

Risk Factors for Suicidal Behavior in Youth and the Impact of SARS-CoV-2 Infection: A
Retrospective Case-Control Study

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Keywords:

Suicide, self-harm, COVID-19, case control study

Author Contribution Statement

All listed authors have made substantial contributions to this work through all of most of the following: initial design, data acquisition and analysis, drafting, and review. All authors have reviewed this work and approve of the final version submitted for publication. All authors agree to take accountability for all aspects of this work and ensure that any questions related to the accuracy or integrity of any part of the work are appropriately investigated and/or resolved.

Disclosures

Kathleen Heslin, Michelle Montero, and Yanli Zhang-James have no disclosures.

In the past year, Dr. Faraone received income, potential income, travel expenses continuing education support and/or research support from Aardvark, Aardwolf, Tris, Otsuka, Ironshore, Johnson & Johnson/Kenvue, ADHDOnline, KemPharm/Corium, Akili, Supernus, Sky Therapeutics, Mentavi and Genomind. With his institution, he has US patent US20130217707 A1 for the use of sodium-hydrogen exchange inhibitors in the treatment of ADHD. He also receives royalties from books published by Guilford Press: Straight Talk about Your Child's Mental Health, Oxford University Press: Schizophrenia: The Facts and Elsevier: ADHD: Non-Pharmacologic Interventions. He is Program Director of www.ADHDEvidence.org and www.ADHDIinAdults.com. Dr. Faraone's research is supported by the European Union's Horizon 2020 research and innovation programme under grant agreement 965381; NIH/NIMH grants U01AR076092, R01MH116037, 1R01NS128535, R01MH131685, 1R01MH130899, U01MH135970, The Upstate Foundation and Supernus Pharmaceuticals. His continuing medical education programs are supported by The Upstate Foundation, Corium Pharmaceuticals, Tris Pharmaceuticals and Supernus Pharmaceuticals.

AI Statement:

No AI tools were used in the writing or editing of this manuscript.

Data Sharing Statement

The individual patient-level electronic health record data in the TriNetX database cannot be shared, as they are the property of TriNetX and may only be accessed through direct contract with the company. Individual-level data was not accessed by the researchers involved in this study. Summary data and results are provided here in the manuscript's Tables and Supplementary Tables.

Funding:

This study received no funding.

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ABSTRACT

Background: Suicide and self-harm remain critical concerns in youth. This study compares patients with and without suicidality or self-harm (SOSH), suicidality (SI/SA), and COVID-19 to investigate 53 pre-existing risk factors associated with suicidality in patients with and without COVID-19.

Methods: A retrospective case-control study was conducted using TriNetX data from 111,631,250 patients across 78 healthcare networks. This study included patients aged 0-21 with any healthcare visit between January 20, 2020, and May 11, 2023.

Outcomes: Comparison groups shared many risk factors, with specific differences. Children with SOSH and COVID-19 had higher odds of support group problems, personality disorder, thyroid disorders, and insomnia; children with SOSH without COVID-19 had higher odds of upbringing problems, anxiety and nonpsychotic disorders, sleep disorders, and autism. Adolescents with SOSH and COVID-19 had higher odds of parent-child conflict; adolescents with SOSH without COVID-19 had higher odds of education and literacy problems. Children with SI/SA and COVID-19 had higher odds of support group problems, personality disorders, and asthma; children with SI/SA without COVID-19 had higher odds of autism. Adolescents with SI/SA and COVID-19 had higher odds of asthma. The effect size of COVID-19 was not significant. SOSH was associated with increased odds of prior SARS-CoV-2 infection in children (OR 2.42) and adolescents (OR 1.88).

Interpretation: This study confirms known SOSH risk factors and demonstrates their association with suicidality. We observed a significant association between SOSH and preceding SARS-CoV-2 infection. This underscores the need to focus on suicide risk in youth affected by COVID-19.

INTRODUCTION

Over the past decade, suicidal ideation and suicide attempt have increased in children and adolescents⁽¹⁾. Suicide remains a leading cause of death in youth⁽²⁾, and presentations to medical facilities for emergency care related to suicide have increased nearly five-fold over the past

decade⁽³⁾. Since the start of the COVID-19 pandemic, there has been interest in the effect of the pandemic and SARS-COV-2 infection on suicidality. Hospital presentations for suicide attempt (SA), self-harm (SH), and suicidal ideation (SI) increased during the pandemic⁽⁴⁻⁶⁾. A smaller number of studies suggest the opposite, including decreased admissions for suicidal behavior during the pandemic lockdown⁽⁷⁾. Despite much research about suicidality or self-harm (SOSH) related to the pandemic, little research has assessed the relationship between SOSH and SARS-COV-2 infection. In adults, an association has been observed between SARS-COV-2 and suicidal ideation or suicidality both before⁽⁸⁾ and after⁽⁹⁾ SARS-COV-2 infection; and between self-harm or thoughts of self-harm and history of SARS-COV-2 infection⁽¹⁰⁾. Our recent study of the electronic health record (EHR) data of 13 million youth found that COVID-19 is a significant risk factor for suicidal ideation and attempt, with hazard ratios 2.2 (2.0-2.4) and 2.8 (2.0-3.8), respectively, in adolescents even two years after their initial SARS-CoV-2 infection⁽¹¹⁾. Suggested etiologies include the potential association of suicidality and inflammation⁽¹²⁾. Although COVID-19 is no longer a public health crisis, the virus remains prevalent in the United States, and associated long-term psychiatric outcomes remain pertinent, particularly in youth. Large studies using real-world data to evaluate the impact of SARS-COV-2 infection itself on suicidal behavior in children and adolescents are urgently needed.

In addition to COVID-19, many risk factors for suicidality have been investigated extensively during the past 50 years⁽¹³⁾. These include psychiatric disorders like ADHD and conduct disorder⁽⁵⁾ and symptoms like anxiety^(14, 15); socioeconomic factors including low-income or sexual minority status⁽¹⁴⁾; and medical diagnoses like asthma^(16, 17) and diabetes^(18, 19). A meta-analysis showed that across 50 years, much of the research has been homogeneously focused on risk factors from the five main categories⁽¹³⁾, few studies examined the combination of multiple

risk factors, and few used large real-world data. Furthermore, the predictive accuracies from these studies have been mediocre⁽¹³⁾. Establishing valid and predictive risk factors is the first step toward improving the prevention and treatment of suicide. Such insights will guide future research in developing more accurate predictive models, identifying novel predictors, and most importantly avoiding wasted effort on non-informative risk factors.

To achieve this goal, we used a large de-identified global database of electronic health records from 13 million children and adolescents to comprehensively assess all the previously identified risk factors for suicidality, specifically those which we could map to the electronic health record data, in relation to SARS-CoV-2 using a retrospective case-control design.

METHODS

We conducted a retrospective case-control study using TriNetX, a global research network of de-identified data from electronic medical records (EMRs). This study focused on the Research Network, a collection of data from 111,631,250 patients across 78 healthcare networks (HCOs). This study population included 13,038,353 patients 0-21 who had any healthcare visit within the study period of January 20, 2020 (the first reported COVID-19 case in the United States [US]) until May 11, 2023 (the end of the US federal COVID-19 Public Health Emergency). The study used de-identified patient data and was exempted from institutional review.

STUDY DESIGN

The study population included children (0-12) and adolescents (13-21). In each age group, we compared characteristics (pre-existing psychiatric, medical, and socioeconomic factors) between populations of patients diagnosed with first-time COVID-19 who later developed suicidality or self-harm (SOSH), and patients diagnosed with first-time COVID-19 who did not later develop SOSH.

COVID-19 CASE CRITERIA

We defined COVID-19 positive cases based on either positive laboratory tests for SARS-CoV-2 or COVID-19 diagnostic codes (see Supplement) within the study period. Exclusion criteria included patients diagnosed with other viral diseases (ICD B25-B24) or other specified viral diseases (B33.8) in the study period, and patients with a personal history of COVID-19 (Z86.16). In this text, “COVID-19” refers to both COVID-19 diagnosis and acute SARS-CoV-2 infection.

SUICIDALITY AND SELF-HARM (SOSH)

SOSH was defined as the presence of any of the following ICD-10 codes: suicide attempt (suicide attempt, initial encounter [T14.91XA]; or suicide attempt [T14.91]); suicidal ideations (R45.851); or intentional self-harm (X71-X83).

SUICIDALITY (SI/SA)

Suicidality (SI/SA) was defined as the presence of any of the following: suicide attempt (suicide attempt, initial encounter [T14.91XA]; or suicide attempt [T14.91]); or suicidal ideations (R45.851).

COHORT DESIGN

For the primary analysis, in each age group (0-12, 13-21), we created four cohorts: patients who, within the study period, had been diagnosed with COVID-19 and were diagnosed with *SOSH* after their COVID-19 diagnosis (COVID+, *SOSH*); patients with a COVID-19 diagnosis who were not later diagnosed with *SOSH* (COVID+,*SOSH*-); patients who developed *SOSH* but did not have COVID-19 during the study period (COVID-, *SOSH*); and patients who were not diagnosed with COVID-19 or *SOSH* in the study period (COVID-, *SOSH*-).

POPULATION COMPARISON

In the “Compare Outcomes” function, we selected 53 psychiatric, medical, and socioeconomic characteristics (“pre-existing characteristics”) associated with suicidality or self-harm in previous literature (see Table 1). For all group comparisons, we examined the presence of these characteristics before the index event. Index event was defined as any healthcare visit that occurred during the study period.

PROPENSITY SCORE-MATCHING

Using TriNetX’s propensity score matching (PSM) algorithm, we balanced cohorts based on ten demographic factors: age at index event, sex (male/female), race (American Indian or Alaska

Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and white), and ethnicity (Hispanic or Latino, Not Hispanic or Latino). The PSM algorithm uses "greedy nearest neighbor matching" with a caliper set at 0.1 pooled standard deviations for individual patients in the smaller cohort to find best matches from the larger cohort. Combined matched cohorts were incorporated into our comparison analysis following the validation of propensity scores.

ANALYSIS

For our primary analysis, using the TriNetX “Compare Outcomes” function, we compared the four cohorts four ways: COVID-19(+), SOSH(+) vs. COVID-19(+), SOSH(-); COVID-19(+), SOSH(+) vs. COVID-19(-), SOSH(+); COVID-19(+), SOSH(+) vs. COVID-19(-), SOSH(-); and COVID-19(-), SOSH(+) vs. COVID-19(-), SOSH(-). We compared these cohorts after propensity score-matching based on pre-existing demographic factors at the time of index event. During each comparison, if fewer than 10 patients in either cohort were associated with a characteristic, then that characteristic was excluded from analysis. In TriNetX, populations smaller than 10 are listed as “10” to protect patient privacy and are not reliable for analysis⁽²⁰⁾.

Where the primary analysis compared cohorts based on development of SOSH, we repeated the analysis on smaller cohorts to focus on suicidality alone. The second analysis focused on suicidal ideations and suicide attempt (SI/SA). We carried out the following comparisons: COVID-19 (+), SI/SA(+) vs. COVID-19 (+), SI/SA(-); COVID-19 (+), SI/SA(+) vs. COVID-19(-), SI/SA(+); COVID-19 (+), SI/SA(+) vs. COVID-19 (-), SI/SA(-); COVID-19 (-), SI/SA(+) vs. COVID-19 (-), SI/SA(-). We repeated the procedures from the SOSH analysis (population comparison, propensity score-matching, and cohort comparison).

STATISTICAL ANALYSIS

For our primary and secondary analyses, we computed odds ratios and 95% confidence intervals (CI), Z-scores, and p values according to Altman and Bland⁽²¹⁾. We used the Bonferroni method of correction with an adjusted alpha level of $p < 0.0009$ based on a total of 53 tests. We determined the degree of COVID-19 effect by calculating the variance off the odds ratios, based on Altman and Bland⁽²¹⁾ and Higgins and Thomas⁽²²⁾, as described in the supplementary information.

RESULTS

In the TriNetX Research Network, a total of 7,341,636 children and 5,696,717 adolescents had a visit in the study period. Among these, 454,758 children and 374,567 adolescents had COVID-19 infection. In the total population, 9,901 children (0.13%) and 124,387 adolescents (2.18%) reported suicide ideation, intentional self-harm, or suicide attempt (SOSH). Among patients with COVID-19, 1375 children (0.30%) and 14845 adolescents (3.96%) had SOSH. In the general population, 9540 children (0.13%) and 120001 adolescents (2.11%) had SI/SA. Among patients with COVID-19, 1311 children (0.29%) and 15521 adolescents (4.14%) had SI/SA.

After matching, in the 0-12 group, patients were 50.84% male, 49.15% female, with an average age of 8. This cohort was 57.33% white, 25.72% Black, 1.032% Asian, 0.74% American Indian or Alaska Native, 0.74% Native Hawaiian or Pacific Islander, 14.15% Hispanic, and 71.26% non-Hispanic. In the 13-21 group, patients were 32.03% male, 67.87% female, with an average age of 14. Patients were 60.63% white, 22.29% Black, 2.13% Asian, 0.47% American Indian or Alaska Native, 0.35% Native Hawaiian or Pacific Islander, 11.96% Hispanic, and 70.7% non-Hispanic.

Compared to patients without SOSH, patients with SOSH had greater odds of a preceding diagnosis of COVID-19, for both children (OR 2.42, 95%CI (2.29, 2.56), $p < 0.0008$) and adolescents (OR 1.88, 95%CI (1.85, 1.92), $p < 0.0008$). Compared to patients without SI/SA, patients with SI/SA also had greater odds of a preceding diagnosis of COVID-19, both for children (OR 2.32, 95%CI (2.19, 2.46), $p < 0.0008$) and adolescents (OR 1.90, 95% CI (1.86, 1.93), $p < 0.0008$).

Association with Suicidality and Self-Harm in COVID-19(-) Patients

SOSH and SI/SA

Ages 0-12

Among patients with no diagnosis of COVID-19 before or during the study period, patients with SOSH had a significantly greater odds of pre-existing psychiatric diagnosis (ADHD (OR 6.71, 95%CI (4.87, 9.24), $p < 0.0008$), conduct disorders (OR 7.68, 95%CI (4.83, 12.21), $p < 0.0008$), anxiety and nonpsychotic disorders (OR 6.82, 95%CI (4.94, 9.43), $p < 0.0008$), unspecified anxiety (OR 8.43, 95%CI (5.06, 14.05), $p < 0.0008$), autistic disorder (OR 3.83, 95%CI (2.30, 6.40), $p < 0.0008$)), medical diagnoses (sleep disorders (OR 2.01, 95%CI (1.45, 2.80), $p < 0.0008$)), and one socioeconomic diagnosis (problems related to upbringing (OR 8.08, 95%CI (4.29, 15.22), $p < 0.0008$)) (Table 2) (Figure 1).

Among this COVID-19 negative population, patients with SI/SA had a similar profile: higher odds of psychiatric diagnoses (ADHD (OR 9.04, 95%CI (6.27, 13.06), $p < 0.0008$), conduct disorders (OR 10.82, 95%CI (6.53, 17.95), $p < 0.0008$), adjustment disorders (OR 6.77, 95%CI (3.57, 12.85), $p < 0.0008$), anxiety disorders (OR 8.61, 95%CI (6.02, 12.32), $p < 0.0008$), unspecified anxiety (OR 9.44, 95%CI (5.50, 16.21), $p < 0.0008$), autistic disorder (OR 4.30,

95% CI (2.47, 7.46), $p < 0.0008$) and one medical diagnosis (sleep disorders (OR 2.00, 95% CI (1.41, 2.83), $p = 0.0001$)) (Table 3) (Figure 2).

Ages 13-21

Adolescents without COVID-19 who developed SOSH had a significantly greater odds of pre-existing psychiatric risk factors like ADHD (OR 2.02, 95% CI (1.80, 2.27), $p < 0.0008$), conduct disorders (OR 2.60, 95% CI (2.19, 3.08), $p < 0.0008$), adjustment disorders (OR 1.90, 95% CI (1.50, 2.42), $p < 0.0008$), PTSD (OR 6.27, 95% CI (3.76, 10.47), $p < 0.0008$), bipolar disorder (OR 4.01, 95% CI (2.23, 7.21), $p < 0.0008$), disorders of adults personality and behavior (OR 2.49, 95% CI (2.00, 3.11), $p < 0.0008$), borderline personality disorder (OR 4.09, 95% CI (2.23, 7.50), $p < 0.0008$), mood disorders (OR 4.07, 95% CI (3.37, 4.92), $p < 0.0008$), anxiety and nonpsychotic disorders (OR 2.29, 95% CI (2.02, 2.60), $p < 0.0008$), unspecified anxiety disorder (OR 2.44, 95% CI (2.05, 2.89), $p < 0.0008$), generalized anxiety disorder (OR 2.27, 95% CI (1.75, 2.96), $p < 0.0008$), depressive episode (OR 3.75, 95% CI (2.98, 4.71), $p < 0.0008$), recurrent major depressive disorder (OR 7.62, 95% CI (4.17, 13.92), $p < 0.0008$), and autistic disorder (OR 1.63, 95% CI (1.26, 2.11), $p = 0.0002$) (Table 4) (Figure 3). These patients also had higher odds of socioeconomic factors: problems related to primary support group (OR 2.15, 95% CI (1.53, 3.01), $p < 0.0008$), problems related to education and literacy (OR 2.20, 95% CI (1.52, 3.19), $p < 0.0008$), problems related to upbringing (OR 3.04, 95% CI (2.15, 4.30), $p < 0.0008$), family history of mental and behavioral disorders (OR 4.71, 95% CI (2.97, 7.46), $p < 0.0008$), and upbringing away from parents (OR 3.13, 95% CI (1.78, 5.50), $p < 0.0008$). There were increased odds of only two medical diagnoses: sleep disorders (OR 1.37, 95% CI (1.18, 1.59), $p < 0.0008$) and insomnia (OR 2.03, 95% CI (1.44, 2.86), $p < 0.0008$).

Of the adolescents negative for COVID-19 with SI/SA, the odds were greater for all pre-existing risk factors, with exceptions: one psychiatric risk factor (intellectual disabilities (OR 1.42, 95% CI (1.06,1.91), $p=0.0184$)) and four medical risk factors: disorders of thyroid gland (OR 0.89, 95% CI (0.72,1.09), $p=0.2568$), diabetes mellitus (OR 0.92, 95% CI (0.73,1.16), $p=0.4918$), epilepsy (OR 0.86, 95% CI (0.71,1.04), $p=0.1153$), $p=0.1153$), and migraine (OR 1.22, 95% CI (1.06,1.41), $p=0.0058$) (Table 5) (Figure 4).

Children v. Adolescents

In the COVID-19(-) populations with SOSH (Table 6) and with SI/SA (Table 7), no characteristics had significantly greater odds in children only. There were greater odds for several characteristics only in adolescents, and for several characteristics in both children in adolescents (Table 6) (Table 7).

Association with Suicidality and Self-Harm in COVID-19(+) Patients

SOSH and SI/SA

Ages 0-12

Among patients diagnosed with COVID-19, those with later SOSH had a greater odds of psychiatric diagnoses (ADHD (OR 5.56, 95% CI (4.19, 7.38), $p<0.0008$), conduct disorders (OR 7.32, 95% CI (4.77, 11.24), $p<0.0008$), adult personality disorders (OR 4.47, 95% CI (2.37, 8.40), $p<0.0008$), unspecified anxiety (OR 6.18, 95% CI (4.58, 8.34), $p<0.0008$), generalized anxiety (OR 5.89, 95% CI (3.85, 9.01), $p<0.0008$), socioeconomic factors (problems with primary support group (OR 7.06, 95% CI (3.73, 13.36), $p<0.0008$)), medical diagnoses (thyroid disorders (OR 1.63, 95% CI (1.31, 2.02), $p<0.0008$), and insomnia (OR 2.46, 95% CI (1.81, 3.34), $p<0.0008$)) (Table 8) (Figure 1).

Patients with SI/SA also had greater odds of psychiatric diagnoses (ADHD (OR 7.93, 95%CI (5.75, 10.93), $p < 0.0008$), conduct disorders (OR 11.50, 95%CI (6.84, 19.34), $p < 0.0008$), adjustment disorders (OR 7.04, 95%CI (3.82, 12.97), $p < 0.0008$), personality disorders (OR 3.67, 95%CI (2.02, 6.68), $p < 0.0008$), anxiety disorders (OR 5.69, 95%CI (4.23, 7.64), $p < 0.0008$), unspecified anxiety (OR 5.03, 95%CI (3.36, 7.52), $p < 0.0008$), socioeconomic factors (problems related to primary support group (OR 5.69, 95%CI (3.26, 9.93), $p < 0.0008$)), and medical diagnoses (asthma (OR 1.59, 95%CI (1.28, 1.98), $p < 0.0008$), sleep disorders (OR 2.22, 95%CI (1.64, 3.00), $p < 0.0008$)) (Table 9) (Figure 2).

Ages 13-21

In the adolescent COVID-19-positive group, those with SOSH had greater odds of psychiatric risk factors including ADHD (OR 1.93; 95% CI (1.75, 2.13), $p < 0.0008$), conduct disorders (OR 2.51; 95% CI (2.17, 2.90), $p < 0.0008$), adjustment disorders (OR 1.73 ; CI (1.43, 2.10), $p < 0.0008$), PTSD (OR 3.84 ; 95% CI (2.62, 5.64), $p < 0.0008$), bipolar disorder (OR 6.28 ; 95% CI (3.41, 11.55), $p < 0.0008$), disorders of adults personality and behavior (OR 1.96 ; 95% CI (1.62, 2.36), $p < 0.0008$), borderline personality disorder (OR 5.38 ; 95% CI (2.83, 10.25), $p < 0.0008$), mood disorders (OR 3.26 ; 95% CI (2.79, 3.82), $p < 0.0008$), anxiety and non-psychotic disorders (OR 1.77 ; 95% CI (1.60, 1.96), $p < 0.0008$), unspecified anxiety disorder (OR 1.70 ; 95% CI (1.49, 1.95), $p < 0.0008$), generalized anxiety disorder (OR 1.84 ; 95% CI (1.47, 2.31), $p < 0.0008$), depressive episode (OR 3.26 ; 95% CI (2.70, 3.94), $p < 0.0008$), recurrent major depressive disorder (OR 5.38 ; 95% CI (3.20, 9.03), $p < 0.0008$) and autism (OR 1.67 ; 95% CI (1.31, 2.11), $p < 0.0008$) (Table 10) (Figure 3). Patients had greater odds of socioeconomic factors including problems related to primary support groups (OR 2.58; 95% CI (1.90, 3.50), $p < 0.0008$), problems related to upbringing (OR 3.75; 95% CI (2.64, 5.32), $p =$

<0.0008), family history of mental and behavioral disorders (OR 3.64; 95% CI (2.41,5.49), $p<0.0008$), parent-child conflict (OR 2.85; 95% CI (1.69,4.81), $p=0.0001$) and upbringing away from parents (OR 3.51; 95% CI (1.85, 6.66), $p=0.0001$). These patients had greater odds of sleep disorders (OR 1.25; 95% CI [1.10, 1.42], $p=0.0005$) and insomnia (OR 2.15; 95% CI [1.62, 2.85], $p<0.0008$).

Among the COVID-19 positive adolescents who developed SI/SA, odds were greater for all pre-existing risk factors with a few exceptions: one psychiatric risk factor (intellectual disabilities (OR 1.28, 95% CI (0.99,1.64), $p=0.057$)) and five medical risk factors (asthma (OR 1.01, 95% CI (0.94,1.08), $p=0.8581$), disorders of thyroid gland (OR 1.00, 95% CI (0.82,1.22), $p=1.000$), diabetes mellitus (OR 1.18, 95% CI (0.97,1.43), $p=0.0889$), epilepsy (OR 0.94, 95% CI (0.79,1.12), $p=0.4811$), and migraine (OR 1.01, 95% CI (0.89,1.15), $p=0.8796$)) (Table 11) (Figure 4).

Children vs. Adolescents

In the COVID-19(+) populations with SOSH (Table 12), there were significantly greater odds of one characteristic in children only, several in adolescents only, and several in both children and adolescents. In the COVID-19(+) population with SI/SA (Table 13), there were also significantly greater odds of only one characteristic in children only, several in exclusively adolescents, and several in both groups.

Effects of COVID-19 on the Association with Suicidality and Self-Harm

Ages 0-12

During separate comparison of COVID-19(+) and COVID-19(-) children who all experienced SOSH, COVID-19 diagnosis itself was associated only with a pre-existing diagnosis of asthma (OR 1.75, 95% CI (1.41, 2.18), $p<0.0008$) (Supplementary Table 1). Among children diagnosed

with SI/SA, COVID-19 diagnosis was associated with pre-existing diagnosis of asthma (OR 2.06, 95% CI (1.63, 2.61), $p < 0.0008$) and insomnia (OR 3.01, 95% CI (1.70, 5.34), $p = 0.0002$) (Supplementary Table 2).

However, upon analysis of the variance of the odds ratios, the specific effect size of COVID-19 diagnosis was not significant for any pre-existing characteristic, for patients with SOSH or SI/SA.

Ages 13-21

In adolescents with SOSH, COVID-19 was associated with greater odds of the pre-existing psychiatric diagnoses ADHD (OR 1.35, 95% CI (1.23, 1.47), $p < 0.0008$), conduct disorder (OR 1.34, 95% CI (1.19, 1.51), $p < 0.0008$), adjustment disorders (OR 1.44, 95% CI (1.20, 1.74), $p < 0.0001$), mood disorders (OR 1.26, 95% CI (1.12, 1.41), $p < 0.0001$), anxiety disorders (OR 1.35, 95% CI (1.23, 1.48), $p < 0.0008$), unspecified anxiety (OR 1.29, 95% CI (1.14, 1.47), $p < 0.0008$), and depressive episode (OR 1.32, 95% CI (1.15, 1.52), $p < 0.0001$) (Supplementary Table 3). In this group, there was higher odds of medical diagnoses including asthma (OR 1.36, 95% CI (1.24, 1.49), $p < 0.0008$), sleep disorders (OR 1.35, 95% CI (1.19, 1.54), $p < 0.0008$), insomnia (OR 1.56, 95% CI (1.21, 2.01), $p < 0.0006$) and migraines (OR 1.81, 95% CI (1.44, 2.29), $p < 0.0008$).

In adolescents with SI/SA, COVID-19 was associated with greater odds of the psychiatric risk factors ADHD (OR 1.25, 95% CI (1.18, 1.33), $p < 0.0008$), conduct disorder (OR 1.28, 95% CI (1.18, 1.40), $p < 0.0008$), bipolar disorder (OR 1.39, 95% CI (1.21, 1.59), $p < 0.0008$), and unspecified anxiety (OR 1.14, 95% CI (1.08, 1.21), $p < 0.0008$) (Supplementary Table 4).

Additionally, there were greater odds of socioeconomic factors (personal history of unspecified abuse in childhood (OR 2.57, 95% CI (1.85, 3.57), $p < 0.0008$)) and medical diagnoses (asthma (OR 1.22, 95% CI (1.13, 1.31), $p < 0.0008$) and diabetes mellitus (OR 1.66, 95% CI (1.34, 2.04), $p < 0.0008$)).

In contrast, there were lower odds of socioeconomic risk factors related to education and literacy (OR 0.71, 95% CI (0.60, 0.83), $p < 0.0008$), upbringing problems (OR 0.83, 95% CI (0.76, 0.90), $p < 0.0008$), parent-child conflict (OR 0.65, 95% CI (0.56, 0.75), $p < 0.0008$), history of childhood psychological abuse (OR 0.44, 95% CI (0.34, 0.56), $p < 0.0008$); and psychiatric risk factors including mental disorders due to psychoactive substance use (OR 0.85, 95% CI (0.78, 0.93), $p = 0.0003$), alcohol-related disorders (OR 0.65, 95% CI (0.53, 0.79), $p < 0.0008$), gender identity disorder (OR 0.71, 95% CI (0.58, 0.86), $p = 0.0006$), history of self-harm (OR 0.87, 95% CI (0.81, 0.94), $p = 0.0003$), history of non-suicidal self-harm (OR 0.56, 95% CI (0.47, 0.68), $p < 0.0008$), mood disorders (OR 0.83, 95% CI (0.80, 0.87), $p < 0.0008$), generalized anxiety disorder (OR 0.86, 95% CI (0.79, 0.93), $p = 0.0005$), depressive episode (OR 0.86, 95% CI (0.82, 0.90), $p < 0.0008$), and recurrent major depressive disorder (OR 0.70, 95% CI (0.64, 0.75), $p < 0.0008$).

In this age group, the effect size of COVID-19 was not significant for any pre-existing characteristic for patients with SOSH or SI/SA.

Children vs. Adolescents

In patients with SOSH, patients diagnosed with COVID-19 had significantly greater odds of only one characteristic in children, and of several in adolescents (Table 14). In patients with SI/SA, patients with COVID-19 had significantly greater odds of two characteristics in children, and of several in adolescents (Table 15).

DISCUSSION

This is the first study to specifically examine this number of risk factors for suicidality and self-harm in both children and adolescents in relation to COVID-19 diagnosis and also examine the effect of COVID-19. Though we examined known risk factors, we observed a marked variety of ORs across these pre-existing characteristics: for some, we observed significant association with SOSH and SI/A, and for others did not observe such strong association.

In both children and adolescents, patients with SOSH and SI/SA had a greater odds of a prior COVID-19 diagnosis than patients without. In these two age groups, SOSH and SI/SA were associated with several pre-existing psychiatric disorders, medical diagnoses, and socioeconomic factors previously described in the literature. Problems with primary support group, adult personality disorders, GAD, thyroid disorders, and insomnia were significant only in COVID-19+ children with SOSH; while upbringing problems, anxiety and other nonpsychotic disorders, sleep disorders, and autistic disorder were significant only in COVID-19- children with SOSH. In children with SI/SA, problems with primary support group, adult personality disorders, and asthma were significant only in COVID-19+ patients; while autistic disorder was significant only in COVID-19- patients. In adolescents with SOSH, problems related to education and literacy were significant only in COVID-19- patients, while parent-child conflict was only significant in COVID-19+ patients. In adolescents with SI/SA, asthma was only significant in COVID-19- patients.

This study reaffirms the associations between factors related to suicidality that exist independently of the pandemic context. These include psychiatric diagnoses like ADHD and conduct disorder⁽⁵⁾, medical diagnoses like insomnia or sleep disorders⁽²³⁾, and socioeconomic factors like childhood abuse⁽²⁴⁾. In contrast to prior literature, this study does not consistently demonstrate an association between SOSH and medical risk factors like diabetes and asthma.

We found a greater odds of COVID-19 in patients with suicidality than without but found little difference between the factors associated with suicidality in COVID-19(+) and COVID-19(-) patients.

Greater suicidality rates have been observed in COVID-19-infected patients both before and after SARS-CoV-2 diagnosis^(8,9). Development of SOSH after COVID-19 diagnosis could be associated with COVID-19-related inflammation⁽¹²⁾, potentially related to the emerging relationship between inflammation and depression⁽²⁵⁾ and between inflammation and suicide⁽²⁶⁾.

This study has several strengths. Replicating associations between SOSH and previously studied risk factors in a large sample documents generalizability. Separating child and adolescent populations addresses variability between age groups, including the possibility of unique risk factors. Additionally, our focus on suicidality after COVID-19 diagnosis attempts to examine associations of the disease itself, rather than the psychological impact of the pandemic.

Regarding limitations, this study used TriNetX, which is sourced from electronic medical records and examines diagnoses based on ICD codes. The accuracy of EMR data may vary based on documentation practices. Providers may be less likely to document socioeconomic factors like abuse or homelessness and may not attach corresponding ICD codes. The database likely underestimates the true set of patients with these socioeconomic concerns.

This study controlled for a limited set of covariates through propensity score-matching. Due to platform limitations (inability to balance for greater than a set number of covariates for very large samples), we restricted propensity-score matching to demographic factors (age, sex, race, ethnicity), and so the present study fails to account for the confounding effect of pre-existing psychiatric disorders (e.g. depression), medical history, and socioeconomic factors. Additional

confounders may remain. As we controlled for demographic factors, our study also does not address disparities in SOSH or risk factors across racial, ethnic, and sex groups.

While this study examined SOSH (SI/SA/SIB) and suicidality (SI/SA) separately, it does not individually examine SI, SA, and SIB, which may have different risk factor profiles. Furthermore, this study does not account for variability in the expression of COVID-19 that may impact suicide risk, including severity of COVID-19 infection, need for hospitalization, burden of COVID-19 symptoms, and persistence of symptoms after infection⁽²⁷⁾.

Our study is the first to examine risk factors for suicidality and self-harm associated with COVID-19 diagnosis and infection in a large sample of children and adolescents; demonstrates increased odds of preceding COVID-19 diagnosis in patients with suicidality and self-harm; and demonstrates minimal association between COVID-19 and pre-existing risk factors in children, but association with several psychiatric, medical, and socioeconomic factors in adolescents.

Tables

ICD-10 Code	Characteristic
Z55	Problems related to education and literacy
Z59	Problems related to housing and economic circumstances
Z60	Problems related to social environment
Z60.4	Social exclusion and rejection
Z62	Problems related to upbringing
Z62-2	Upbringing away from parents
Z62.81	Personal history of abuse in childhood
Z62.810	Personal history of physical and sexual abuse in childhood
Z62.811	Personal history of psychological abuse in childhood
Z62.812	Personal history of neglect in childhood
Z62.819	Personal history of unspecified abuse in childhood
Z62-82	Parent-child conflict
Z63	Other problems related to primary support group, including family circumstances
Z65	Problems related to other psychosocial circumstances
Z81	Family history of mental and behavioral disorders
Z91.5	Personal history of self-harm
Z91.52	Personal history of nonsuicidal self-harm
F10-F19	Mental and behavioral disorders due to psychoactive substance use
F10	Alcohol related disorders
F12	Cannabis related disorders
F17	Nicotine dependence
F20-F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders
F20	Schizophrenia
F22	Delusional disorders
F25	Schizoaffective disorders
F29	Unspecified psychosis not due to a substance or known physiological condition
F30-F39	Mood [affective] disorders
F31	Bipolar disorder
F32	Depressive episode
F33	Major depressive disorder, recurrent
F34.1	Dysthymic disorder
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders
F41-0	Panic disorder [episodic paroxysmal anxiety]
F41-1	Generalized anxiety disorder
F41-9	Anxiety disorder, unspecified

F42	Obsessive-compulsive disorder
F43-1	Post-traumatic stress disorder (PTSD)
F43-2	Adjustment disorders
F60-F69	Disorders of adult personality and behavior
F60-3	Borderline personality disorder
F64	Gender identity disorders
F70-F79	Intellectual Disabilities
F84-0	Autistic disorder
F84-5	Asperger's syndrome
F90	Attention-deficit hyperactivity disorders
F91	Conduct disorders
J45	Asthma
E00-E07	Disorders of thyroid gland
E08-E13	Diabetes mellitus
G40	Epilepsy and recurrent seizures
G47	Sleep disorders
G47-0	Insomnia
G43	Migraine

Table 1. Socioeconomic, psychiatric, and medical characteristics assessed for all comparison groups.

ICD-10 Code	Characteristic	COVID-19(-), SOSH(+)		COVID-19(-), SOSH(-)		OR	95% CI	P value
		N	%	N	%			
SOCIOECONOMIC DIAGNOSES								
Z62	Problems related to upbringing	84	6.20%	11	0.81%	8.08	(4.29, 15.22)	*<0.0008
PSYCHIATRIC DIAGNOSES								
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	262	19.31%	46	3.39%	6.82	(4.94, 9.43)	*<0.0008
F41-9	Anxiety disorder, unspecified	131	9.65%	17	1.25%	8.43	(5.06, 14.05)	*<0.0008
F84-0	Autistic disorder	70	5.16%	19	1.40%	3.83	(2.30, 6.40)	*<0.0008
F90	Attention-deficit hyperactivity disorders	263	19.38%	47	3.46%	6.71	(4.87, 9.24)	*<0.0008
F91	Conduct disorders	146	10.76%	21	1.55%	7.68	(4.83, 12.21)	*<0.0008
MEDICAL DIAGNOSES								

J45	Asthma	151	11.13%	113	8.32%	1.38	(1.07, 1.78)	0.0138
G40	Epilepsy and recurrent seizures	19	1.40%	22	1.62%	0.86	(0.46, 1.60)	0.6517
G47	Sleep disorders	110	8.11%	57	4.20%	2.01	(1.45, 2.80)	*<0.0008
G43	Migraine	14	1.03%	14	1.03%	1.00	(0.48, 2.11)	0.9986

Table 2. Prevalence and odds ratios of medical/psychiatric/socioeconomic characteristics in patients 0-12 with or without SOSH among COVID-19 (-) patients. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk (*).

ICD-10 Code	Characteristic	COVID-19(-), SI/SA(+)		COVID-19(-), SI/SA(-)		OR	95%CI	P value
		N	%	N	%			
PSYCHIATRIC DIAGNOSES								
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	256	19.65%	36	2.76%	8.61	(6.02, 12.32)	*<0.0008
F41.9	Anxiety disorder, unspecified	129	9.90%	15	1.15%	9.44	(5.50, 16.21)	*<0.0008
F43.2	Adjustment disorders	71	5.45%	11	0.84%	6.77	(3.57, 12.85)	*<0.0008
F84.0	Autistic disorder	66	5.07%	16	1.23%	4.30	(2.47, 7.46)	*<0.0008
F90	Attention-deficit hyperactivity disorders	254	19.49%	34	2.61%	9.04	(6.27, 13.06)	*<0.0008
F91	Conduct disorders	163	12.51%	17	1.30%	10.82	(6.53, 17.95)	*<0.0008
MEDICAL DIAGNOSES								
J45	Asthma	122	9.36%	115	8.82%	1.07	(0.82, 1.40)	0.6419
G40	Epilepsy and recurrent seizures	12	0.92%	17	1.30%	0.70	(0.33, 1.48)	0.3598
G47	Sleep disorders	98	7.52%	51	3.91%	2.00	(1.41, 2.83)	*0.0001

Table 3. Prevalence and odds ratios of medical/psychiatric/socioeconomic characteristics in patients 0-12 with or without SI/SA among COVID-19 (-) patients. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk (*).

ICD-10 Code	Characteristic	COVID-19(-), SOSH(+)		COVID-19(-), SOSH(-)		OR	95%CI	P value
		N	%	N	%			
SOCIOECONOMIC DIAGNOSES								

Z55	Problems related to education and literacy	90	0.59%	41	0.27%	2.20	(1.52, 3.19)	<0.0008*
Z60	Problems related to social environment	32	0.21%	14	0.09%	2.29	(1.22, 4.29)	0.0098
Z62	Problems related to upbringing	130	0.85%	43	0.28%	3.04	(2.15, 4.30)	<0.0008*
Z62.2	Upbringing away from parents	50	0.33%	16	0.10%	3.13	(1.78, 5.50)	<0.0008*
Z62.82	Parent-child conflict	33	0.22%	13	0.09%	2.54	(1.34, 4.83)	0.0045
Z63	Other problems related to primary support group, including family circumstances	107	0.70%	50	0.33%	2.15	(1.53, 3.01)	<0.0008*
Z65	Problems related to other psychosocial circumstances	44	0.29%	18	0.12%	2.45	(1.41, 4.24)	0.0014
Z81	Family history of mental and behavioral disorders	103	0.67%	22	0.14%	4.71	(2.97, 7.46)	<0.0008*
PSYCHIATRIC DIAGNOSES								
F30-F39	Mood [affective] disorders	535	3.50%	135	0.88%	4.07	(3.37, 4.92)	<0.0008*
F31	Bipolar disorder	56	0.37%	14	0.09%	4.01	(2.23, 7.21)	<0.0008*
F32	Depressive episode	350	2.29%	95	0.62%	3.75	(2.98, 4.71)	<0.0008*
F33	Major depressive disorder, recurrent	91	0.60%	12	0.08%	7.62	(4.17, 13.92)	<0.0008*
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	806	5.27%	362	2.37%	2.29	(2.02, 2.60)	<0.0008*
F41.0	Panic disorder [episodic paroxysmal anxiety]	30	0.20%	12	0.08%	2.50	(1.28, 4.89)	0.0073
F41.1	Generalized anxiety disorder	183	1.20%	81	0.53%	2.27	(1.75, 2.96)	<0.0008*
F41.9	Anxiety disorder, unspecified	450	2.94%	188	1.23%	2.44	(2.05, 2.89)	<0.0008*
F42	Obsessive-compulsive disorder	45	0.29%	28	0.18%	1.61	(1.00, 2.58)	0.0481
F43.1	Post-traumatic stress disorder (PTSD)	106	0.69%	17	0.11%	6.27	(3.76, 10.47)	<0.0008*
F43.2	Adjustment disorders	195	1.28%	103	0.67%	1.90	(1.50, 2.42)	<0.0008*
F60-F69	Disorders of adult personality and behavior	276	1.80%	112	0.73%	2.49	(2.00, 3.11)	<0.0008*
F60.3	Borderline personality disorder	53	0.35%	13	0.09%	4.09	(2.23, 7.50)	<0.0008*
F70-F79	Intellectual	42	0.27%	45	0.29%	0.93	(0.61, 1.42)	1.207

	Disabilities							
F84-0	Autistic disorder	153	1.00%	94	0.61%	1.63	(1.26, 2.11)	0.0002*
F84-5	Asperger's syndrome	34	0.22%	17	0.11%	2.00	(1.12, 3.59)	0.0194
F90	Attention-deficit hyperactivity disorders	894	5.85%	455	2.98%	2.02	(1.80, 2.27)	<0.0008*
F91	Conduct disorders	477	3.12%	187	1.22%	2.60	(2.19, 3.08)	<0.0008*
MEDICAL DIAGNOSES								
J45	Asthma	878	5.74%	801	5.24%	1.10	(1.00, 1.22)	0.0529
E00-E07	Disorders of thyroid gland	62	0.41%	91	0.60%	0.68	(0.49, 0.94)	0.5514
E08-E13	Diabetes mellitus	58	0.38%	75	0.49%	0.77	(0.55, 1.09)	1.166
G40	Epilepsy and recurrent seizures	105	0.69%	148	0.97%	0.71	(0.55, 0.91)	0.3332
G47	Sleep disorders	419	2.74%	309	2.02%	1.37	(1.18, 1.59)	<0.0008*
G47-0	Insomnia	99	0.65%	49	0.32%	2.03	(1.44, 2.86)	<0.0008*
G43	Migraine	111	0.73%	117	0.77%	0.95	(0.73, 1.23)	1.246

Table 4. Prevalence and odds ratios of medical/psychiatric/socioeconomic characteristics in patients 13-21 with or without SOSH among COVID-19 (-) patients. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk (*).

ICD-10 Code	Characteristic	COVID-19(-), SI/SA(+)		COVID-19(-), SI/SA(-)		OR	95%CI	P value
		N	%	N	%			
SOCIOECONOMIC DIAGNOSES								
Z55	Problems related to education and literacy	344	2.22%	94	0.61%	3.72	(2.96, 4.68)	<0.0008*
Z59	Problems related to housing and economic circumstances	99	0.64%	36	0.23%	2.76	(1.88, 4.05)	<0.0008*
Z60	Problems related to social environment	209	1.35%	19	0.12%	11.14	(6.96, 17.82)	<0.0008*
Z62	Problems related to upbringing	1147	7.41%	114	0.74%	10.79	(8.89, 13.09)	<0.0008*
Z62-2	Upbringing away from parents	213	1.38%	50	0.32%	4.31	(3.16, 5.86)	<0.0008*
Z62.81	Personal history of abuse in childhood	639	4.13%	36	0.23%	18.47	(13.19, 25.86)	<0.0008*
Z62.810	Personal history of physical and sexual abuse in childhood	478	3.09%	23	0.15%	21.41	(14.08, 32.56)	<0.0008*
Z62-82	Parent-child conflict	447	2.89%	34	0.22%	13.51	(9.52, 19.16)	<0.0008*
Z63	Other problems related to primary support	687	4.44%	92	0.59%	7.77	(6.24, 9.67)	<0.0008*

	group, including family circumstances								
Z65	Problems related to other psychosocial circumstances	275	1.78%	40	0.26%	6.98	(5.01, 9.73)	<0.0008*	
Z81	Family history of mental and behavioral disorders	958	6.19%	83	0.54%	12.24	(9.77, 15.33)	<0.0008*	
Z91.5	Personal history of self-harm	1674	10.82%	51	0.33%	36.68	(27.74, 48.52)	<0.0008*	
PSYCHIATRIC DIAGNOSES									
F10-F19	Mental and behavioral disorders due to psychoactive substance use	1208	7.81%	129	0.83%	10.07	(8.39, 12.10)	<0.0008*	
F10	Alcohol related disorders	244	1.58%	18	0.12%	13.76	(8.52, 22.21)	<0.0008*	
F12	Cannabis related disorders	708	4.58%	68	0.44%	10.86	(8.46, 13.95)	<0.0008*	
F17	Nicotine dependence	403	2.60%	41	0.26%	10.07	(7.29, 13.89)	<0.0008*	
F20-F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders	319	2.06%	24	0.16%	13.55	(8.94, 20.53)	<0.0008*	
F29	Unspecified psychosis not due to a substance or known physiological condition	185	1.20%	12	0.08%	15.59	(8.69, 27.97)	<0.0008*	
F30-F39	Mood [affective] disorders	5929	38.32%	636	4.11%	14.49	(13.30, 15.79)	<0.0008*	
F31	Bipolar disorder	361	2.33%	37	0.24%	9.97	(7.10, 13.99)	<0.0008*	
F32	Depressive episode	4616	29.83%	475	3.07%	13.42	(12.18, 14.80)	<0.0008*	
F33	Major depressive disorder, recurrent	1627	10.52%	116	0.75%	15.56	(12.87, 18.81)	<0.0008*	
F34.1	Dysthymic disorder	126	0.81%	28	0.18%	4.53	(3.01, 6.82)	<0.0008*	
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	4935	31.89%	1206	7.79%	5.54	(5.18, 5.93)	<0.0008*	
F41.0	Panic disorder [episodic paroxysmal anxiety]	353	2.28%	57	0.37%	6.31	(4.77, 8.36)	<0.0008*	
F41.1	Generalized anxiety disorder	1220	7.88%	247	1.60%	5.28	(4.59, 6.06)	<0.0008*	
F41.9	Anxiety disorder, unspecified	2656	17.17%	720	4.65%	4.25	(3.90, 4.63)	<0.0008*	
F42	Obsessive-compulsive disorder	257	1.66%	45	0.29%	5.79	(4.22, 7.95)	<0.0008*	
F43.1	Post-traumatic	915	5.91%	91	0.59%	10.62	(8.55, 13.19)	<0.0008*	

	stress disorder (PTSD)							
F43·2	Adjustment disorders	981	6·34%	221	1·43%	4·67	(4·03, 5·42)	<0·0008*
F60-F69	Disorders of adult personality and behavior	839	5·42%	188	1·21%	4·66	(3·97, 5·47)	<0·0008*
F60·3	Borderline personality disorder	176	1·14%	15	0·10%	11·86	(7·00, 20·10)	<0·0008*
F64	Gender identity disorders	243	1·57%	52	0·34%	4·73	(3·50, 6·39)	<0·0008*
F70-F79	Intellectual Disabilities	108	0·70%	76	0·49%	1·42	(1·06, 1·91)	0·0184
F84·0	Autistic disorder	446	2·88%	182	1·18%	2·49	(2·10, 2·97)	<0·0008*
F84·5	Asperger's syndrome	60	0·39%	19	0·12%	3·17	(1·89, 5·31)	<0·0008*
F90	Attention-deficit hyperactivity disorders	2138	13·82%	760	4·91%	3·10	(2·85, 3·38)	<0·0008*
F91	Conduct disorders	1039	6·71%	230	1·49%	4·77	(4·13, 5·51)	<0·0008*
MEDICAL DIAGNOSES								
J45	Asthma	1570	10·15%	1246	8·05%	1·29	(1·19, 1·39)	<0·0008*
E00-E07	Disorders of thyroid gland	177	1·14%	199	1·29%	0·89	(0·72, 1·09)	0·2568
E08-E13	Diabetes mellitus	141	0·91%	153	0·99%	0·92	(0·73, 1·16)	0·4918
G40	Epilepsy and recurrent seizures	193	1·25%	225	1·45%	0·86	(0·71, 1·04)	0·1153
G47	Sleep disorders	1140	7·37%	592	3·83%	2·00	(1·81, 2·21)	<0·0008*
G47·0	Insomnia	557	3·60%	117	0·76%	4·90	(4·01, 5·99)	<0·0008*
G43	Migraine	425	2·75%	349	2·26%	1·22	(1·06, 1·41)	0·0058

Table 5. Prevalence and odds ratios of medical/psychiatric/socioeconomic characteristics in patients 0-12 with or without SI/SA among COVID-19 (-) patients. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk (*).

ICD-10 Code	Characteristic	0-12			13-21		
SOCIOECONOMIC DIAGNOSES		OR	95%CI	p value	OR	95%CI	p value
Z55	Problems related to education and literacy				2·20	(1·52, 3·19)	<0·0008*
Z60	Problems related to social environment				2·29	(1·22, 4·29)	0·0098
Z62	Problems related to upbringing	8·08	(4·29, 15·22)	*<0·0008	3·04	(2·15, 4·30)	<0·0008*
Z62·2	Upbringing away from parents				3·13	(1·78, 5·50)	<0·0008*
Z62·82	Parent-child conflict				2·54	(1·34, 4·83)	0·0045

Z63	Other problems related to primary support group, including family circumstances				2.15	(1.53, 3.01)	<0.0008*
Z65	Problems related to other psychosocial circumstances				2.45	(1.41, 4.24)	0.0014
Z81	Family history of mental and behavioral disorders				4.71	(2.97, 7.46)	<0.0008*
PSYCHIATRIC DIAGNOSES							
F30-F39	Mood [affective] disorders				4.07	(3.37, 4.92)	<0.0008*
F31	Bipolar disorder				4.01	(2.23, 7.21)	<0.0008*
F32	Depressive episode				3.75	(2.98, 4.71)	<0.0008*
F33	Major depressive disorder, recurrent				7.62	(4.17, 13.92)	<0.0008*
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	6.82	(4.94, 9.43)	*<0.0008	2.29	(2.02, 2.60)	<0.0008*
F41.0	Panic disorder [episodic paroxysmal anxiety]				2.50	(1.28, 4.89)	0.0073
F41.1	Generalized anxiety disorder				2.27	(1.75, 2.96)	<0.0008*
F41.9	Anxiety disorder, unspecified	8.43	(5.06, 14.05)	*<0.0008	2.44	(2.05, 2.89)	<0.0008*
F42	Obsessive-compulsive disorder				1.61	(1.00, 2.58)	0.0481
F43.1	Post-traumatic stress disorder (PTSD)				6.27	(3.76, 10.47)	<0.0008*
F43.2	Adjustment disorders				1.90	(1.50, 2.42)	<0.0008*
F60-F69	Disorders of adult personality and behavior				2.49	(2.00, 3.11)	<0.0008*
F60.3	Borderline personality disorder				4.09	(2.23, 7.50)	<0.0008*
F70-F79	Intellectual Disabilities				0.93	(0.61, 1.42)	1.207
F84.0	Autistic disorder	3.83	(2.30, 6.40)	*<0.0008	1.63	(1.26, 2.11)	0.0002*
F84.5	Asperger's syndrome				2.00	(1.12, 3.59)	0.0194
F90	Attention-deficit hyperactivity disorders	6.71	(4.87, 9.24)	*<0.0008	2.02	(1.80, 2.27)	<0.0008*
F91	Conduct disorders	7.68	(4.83, 12.21)	*<0.0008	2.60	(2.19, 3.08)	<0.0008*
MEDICAL DIAGNOSES							
J45	Asthma	1.38	(1.07, 1.78)	0.0138	1.10	(1.00, 1.22)	0.0529
E00-E07	Disorders of thyroid gland				0.68	(0.49, 0.94)	0.5514
E08-E13	Diabetes mellitus				0.77	(0.55, 1.09)	1.166

G40	Epilepsy and recurrent seizures	0.86	(0.46, 1.60)	0.6517	0.71	(0.55, 0.91)	0.3332
G47	Sleep disorders	2.01	(1.45, 2.80)	*<0.0008	1.37	(1.18, 1.59)	<0.0008*
G47.0	Insomnia				2.03	(1.44, 2.86)	<0.0008*
G43	Migraine	1.00	(0.48, 2.11)	0.9986	0.95	(0.73, 1.23)	1.246

Table 6. Odds ratios (OR) of medical, psychiatric, and socioeconomic characteristics in COVID-19 (-) patients with or without SOSH, with a comparison between OR for the 0-12 and 13-21 age groups. Bold denotes significantly greater odds. Italics denotes significantly lower odds. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk. Characteristics observed in a total of 10 or fewer patients were excluded from comparison and are not included in this table.

ICD-10 Code	Characteristic	0-12			13-21		
SOCIOECONOMIC DIAGNOSES		OR	95% CI	p value	OR	95% CI	p value
Z55	Problems related to education and literacy				3.72	(2.96, 4.68)	<0.0008*
Z59	Problems related to housing and economic circumstances				2.76	(1.88, 4.05)	<0.0008*
Z60	Problems related to social environment				11.14	(6.96, 17.82)	<0.0008*
Z62	Problems related to upbringing				10.79	(8.89, 13.09)	<0.0008*
Z62.2	Upbringing away from parents				4.31	(3.16, 5.86)	<0.0008*
Z62.81	Personal history of abuse in childhood				18.47	(13.19, 25.86)	<0.0008*
Z62.810	Personal history of physical and sexual abuse in childhood				21.41	(14.08, 32.56)	<0.0008*
Z62.82	Parent-child conflict				13.51	(9.52, 19.16)	<0.0008*
Z63	Other problems related to primary support group, including family circumstances				7.77	(6.24, 9.67)	<0.0008*
Z65	Problems related to other psychosocial circumstances				6.98	(5.01, 9.73)	<0.0008*
Z81	Family history of mental and behavioral disorders				12.24	(9.77, 15.33)	<0.0008*

Z91.5	Personal history of self-harm				36.68	(27.74, 48.52)	<0.0008*
PSYCHIATRIC DIAGNOSES							
F10-F19	Mental and behavioral disorders due to psychoactive substance use				10.07	(8.39, 12.10)	<0.0008*
F10	Alcohol related disorders				13.76	(8.52, 22.21)	<0.0008*
F12	Cannabis related disorders				10.86	(8.46, 13.95)	<0.0008*
F17	Nicotine dependence				10.07	(7.29, 13.89)	<0.0008*
F20-F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders				13.55	(8.94, 20.53)	<0.0008*
F29	Unspecified psychosis not due to a substance or known physiological condition				15.59	(8.69, 27.97)	<0.0008*
F30-F39	Mood [affective] disorders				14.49	(13.30, 15.79)	<0.0008*
F31	Bipolar disorder				9.97	(7.10, 13.99)	<0.0008*
F32	Depressive episode				13.42	(12.18, 14.80)	<0.0008*
F33	Major depressive disorder, recurrent				15.56	(12.87, 18.81)	<0.0008*
F34.1	Dysthymic disorder				4.53	(3.01, 6.82)	<0.0008*
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	8.61	(6.02, 12.32)	*<0.0008	5.54	(5.18, 5.93)	<0.0008*
F41.0	Panic disorder [episodic paroxysmal anxiety]				6.31	(4.77, 8.36)	<0.0008*
F41.1	Generalized anxiety disorder				5.28	(4.59, 6.06)	<0.0008*
F41.9	Anxiety disorder, unspecified	9.44	(5.50, 16.21)	*<0.0008	4.25	(3.90, 4.63)	<0.0008*
F42	Obsessive-compulsive disorder				5.79	(4.22, 7.95)	<0.0008*
F43.1	Post-traumatic stress disorder (PTSD)				10.62	(8.55, 13.19)	<0.0008*
F43.2	Adjustment disorders	6.77	(3.57, 12.85)	*<0.0008	4.67	(4.03, 5.42)	<0.0008*
F60-F69	Disorders of adult personality and behavior				4.66	(3.97, 5.47)	<0.0008*
F60.3	Borderline personality disorder				11.86	(7.00, 20.10)	<0.0008*
F64	Gender identity disorders				4.73	(3.50, 6.39)	<0.0008*

F70-F79	Intellectual Disabilities				1.42	(1.06, 1.91)	0.0184
F84.0	Autistic disorder	4.30	(2.47, 7.46)	*<0.0008	2.49	(2.10, 2.97)	<0.0008*
F84.5	Asperger's syndrome				3.17	(1.89, 5.31)	<0.0008*
F90	Attention-deficit hyperactivity disorders	9.04	(6.27, 13.06)	*<0.0008	3.10	(2.85, 3.38)	<0.0008*
F91	Conduct disorders	10.82	(6.53, 17.95)	*<0.0008	4.77	(4.13, 5.51)	<0.0008*
MEDICAL DIAGNOSES							
J45	Asthma	1.07	(0.82, 1.40)	0.6419	1.29	(1.19, 1.39)	<0.0008*
E00-E07	Disorders of thyroid gland				0.89	(0.72, 1.09)	0.2568
E08-E13	Diabetes mellitus				0.92	(0.73, 1.16)	0.4918
G40	Epilepsy and recurrent seizures	0.70	(0.33, 1.48)	0.3598	0.86	(0.71, 1.04)	0.1153
G47	Sleep disorders	2.00	(1.41, 2.83)	*0.0001	2.00	(1.81, 2.21)	<0.0008*
G47.0	Insomnia				4.90	(4.01, 5.99)	<0.0008*
G43	Migraine				1.22	(1.06, 1.41)	0.0058

Table 7. Odds ratios (OR) of medical, psychiatric, and socioeconomic characteristics in COVID-19 (-) patients with or without SI/SA, with a comparison between OR for the 0-12 and 13-21 age groups. Bold denotes significantly greater odds. Italics denotes significantly lower odds. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk. Characteristics observed in a total of 10 or fewer patients were excluded from comparison and are not included in this table.

ICD-10 Code	Characteristic	COVID-19(+), SOSH(+)		COVID-19(+), SOSH(-)		OR	95% CI	P value
		N	%	N	%			
SOCIOECONOMIC DIAGNOSES								
Z59	Problems related to housing and economic circumstances	15	1.10%	11	0.81%	1.37	(0.63, 2.99)	0.4407
Z63	Other problems related to primary support group, including family circumstances	74	5.45%	11	0.81%	7.06	(3.73, 13.36)	*<0.0008
PSYCHIATRIC DIAGNOSES								
F41.1	Generalized anxiety disorder	140	10.31%	26	1.91%	5.89	(3.85, 9.01)	*<0.0008
F41.9	Anxiety disorder, unspecified	281	20.69%	55	4.05%	6.18	(4.58, 8.34)	*<0.0008
F60-F69	Disorders of adult personality and behavior	52	3.83%	12	0.88%	4.47	(2.37, 8.40)	*<0.0008
F84.5	Asperger's syndrome	47	3.46%	31	2.28%	1.53	(0.97, 2.43)	0.0675
F90	Attention-deficit hyperactivity disorders	293	21.58%	64	4.71%	5.56	(4.19, 7.38)	*<0.0008

F91	Conduct disorders	164	12.08%	25	1.84%	7.32	(4.77, 11.24)	*<0.0008
MEDICAL DIAGNOSES								
E00-E07	Disorders of thyroid gland	244	17.97%	161	11.86%	1.63	(1.31, 2.02)	*<0.0008
G47	Sleep disorders	29	2.14%	13	0.96%	2.26	(1.17, 4.36)	0.0153
G47.0	Insomnia	145	10.68%	63	4.64%	2.46	(1.81, 3.34)	*<0.0008

Table 8. Prevalence and odds ratios of medical/psychiatric/socioeconomic characteristics in patients 0-12 with or without SOSH among COVID-19 (+) patients. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk (*).

ICD-10 Code	Characteristic	COVID-19(+), SI/SA(+)		COVID-19(+), SI/SA(-)		OR	95% CI	P value
		N	%	N	%			
SOCIOECONOMIC DIAGNOSES								
Z63	Other problems related to primary support group, including family circumstances	81	6.21%	15	1.15%	5.69	(3.26, 9.93)	*<0.0008
PSYCHIATRIC DIAGNOSES								
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	273	20.94%	58	4.45%	5.69	(4.23, 7.64)	*<0.0008
F41.9	Anxiety disorder, unspecified	138	10.58%	30	2.30%	5.03	(3.36, 7.52)	*<0.0008
F43.2	Adjustment disorders	80	6.13%	12	0.92%	7.04	(3.82, 12.97)	*<0.0008
F60-F69	Disorders of adult personality and behavior	50	3.83%	14	1.07%	3.67	(2.02, 6.68)	*<0.0008
F84.0	Autistic disorder	42	3.22%	16	1.23%	2.68	(1.50, 4.79)	0.0009
F90	Attention-deficit hyperactivity disorders	293	22.47%	46	3.53%	7.93	(5.75, 10.93)	*<0.0008
F91	Conduct disorders	163	12.50%	16	1.23%	11.50	(6.84, 19.34)	*<0.0008
MEDICAL DIAGNOSES								
J45	Asthma	229	17.56%	154	11.81%	1.59	(1.28, 1.98)	*<0.0008
G40	Epilepsy and recurrent seizures	24	1.84%	16	1.23%	1.51	(0.80, 2.85)	0.20701
G47	Sleep disorders	140	10.74%	67	5.14%	2.22	(1.64, 3.00)	*<0.0008
G43	Migraine	12	0.92%	12	0.92%	1.00	(0.45, 2.23)	1

Table 9. Prevalence and odds ratios of medical/psychiatric/socioeconomic characteristics in patients 0-12 with or without SI/SA among COVID-19 (+) patients. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk (*).

ICD-10 Code	Characteristic	COVID-19(+), SOSH(+)		COVID-19(+), SOSH(-)		OR	95% CI	P value
		N	%	N	%			
SOCIOECONOMIC DIAGNOSES								
Z55	Problems related to education and literacy	80	0.52%	67	0.44%	1.20	(0.86, 1.65)	0.2868
Z60	Problems related to social environment	25	0.16%	15	0.10%	1.67	(0.88, 3.16)	0.1175
Z62	Problems related to upbringing	149	0.97%	40	0.26%	3.75	(2.64, 5.32)	<0.0008*
Z62.2	Upbringing away from parents	42	0.27%	12	0.08%	3.51	(1.85, 6.66)	0.0001*
Z62.82	Parent-child conflict	54	0.35%	19	0.12%	2.85	(1.69, 4.81)	0.0001*
Z63	Other problems related to primary support group, including family circumstances	146	0.95%	57	0.37%	2.58	(1.90, 3.50)	<0.0008*
Z65	Problems related to other psychosocial circumstances	62	0.41%	40	0.26%	1.55	(1.04, 2.31)	0.03016
Z81	Family history of mental and behavioral disorders	105	0.69%	29	0.19%	3.64	(2.41, 5.49)	<0.0008*
PSYCHIATRIC DIAGNOSES								
F10-F19	Mental and behavioral disorders due to psychoactive substance use	49	0.32%	29	0.19%	1.69	(1.07, 2.68)	0.0248
F30-F39	Mood [affective] disorders	668	4.37%	211	1.38%	3.26	(2.79, 3.82)	<0.0008*
F31	Bipolar disorder	75	0.49%	12	0.08%	6.28	(3.41, 11.55)	<0.0008*
F32	Depressive episode	460	3.01%	144	0.94%	3.26	(2.70, 3.94)	<0.0008*
F33	Major depressive disorder, recurrent	91	0.59%	17	0.11%	5.38	(3.20, 9.03)	<0.0008*
F34.1	Dysthymic disorder	22	0.14%	13	0.08%	1.69	(0.85, 3.36)	0.1325
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	1066	6.97%	622	4.07%	1.77	(1.60, 1.96)	<0.0008*
F41.0	Panic disorder [episodic paroxysmal anxiety]	42	0.27%	19	0.12%	2.21	(1.29, 3.81)	0.0041
F41.1	Generalized	216	1.41%	118	0.77%	1.84	(1.47, 2.31)	<0.0008*

	anxiety disorder								
F41-9	Anxiety disorder, unspecified	577	3.77%	344	2.25%	1.70	(1.49, 1.95)	<0.0008*	
F42	Obsessive-compulsive disorder	59	0.39%	32	0.21%	1.85	(1.20, 2.84)	0.0053	
F43-1	Post-traumatic stress disorder (PTSD)	126	0.82%	33	0.22%	3.84	(2.62, 5.64)	<0.0008*	
F43-2	Adjustment disorders	280	1.83%	163	1.07%	1.73	(1.43, 2.10)	<0.0008*	
F60-F69	Disorders of adult personality and behavior	331	2.16%	171	1.12%	1.96	(1.62, 2.36)	<0.0008*	
F60-3	Borderline personality disorder	59	0.39%	11	0.07%	5.38	(2.83, 10.25)	<0.0008*	
F70-F79	Intellectual Disabilities	45	0.29%	67	0.44%	0.67	(0.46, 0.98)	0.0382	
F84-0	Autistic disorder	184	1.20%	111	0.73%	1.67	(1.31, 2.11)	<0.0008*	
F84-5	Asperger's syndrome	40	0.26%	17	0.11%	2.36	(1.34, 4.16)	0.0031	
F90	Attention-deficit hyperactivity disorders	1181	7.72%	636	4.16%	1.93	(1.75, 2.13)	<0.0008*	
F91	Conduct disorders	633	4.14%	259	1.69%	2.51	(2.17, 2.90)	<0.0008*	
MEDICAL DIAGNOSES									
J45	Asthma	1172	7.66%	1285	8.40%	0.90	(0.83, 0.98)	0.0174	
E00-E07	Disorders of thyroid gland	70	0.46%	93	0.61%	0.75	(0.55, 1.03)	0.0714	
E08-E13	Diabetes mellitus	88	0.58%	75	0.49%	1.17	(0.86, 1.60)	0.3122	
G40	Epilepsy and recurrent seizures	130	0.85%	171	1.12%	0.76	(0.60, 0.95)	0.0178	
G47	Sleep disorders	562	3.67%	452	2.96%	1.25	(1.10, 1.42)	0.0005*	
G47-0	Insomnia	154	1.01%	72	0.47%	2.15	(1.62, 2.85)	<0.0008*	
G43	Migraine	200	1.31%	179	1.17%	1.12	(0.91, 1.37)	0.2815	

Table 10. Prevalence and odds ratios of medical/psychiatric/socioeconomic characteristics in patients 13-21 with or without SOSH among COVID-19 (+) patients. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk (*).

ICD-10 Code	Characteristic	COVID-19(+), SI/SA(+)		COVID-19(+), SI/SA(-)		OR	95%CI	P value
		N	%	N	%			
SOCIOECONOMIC DIAGNOSES								
Z55	Problems related to education and literacy	245	1.58%	134	0.87%	1.84	(1.49, 2.28)	<0.0008*
Z59	Problems related to housing and economic circumstances	114	0.74%	43	0.28%	2.66	(1.87, 3.79)	<0.0008*
Z60	Problems related to social	176	1.14%	50	0.32%	3.55	(2.59, 4.86)	<0.0008*

	environment								
Z62	Problems related to upbringing	960	6.20%	150	0.97%	6.76	(5.68, 8.04)	<0.0008*	
Z62.2	Upbringing away from parents	166	1.07%	48	0.31%	3.48	(2.53, 4.81)	<0.0008*	
Z62.81	Personal history of abuse in childhood	585	3.78%	55	0.36%	11.01	(8.35, 14.54)	<0.0008*	
Z62.810	Personal history of physical and sexual abuse in childhood	416	2.69%	41	0.26%	10.40	(7.54, 14.34)	<0.0008*	
Z62.819	Personal history of unspecified abuse in childhood	128	0.83%	11	0.07%	11.73	(6.33, 21.71)	<0.0008*	
Z62.82	Parent-child conflict	293	1.89%	43	0.28%	6.93	(5.03, 9.55)	<0.0008*	
Z63	Other problems related to primary support group, including family circumstances	788	5.09%	180	1.16%	4.56	(3.87, 5.37)	<0.0008*	
Z65	Problems related to other psychosocial circumstances	216	1.40%	92	0.59%	2.37	(1.85, 3.02)	<0.0008*	
Z81	Family history of mental and behavioral disorders	757	4.89%	90	0.58%	8.79	(7.06, 10.95)	<0.0008*	
Z91.5	Personal history of self-harm	1478	9.55%	94	0.61%	17.28	(14.01, 21.31)	<0.0008*	
PSYCHIATRIC DIAGNOSES									
F10-F19	Mental and behavioral disorders due to psychoactive substance use	1041	6.73%	221	1.43%	4.98	(4.30, 5.77)	<0.0008*	
F10	Alcohol related disorders	159	1.03%	36	0.23%	4.45	(3.10, 6.40)	<0.0008*	
F12	Cannabis related disorders	596	3.85%	79	0.51%	7.81	(6.17, 9.88)	<0.0008*	
F17	Nicotine dependence	412	2.66%	83	0.54%	5.07	(4.00, 6.43)	<0.0008*	
F20-F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders	361	2.33%	43	0.28%	8.57	(6.24, 11.77)	<0.0008*	
F20	Schizophrenia	96	0.62%	11	0.07%	8.78	(4.70, 16.38)	<0.0008*	
F29	Unspecified psychosis not due to a substance or known physiological condition	205	1.32%	31	0.20%	6.69	(4.58, 9.76)	<0.0008*	
F30-F39	Mood [affective] disorders	5281	34.13%	951	6.15%	7.91	(7.35, 8.52)	<0.0008*	
F31	Bipolar disorder	497	3.21%	59	0.38%	8.67	(6.61, 11.37)	<0.0008*	
F32	Depressive episode	4145	26.79%	741	4.79%	7.27	(6.70, 7.90)	<0.0008*	
F33	Major depressive	1170	7.56%	176	1.14%	7.11	(6.06, 8.34)	<0.0008*	

	disorder, recurrent								
F34.1	Dysthymic disorder	100	0.65%	41	0.26%	2.45	(1.70, 3.52)	<0.0008*	
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	4817	31.13%	1708	11.04%	3.64	(3.43, 3.87)	<0.0008*	
F41.0	Panic disorder [episodic paroxysmal anxiety]	348	2.25%	83	0.54%	4.27	(3.35, 5.43)	<0.0008*	
F41.1	Generalized anxiety disorder	1059	6.84%	387	2.50%	2.86	(2.54, 3.22)	<0.0008*	
F41.9	Anxiety disorder, unspecified	2967	19.17%	991	6.40%	3.47	(3.21, 3.74)	<0.0008*	
F42	Obsessive-compulsive disorder	214	1.38%	66	0.43%	3.27	(2.48, 4.32)	<0.0008*	
F43.1	Post-traumatic stress disorder (PTSD)	896	5.79%	127	0.82%	7.43	(6.16, 8.96)	<0.0008*	
F43.2	Adjustment disorders	1038	6.71%	423	2.73%	2.56	(2.28, 2.87)	<0.0008*	
F60-F69	Disorders of adult personality and behavior	836	5.40%	242	1.56%	3.59	(3.11, 4.16)	<0.0008*	
F60.3	Borderline personality disorder	194	1.25%	22	0.14%	8.92	(5.73, 13.87)	<0.0008*	
F64	Gender identity disorders	173	1.12%	30	0.19%	5.82	(3.95, 8.58)	<0.0008*	
F70-F79	Intellectual Disabilities	140	0.90%	110	0.71%	1.28	(0.99, 1.64)	0.057	
F84.0	Autistic disorder	450	2.91%	220	1.42%	2.08	(1.76, 2.44)	<0.0008*	
F84.5	Asperger's syndrome	72	0.47%	24	0.16%	3.01	(1.89, 4.78)	<0.0008*	
F90	Attention-deficit hyperactivity disorders	2584	16.70%	1114	7.20%	2.58	(2.40, 2.78)	<0.0008*	
F91	Conduct disorders	1310	8.47%	396	2.56%	3.52	(3.14, 3.95)	<0.0008*	
MEDICAL DIAGNOSES									
J45	Asthma	1870	12.08%	1859	12.01%	1.01	(0.94, 1.08)	0.8581	
E00-E07	Disorders of thyroid gland	201	1.30%	201	1.30%	1.00	(0.82, 1.22)	1	
E08-E13	Diabetes mellitus	232	1.50%	197	1.27%	1.18	(0.97, 1.43)	0.0889	
G40	Epilepsy and recurrent seizures	243	1.57%	259	1.67%	0.94	(0.79, 1.12)	0.4811	
G47	Sleep disorders	1300	8.40%	773	5.00%	1.74	(1.59, 1.91)	<0.0008*	
G47.0	Insomnia	568	3.67%	165	1.07%	3.54	(2.97, 4.21)	<0.0008*	
G43	Migraine	486	3.14%	481	3.11%	1.01	(0.89, 1.15)	0.8796	

Table 11. Prevalence and odds ratios of medical/psychiatric/socioeconomic characteristics in patients 13-21 with or without SI/SA among COVID-19 (+) patients. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk (*).

ICD-10 Code	Characteristic	0-12			13-21		
SOCIOECONOMIC DIAGNOSES		OR	95% CI	p value	OR	95% CI	p value
Z55	Problems related to education and literacy				1.20	(0.86, 1.65)	0.2868
Z59	Problems related to housing and economic circumstances	1.37	(0.63, 2.99)	0.4407			
Z60	Problems related to social environment				1.67	(0.88, 3.16)	0.1175
Z62	Problems related to upbringing				3.75	(2.64, 5.32)	<0.0008*
Z62.2	Upbringing away from parents				3.51	(1.85, 6.66)	0.0001*
Z62.82	Parent-child conflict				2.85	(1.69, 4.81)	0.0001*
Z63	Other problems related to primary support group, including family circumstances	7.06	(3.73, 13.36)	*<0.0008	2.58	(1.90, 3.50)	<0.0008*
Z65	Problems related to other psychosocial circumstances				1.55	(1.04, 2.31)	0.03016
Z81	Family history of mental and behavioral disorders				3.64	(2.41, 5.49)	<0.0008*
PSYCHIATRIC DIAGNOSES							
F10-F19	Mental and behavioral disorders due to psychoactive substance use				1.69	(1.07, 2.68)	0.0248
F30-F39	Mood [affective] disorders				3.26	(2.79, 3.82)	<0.0008*
F31	Bipolar disorder				6.28	(3.41, 11.55)	<0.0008*
F32	Depressive episode				3.26	(2.70, 3.94)	<0.0008*
F33	Major depressive disorder, recurrent				5.38	(3.20, 9.03)	<0.0008*
F34.1	Dysthymic disorder				1.69	(0.85, 3.36)	0.1325
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders				1.77	(1.60, 1.96)	<0.0008*
F41.0	Panic disorder [episodic paroxysmal anxiety]				2.21	(1.29, 3.81)	0.0041
F41.1	Generalized anxiety disorder	5.89	(3.85, 9.01)	*<0.0008	1.84	(1.47, 2.31)	<0.0008*
F41.9	Anxiety disorder, unspecified	6.18	(4.58, 8.34)	*<0.0008	1.70	(1.49, 1.95)	<0.0008*

F42	Obsessive-compulsive disorder				1.85	(1.20, 2.84)	0.0053
F43.1	Post-traumatic stress disorder (PTSD)				3.84	(2.62, 5.64)	<0.0008*
F43.2	Adjustment disorders				1.73	(1.43, 2.10)	<0.0008*
F60-F69	Disorders of adult personality and behavior	4.47	(2.37, 8.40)	*<0.0008	1.96	(1.62, 2.36)	<0.0008*
F60.3	Borderline personality disorder				5.38	(2.83, 10.25)	<0.0008*
F70-F79	Intellectual Disabilities				0.67	(0.46, 0.98)	0.0382
F84.0	Autistic disorder				1.67	(1.31, 2.11)	<0.0008*
F84.5	Asperger's syndrome	1.53	(0.97, 2.43)	0.0675	2.36	(1.34, 4.16)	0.0031
F90	Attention-deficit hyperactivity disorders	5.56	(4.19, 7.38)	*<0.0008	1.93	(1.75, 2.13)	<0.0008*
F91	Conduct disorders	7.32	(4.77, 11.24)	*<0.0008	2.51	(2.17, 2.90)	<0.0008*
MEDICAL DIAGNOSES							
J45	Asthma				0.90	(0.83, 0.98)	0.0174
E00-E07	Disorders of thyroid gland	1.63	(1.31, 2.02)	*<0.0008	0.75	(0.55, 1.03)	0.0714
E08-E13	Diabetes mellitus				1.17	(0.86, 1.60)	0.3122
G40	Epilepsy and recurrent seizures				0.76	(0.60, 0.95)	0.0178
G47	Sleep disorders	2.26	(1.17, 4.36)	0.0153	1.25	(1.10, 1.42)	0.0005*
G47.0	Insomnia	2.46	(1.81, 3.34)	*<0.0008	2.15	(1.62, 2.85)	<0.0008*
G43	Migraine				1.12	(0.91, 1.37)	0.2815

Table 12. Odds ratios (OR) of medical, psychiatric, and socioeconomic characteristics in COVID-19 (+) patients with or without SOSH, with a comparison between OR for the 0-12 and 13-21 age groups. Bold denotes significantly greater odds. Italics denotes significantly lower odds. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk. Characteristics observed in a total of 10 or fewer patients were excluded from comparison and are not included in this table.

ICD-10 Code	Characteristic	0-12			13-21		
SOCIOECONOMIC DIAGNOSES		OR	95%CI	p value	OR	95%CI	p value
Z55	Problems related to education and literacy				1.84	(1.49, 2.28)	<0.0008*
Z59	Problems related to housing and economic circumstances				2.66	(1.87, 3.79)	<0.0008*
Z60	Problems related to social environment				3.55	(2.59, 4.86)	<0.0008*
Z62	Problems related				6.76	(5.68, 8.04)	<0.0008*

	to upbringing						
Z62.2	Upbringing away from parents				3.48	(2.53, 4.81)	<0.0008*
Z62.81	Personal history of abuse in childhood				11.01	(8.35, 14.54)	<0.0008*
Z62.810	Personal history of physical and sexual abuse in childhood				10.40	(7.54, 14.34)	<0.0008*
Z62.819	Personal history of unspecified abuse in childhood				11.73	(6.33, 21.71)	<0.0008*
Z62.82	Parent-child conflict				6.93	(5.03, 9.55)	<0.0008*
Z63	Other problems related to primary support group, including family circumstances	5.69	(3.26, 9.93)	*<0.0008	4.56	(3.87, 5.37)	<0.0008*
Z65	Problems related to other psychosocial circumstances				2.37	(1.85, 3.02)	<0.0008*
Z81	Family history of mental and behavioral disorders				8.79	(7.06, 10.95)	<0.0008*
Z91.5	Personal history of self-harm				17.28	(14.01, 21.31)	<0.0008*
PSYCHIATRIC DIAGNOSES							
F10-F19	Mental and behavioral disorders due to psychoactive substance use				4.98	(4.30, 5.77)	<0.0008*
F10	Alcohol related disorders				4.45	(3.10, 6.40)	<0.0008*
F12	Cannabis related disorders				7.81	(6.17, 9.88)	<0.0008*
F17	Nicotine dependence				5.07	(4.00, 6.43)	<0.0008*
F20-F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders				8.57	(6.24, 11.77)	<0.0008*
F20	Schizophrenia				8.78	(4.70, 16.38)	<0.0008*
F29	Unspecified psychosis not due to a substance or known physiological condition				6.69	(4.58, 9.76)	<0.0008*
F30-F39	Mood [affective] disorders				7.91	(7.35, 8.52)	<0.0008*
F31	Bipolar disorder				8.67	(6.61, 11.37)	<0.0008*
F32	Depressive episode				7.27	(6.70, 7.90)	<0.0008*
F33	Major depressive disorder, recurrent				7.11	(6.06, 8.34)	<0.0008*
F34.1	Dysthymic disorder				2.45	(1.70, 3.52)	<0.0008*

F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	5·69	(4·23, 7·64)	*<0·0008	3·64	(3·43, 3·87)	<0·0008*
F41·0	Panic disorder [episodic paroxysmal anxiety]				4·27	(3·35, 5·43)	<0·0008*
F41·1	Generalized anxiety disorder				2·86	(2·54, 3·22)	<0·0008*
F41·9	Anxiety disorder, unspecified	5·03	(3·36, 7·52)	*<0·0008	3·47	(3·21, 3·74)	<0·0008*
F42	Obsessive-compulsive disorder				3·27	(2·48, 4·32)	<0·0008*
F43·1	Post-traumatic stress disorder (PTSD)				7·43	(6·16, 8·96)	<0·0008*
F43·2	Adjustment disorders	7·04	(3·82, 12·97)	*<0·0008	2·56	(2·28, 2·87)	<0·0008*
F60-F69	Disorders of adult personality and behavior	3·67	(2·02, 6·68)	*<0·0008	3·59	(3·11, 4·16)	<0·0008*
F60·3	Borderline personality disorder				8·92	(5·73, 13·87)	<0·0008*
F64	Gender identity disorders				5·82	(3·95, 8·58)	<0·0008*
F70-F79	Intellectual Disabilities				1·28	(0·99, 1·64)	0·057
F84·0	Autistic disorder	2·68	(1·50, 4·79)	0·0009	2·08	(1·76, 2·44)	<0·0008*
F84·5	Asperger's syndrome				3·01	(1·89, 4·78)	<0·0008*
F90	Attention-deficit hyperactivity disorders	7·93	(5·75, 10·93)	*<0·0008	2·58	(2·40, 2·78)	<0·0008*
F91	Conduct disorders	11·50	(6·84, 19·34)	*<0·0008	3·52	(3·14, 3·95)	<0·0008*
MEDICAL DIAGNOSES							
J45	Asthma	1·59	(1·28, 1·98)	*<0·0008	1·01	(0·94, 1·08)	0·8581
E00-E07	Disorders of thyroid gland				1·00	(0·82, 1·22)	1
E08-E13	Diabetes mellitus				1·18	(0·97, 1·43)	0·0889
G40	Epilepsy and recurrent seizures	1·51	(0·80, 2·85)	0·20701	0·94	(0·79, 1·12)	0·4811
G47	Sleep disorders	2·22	(1·64, 3·00)	*<0·0008	1·74	(1·59, 1·91)	<0·0008*
G47·0	Insomnia				3·54	(2·97, 4·21)	<0·0008*
G43	Migraine	1·00	(0·45, 2·23)	1	1·01	(0·89, 1·15)	0·8796

Table 13. Odds ratios (OR) of medical, psychiatric, and socioeconomic characteristics in COVID-19 (+) patients with or without SI/SA, with a comparison between OR for the 0-12 and 13-21 age groups. Bold denotes significantly greater odds. Italics denotes significantly lower odds. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk. Characteristics observed in a total of 10 or fewer patients were excluded from comparison and are not included in this table.

ICD-10 Code	Characteristic	0-12			13-21		
SOCIOECONOMIC DIAGNOSES		OR	95%CI	p value	OR	95%CI	p value
Z55	Problems related to education and literacy	1.06	(0.53, 2.11)	0.8708	0.89	(0.66, 1.20)	0.4507
Z59	Problems related to housing and economic circumstances	1.25	(0.58, 2.69)	0.5742	1.13	(0.57, 2.21)	0.7446
Z60	Problems related to social environment				0.78	(0.46, 1.32)	0.3605
Z62	Problems related to upbringing	0.90	(0.65, 1.24)	0.5252	1.15	(0.91, 1.45)	0.2564
Z62.2	Upbringing away from parents	0.85	(0.51, 1.41)	0.5285	0.84	(0.56, 1.27)	0.4116
Z62.81	Personal history of abuse in childhood	0.94	(0.59, 1.52)	0.8204	0.95	(0.62, 1.47)	0.8362
Z62.810	Personal history of physical and sexual abuse in childhood	0.65	(0.35, 1.20)	0.1705	1.07	(0.65, 1.76)	0.8384
Z62.82	Parent-child conflict	0.95	(0.51, 1.76)	0.8842	1.64	(1.06, 2.53)	0.0254
Z63	Other problems related to primary support group, including family circumstances	1.23	(0.87, 1.73)	0.2546	1.37	(1.06, 1.76)	0.0141
Z65	Problems related to other psychosocial circumstances	0.73	(0.37, 1.47)	0.3898	1.41	(0.96, 2.08)	0.081
Z81	Family history of mental and behavioral disorders	1.07	(0.74, 1.56)	0.7175	1.02	(0.78, 1.34)	0.8978
Z91.5	Personal history of self-harm	1.17	(0.79, 1.73)	0.4366	0.89	(0.63, 1.25)	0.502
PSYCHIATRIC DIAGNOSES							
F10-F19	Mental and behavioral disorders due to psychoactive substance use				0.91	(0.62, 1.34)	0.6345
F12	Cannabis related disorders				0.71	(0.40, 1.27)	0.2528
F17	Nicotine dependence				1.33	(0.68, 2.61)	0.4067
F20-F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders				1.36	(0.92, 2.00)	0.121
F29	Unspecified psychosis not due to a substance or				1.62	(1.06, 2.49)	0.027

	known physiological condition						
F30-F39	Mood [affective] disorders	0.81	(0.65, 1.01)	0.0565	1.26	(1.12, 1.41)	0.0001*
F31	Bipolar disorder				1.34	(0.95, 1.90)	0.0971
F32	Depressive episode	0.68	(0.51, 0.91)	0.0088	1.32	(1.15, 1.52)	*0.0001
F33	Major depressive disorder, recurrent	0.95	(0.50, 1.79)	0.8812	1.00	(0.75, 1.34)	1
F34.1	Dysthymic disorder				0.76	(0.44, 1.32)	0.3332
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	1.09	(0.90, 1.32)	0.3682	1.35	(1.23, 1.48)	<0.0008*
F41.0	Panic disorder [episodic paroxysmal anxiety]				1.40	(0.88, 2.24)	0.1594
F41.1	Generalized anxiety disorder	0.92	(0.59, 1.45)	0.745	1.18	(0.97, 1.44)	0.0964
F41.9	Anxiety disorder, unspecified	1.08	(0.84, 1.38)	0.5763	1.29	(1.14, 1.47)	<0.0008*
F42	Obsessive-compulsive disorder				1.31	(0.89, 1.94)	0.1712
F43.1	Post-traumatic stress disorder (PTSD)	1.09	(0.72, 1.66)	0.6846	1.19	(0.92, 1.54)	0.1892
F43.2	Adjustment disorders	1.12	(0.80, 1.56)	0.5093	1.44	(1.20, 1.74)	0.0001*
F60-F69	Disorders of adult personality and behavior	0.83	(0.57, 1.21)	0.3447	1.20	(1.02, 1.41)	0.0241
F60.3	Borderline personality disorder				1.11	(0.77, 1.61)	0.5821
F64	Gender identity disorders				1.18	(0.53, 2.64)	0.6965
F70-F79	Intellectual Disabilities				1.07	(0.70, 1.63)	0.7603
F84.0	Autistic disorder	0.66	(0.45, 0.96)	0.0305	1.21	(0.97, 1.50)	0.0897
F84.5	Asperger's syndrome				1.18	(0.74, 1.86)	0.4953
F90	Attention-deficit hyperactivity disorders	1.15	(0.95, 1.38)	0.1543	1.35	(1.23, 1.47)	<0.0008*
F91	Conduct disorders	1.14	(0.90, 1.45)	0.2812	1.34	(1.19, 1.51)	<0.0008*
MEDICAL DIAGNOSES							
J45	Asthma	1.75	(1.41, 2.18)	*<0.0008	1.36	(1.24, 1.49)	<0.0008*
E00-E07	Disorders of thyroid gland				1.13	(0.80, 1.59)	0.4954
E08-E13	Diabetes mellitus				1.52	(1.09, 2.12)	0.0134
G40	Epilepsy and recurrent seizures	1.54	(0.86, 2.76)	0.1487	1.24	(0.96, 1.61)	0.102
G47	Sleep disorders	1.36	(1.05, 1.76)	0.0215	1.35	(1.19, 1.54)	<0.0008*
G47.0	Insomnia	1.43	(0.93, 2.21)	0.1036	1.56	(1.21, 2.01)	0.0006*
G43	Migraine	0.93	(0.43, 1.98)	0.8571	1.81	(1.44, 2.29)	<0.0008*

Table 14. Odds ratios (OR) of medical, psychiatric, and socioeconomic characteristics in patients with SOSH with or without COVID-19, with a comparison between OR for the 0-12 and 13-21 age groups. Bold denotes significantly greater odds. Italics denotes significantly lower odds. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk. Characteristics observed in a total of 10 or fewer patients were excluded from comparison and are not included in this table.

ICD-10 Code	Characteristic	0-12			13-21		
SOCIOECONOMIC DIAGNOSES		OR	95%CI	p value	OR	95%CI	p value
Z55	Problems related to education and literacy	0.61	(0.29, 1.29)	0.197	<i>0.71</i>	<i>(0.60, 0.83)</i>	<0.0008*
Z59	Problems related to housing and economic circumstances				1.15	(0.88, 1.51)	0.3071
Z60	Problems related to social environment				0.84	(0.69, 1.03)	0.0907
Z60.4	Social exclusion and rejection				1.24	(0.88, 1.75)	0.2249
Z62	Problems related to upbringing	0.88	(0.64, 1.21)	0.4254	<i>0.83</i>	<i>(0.76, 0.90)</i>	<0.0008*
Z62.2	Upbringing away from parents	0.77	(0.47, 1.27)	0.3171	0.78	(0.63, 0.95)	0.0153
Z62.81	Personal history of abuse in childhood	0.79	(0.50, 1.24)	0.3031	0.91	(0.81, 1.02)	0.1153
Z62.810	Personal history of physical and sexual abuse in childhood	0.64	(0.34, 1.20)	0.1606	0.87	(0.76, 0.99)	0.0352
Z62.811	Personal history of psychological abuse in childhood				<i>0.44</i>	<i>(0.34, 0.56)</i>	<0.0008*
Z62.812	Personal history of neglect in childhood				0.74	(0.50, 1.08)	0.121
Z62.819	Personal history of unspecified abuse in childhood				2.57	(1.85, 3.57)	<0.0008*
Z62.82	Parent-child conflict	1.19	(0.61, 2.32)	0.6226	<i>0.65</i>	<i>(0.56, 0.75)</i>	<0.0008*
Z63	Other problems related to primary support group, including family circumstances	1.26	(0.90, 1.77)	0.1746	1.15	(1.04, 1.28)	0.0071
Z65	Problems related to other psychosocial circumstances	0.88	(0.44, 1.77)	0.7353	0.78	(0.65, 0.94)	0.0074
Z81	Family history of mental and behavioral disorders	0.95	(0.66, 1.36)	0.794	<i>0.78</i>	<i>(0.71, 0.86)</i>	<0.0008*
Z91.5	Personal history of self-harm	1.28	(0.86, 1.92)	0.2242	<i>0.87</i>	<i>(0.81, 0.94)</i>	<i>0.0003*</i>
Z91.52	Personal history	0.91	(0.38, 2.15)	0.8378	<i>0.56</i>	<i>(0.47, 0.68)</i>	<0.0008*

	of nonsuicidal self-harm							
PSYCHIATRIC DIAGNOSES								
F10-F19	Mental and behavioral disorders due to psychoactive substance use					0.85	(0.78, 0.93)	0.0003*
F10	Alcohol related disorders					0.65	(0.53, 0.79)	<0.0008*
F12	Cannabis related disorders					0.84	(0.75, 0.93)	0.0016
F17	Nicotine dependence					1.02	(0.89, 1.18)	0.7622
F20-F29	Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders					1.13	(0.97, 1.32)	0.1034
F20	Schizophrenia					1.28	(0.95, 1.74)	0.1081
F22	Delusional disorders					1.11	(0.74, 1.67)	0.6162
F25	Schizoaffective disorders					0.84	(0.50, 1.41)	0.5184
F29	Unspecified psychosis not due to a substance or known physiological condition					1.11	(0.91, 1.36)	0.3128
F30-F39	Mood [affective] disorders	0.86	(0.69, 1.08)	0.2059		0.83	(0.80, 0.87)	<0.0008*
F31	Bipolar disorder					1.39	(1.21, 1.59)	<0.0008*
F32	Depressive episode	0.63	(0.47, 0.85)	0.0024		0.86	(0.82, 0.90)	<0.0008*
F33	Major depressive disorder, recurrent	1.51	(0.72, 3.14)	0.2772		0.70	(0.64, 0.75)	<0.0008*
F34.1	Dysthymic disorder					0.79	(0.61, 1.03)	0.0829
F40-F48	Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders	1.08	(0.90, 1.31)	0.4154		0.97	(0.92, 1.01)	0.1492
F41.0	Panic disorder [episodic paroxysmal anxiety]					0.99	(0.85, 1.14)	0.8589
F41.1	Generalized anxiety disorder	0.79	(0.50, 1.27)	0.3455		0.86	(0.79, 0.93)	0.0005*
F41.9	Anxiety disorder, unspecified	1.08	(0.84, 1.39)	0.5727		1.14	(1.08, 1.21)	<0.0008*
F42	Obsessive-compulsive disorder					0.83	(0.69, 1.00)	0.0458
F43.1	Post-traumatic stress disorder (PTSD)	0.93	(0.61, 1.42)	0.7617		0.98	(0.89, 1.08)	0.6584
F43.2	Adjustment	1.14	(0.82, 1.58)	0.4596		1.06	(0.97, 1.16)	0.1908

	disorders						
F60-F69	Disorders of adult personality and behavior	1.00	(0.67, 1.50)	1	1.00	(0.90, 1.10)	0.9452
F60.3	Borderline personality disorder				1.10	(0.90, 1.36)	0.3523
F64	Gender identity disorders				<i>0.71</i>	<i>(0.58, 0.86)</i>	<i>0.0006*</i>
F70-F79	Intellectual Disabilities				1.30	(1.01, 1.67)	0.0416
F84.0	Autistic disorder	0.62	(0.42, 0.93)	0.0192	1.01	(0.88, 1.15)	0.9004
F84.5	Asperger's syndrome				1.20	(0.85, 1.69)	0.3
F90	Attention-deficit hyperactivity disorders	1.20	(0.99, 1.45)	0.0604	1.25	(1.18, 1.33)	<0.0008*
F91	Conduct disorders	1.00	(0.79, 1.26)	1	1.28	(1.18, 1.40)	<0.0008*
MEDICAL DIAGNOSES							
J45	Asthma	2.06	(1.63, 2.61)	*<0.0008	1.22	(1.13, 1.31)	<0.0008*
E00-E07	Disorders of thyroid gland				1.14	(0.93, 1.39)	0.2163
E08-E13	Diabetes mellitus				1.66	(1.34, 2.04)	<0.0008*
G40	Epilepsy and recurrent seizures	2.02	(1.01, 4.05)	0.0479	1.26	(1.04, 1.53)	0.016
G47	Sleep disorders	1.48	(1.13, 1.94)	0.0045	1.15	(1.06, 1.25)	0.0008*
G47.0	Insomnia	3.01	(1.70, 5.34)	*0.0002	1.02	(0.91, 1.15)	0.7513
G43	Migraine	1.09	(0.48, 2.48)	0.8451	1.15	(1.01, 1.31)	0.04

Table 15. Odds ratios (OR) of medical, psychiatric, and socioeconomic characteristics in patients with SI/SA with or without COVID-19, with a comparison between OR for the 0-12 and 13-21 age groups. Bold denotes significantly greater odds. Italics denotes significantly lower odds. Statistical comparisons are represented by odds ratios (OR) with 95% confidence intervals (CI). Significant p-values are indicated with an asterisk. Characteristics observed in a total of 10 or fewer patients were excluded from comparison and are not included in this table.

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Figures

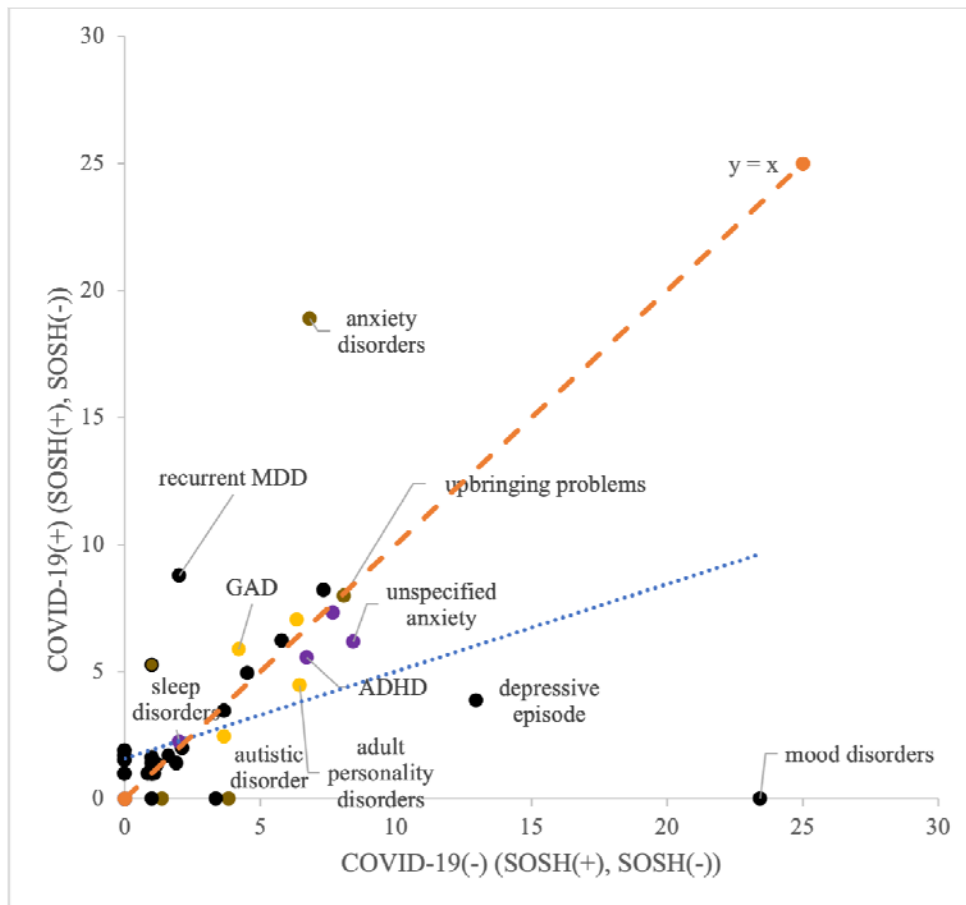


Figure 1. Comparison of odds ratios of medical/psychiatric/socioeconomic characteristics in patients 0-12 years old with or without suicide attempt/suicidal ideation/self-injurious behavior in COVID-19 (-) and COVID-19 (+) patients. Labeled characteristics are a sample of the significant findings. Key: Purple denotes significance in both COVID-19(+) and COVID-19(-) patients; yellow denotes significance in only COVID-19(+) patients; brown denotes significance in only COVID-19(-) patients; and black denotes a lack of significance in each group.

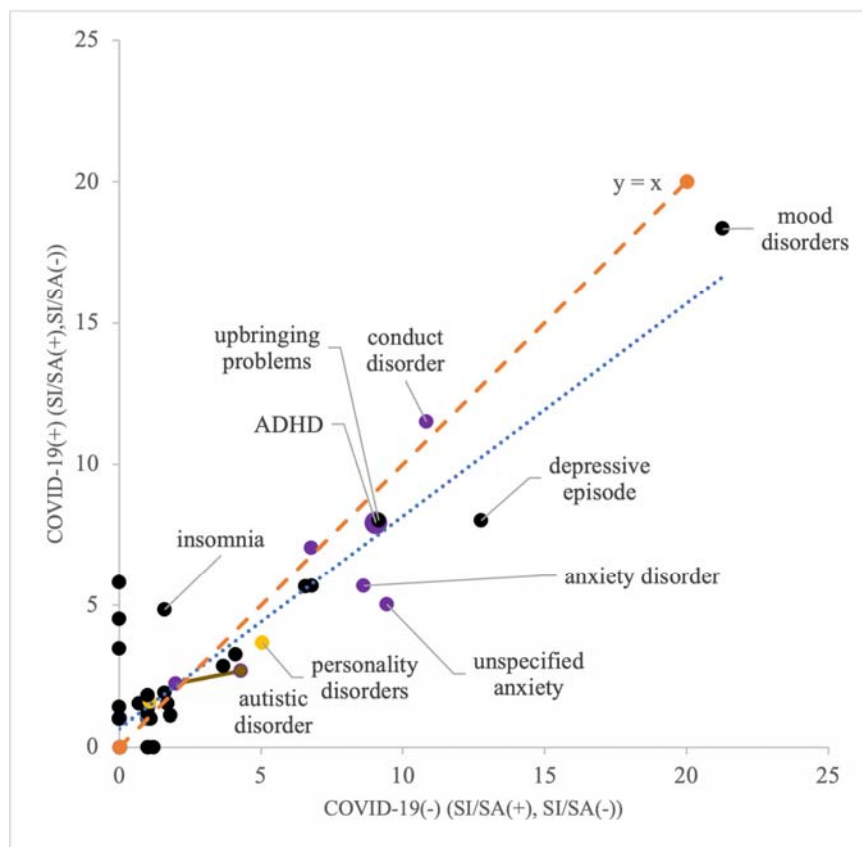


Figure 2. Comparison of odds ratios of medical/psychiatric/socioeconomic characteristics in patients 0-12 years old with or without suicide attempt/suicidal ideation in COVID-19 (-) and COVID-19 (+) patients. Labeled characteristics are a sample of the significant findings. Key: Purple denotes significance in both COVID-19(+) and COVID-19(-) patients; yellow denotes significance in only COVID-19(+) patients; brown denotes significance in only COVID-19(-) patients; and black denotes a lack of significance in each group.

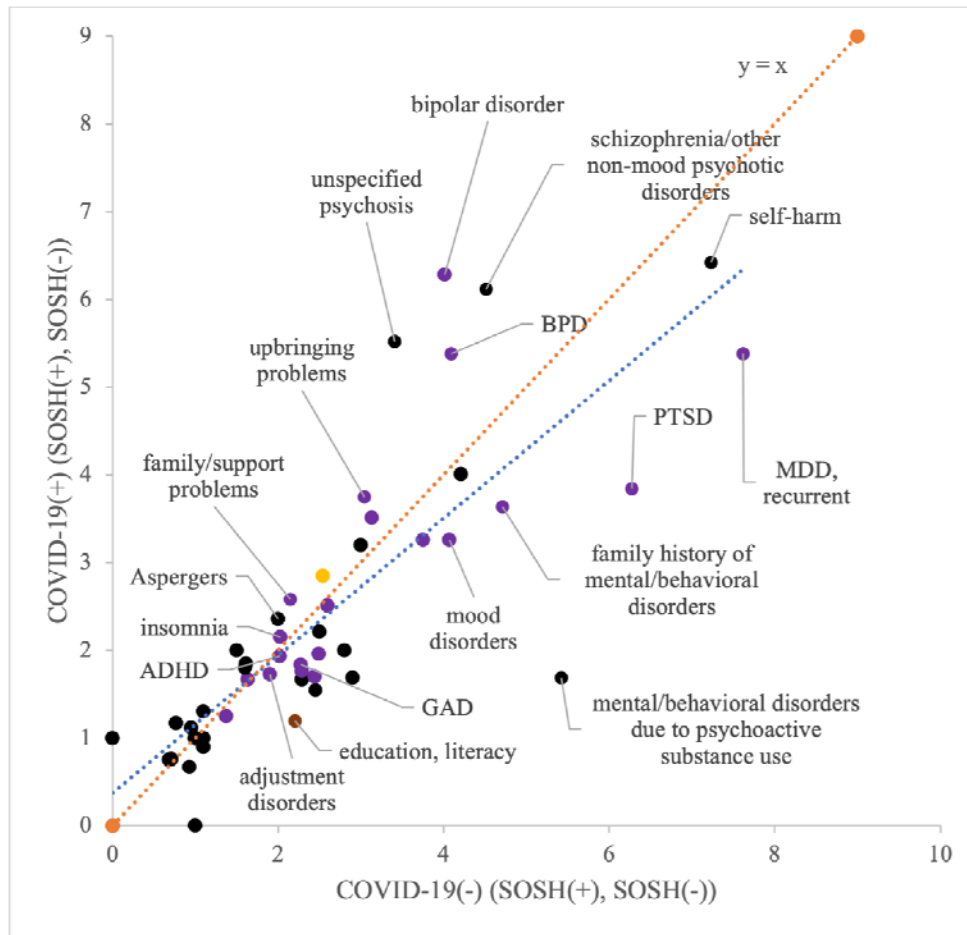


Figure 3. Comparison of odds ratios of medical/psychiatric/socioeconomic characteristics in patients 13-21 years old with or without suicide attempt/suicidal ideation/self-injurious behavior in COVID-19 (-) and COVID-19 (+) patients. Labeled characteristics are a sample of the significant findings. Key: Purple denotes significance in both COVID-19(+) and COVID-19(-) patients; yellow denotes significance in only COVID-19(+) patients; brown denotes significance in only COVID-19(-) patients; and black denotes a lack of significance in each group.

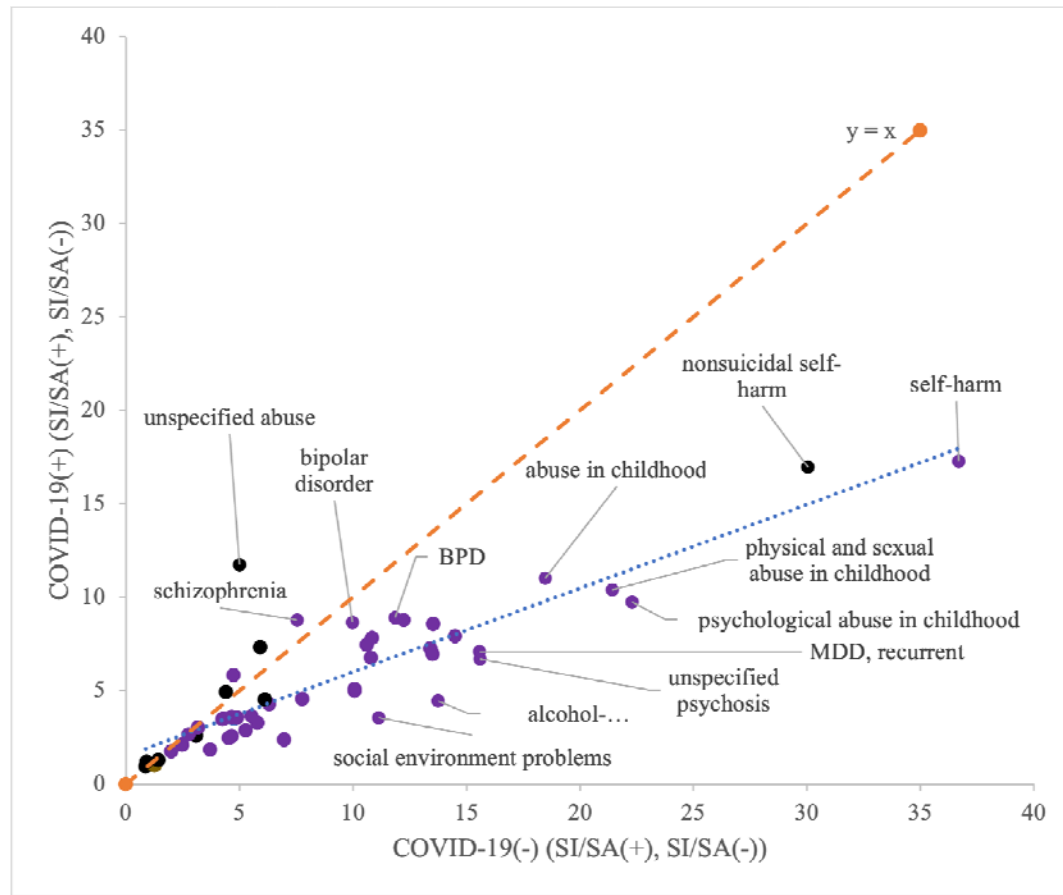


Figure 4. Comparison of odds ratios of medical/psychiatric/socioeconomic characteristics in patients 13-21 years old with or without suicide attempt/suicidal ideation in COVID-19 (-) and COVID-19 (+) patients. Labeled characteristics are a sample of the significant findings. Key: Purple denotes significance in both COVID-19(+) and COVID-19(-) patients; yellow denotes significance in only COVID-19(+) patients; brown denotes significance in only COVID-19(-) patients; and black denotes a lack of significance in each group.