2015;31:494–503.

37. Beck AT, Weissman A, Lester D, et al. The measurement of pessimism: the hopelessness scale. *J Consult Clin Psychol*. 1974;42:861–865.

38. Rueda-Jaimes GE, Castro-Rueda VA, Rangel-Martínez-Villalba AM, et al. Validation of the Beck Hopelessness Scale in patients with suicide risk. *Rev Psiquiatr Salud Ment (Engl Ed)*. 2018;11:86–93.

39. Beck AT, Steer RA. Clinical predictors of eventual suicide: a 5- to 10-year prospective study of suicide attempters. *J Affect Disord*. 1989;17:203–209.

40. Posner K, Brown GK, Stanley B, et al. The Columbia-Suicide Severity Rating Scale: initial validity and internal consistency findings from three multisite studies with adolescents and adults. *Am J Psychiatry*. 2011;168: 1266–1277.

41. Al-Halabí S, Sáiz PA, Burón P, et al. Validación de la versión en español de la Columbia-Suicide Severity Rating Scale (Escala Columbia para Evaluar el Riesgo de Suicidio). *Rev Psiquiatr Salud Ment*. 2016;9:134–142.

42. Brugha TS, Cragg D. The List of Threatening Experiences: the reliability and validity of a brief life events questionnaire. *Acta Psychiatr Scand*. 1990;82:77–81.

43. Porras-Segovia A, Valmisa E, Gutiérrez B, et al. Prevalence and correlates of major depression in Granada, Spain: results from the GranadΣp study. *Int J Soc Psychiatry*. 2018;64:450–458.

44. Lee SM, Kang WS, Cho AR, et al. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Compr Psychiatry*. 2018;87:123–127.

45. Mak IW, Chu CM, Pan PC, et al. Long-term psychiatric morbidities among SARS survivors. *Gen Hosp Psychiatry*. 2009;31:318–326.

46. Yip PS, Cheung YT, Chau PH, et al. The impact of epidemic outbreak: the case of severe acute respiratory syndrome (SARS) and suicide among older adults in Hong Kong. *Crisis*. 2010;31:86–92.

47. Hagerty SL, Williams LM. The impact of COVID-19 on mental health: the interactive roles of brain biotypes and human connection. *Brain Behav Immun Health*. 2020;5:100078.

48. Baryshnikov I, Rosenström T, Jylhä P, et al. State and trait hopelessness in a prospective five-year study of patients with depressive disorders. *J Affect Disord*. 2018;239:107–114.

49. Mongan D, Cannon M, Cotter DR. COVID-19, hypercoagulation and what it could mean for patients with psychotic disorders. *Brain Behav Immun*. 2020;88:9–10.

50. Banerjee D, Viswanath B. Neuropsychiatric manifestations of COVID-19 and possible pathogenic mechanisms: insights from other coronaviruses. *Asian J Psychiatr*. 2020;54:102350.

51. Pirkis J, John A, Shin S, et al. Suicide trends in the early months of the COVID-19 pandemic: an interrupted time-series analysis of preliminary data from 21 countries. *Lancet Psychiatry*. 2021;8:579–588.

52. Torales J, O'Higgins M, Castaldelli-Maia JM, et al. The outbreak of COVID-19 coronavirus and its impact on global mental health. *Int J Soc Psychiatry*. 2020;66:317–320.

53. Anmella G, Fico G, Roca A, et al. Unravelling potential severe psychiatric repercussions on healthcare professionals during the COVID-19 crisis. *J Affect Disord*. 2020;273:422–424.

54. Thakur V, Jain A. COVID 2019-suicides: a global psychological pandemic. *Brain Behav Immun*. 2020;88:952–953.

55. Gillet G, Jordan I. Severe psychiatric disturbance and attempted suicide in a patient with COVID-19 and no psychiatric history. *BMJ Case Rep*. 2020; 13:e239191.

56. Epstein D, Andrawis W, Lipsky AM, et al. Anxiety and suicidality in a hospitalized patient with COVID-19 infection. *Eur J Case Rep Intern Med*. 2020;7:001651.

57. Xiang YT, Yang Y, Li W, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry*. 2020;7:228–229.

58. Duan L, Zhu G. Psychological interventions for people affected by the COVID-19 epidemic. *Lancet Psychiatry*. 2020;7:300–302.