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ORIGINAL ARTICLE

The impact of SARS-CoV-2 pandemic on patients who attend a pediatric emergency department for mental health issues

Impacto de la pandemia por SARS-CoV-2 en los pacientes que acuden a urgencias de pediatría por problemas de salud mental

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What do we know about the subject matter of this study?

The confinement due to the SARS-CoV-2 pandemic caused an important change in the daily life of the pediatric population which could have had an impact on their mental health.

What does this study contribute to what is already known?

This single-center observational study describes a significant increase in mental health-related consultations in a pediatric Emergency Department after the SARS-CoV-2 pandemic confinement, highlighting the increase in consultations due to suicide attempts and depression.

Abstract

The lockdown during the SARS-CoV-2 pandemic and the effect of the virus on the population could be a precipitating factor for mental health disorders in the pediatric population. **Objective**: To compare the reasons for consultation, diagnoses at discharge, and admission and re-consultation rates of pediatric patients attending the Emergency Department due to mental health disorders before and after the SARS-CoV-2 pandemic lockdown. **Patients and Method**: Retrospective, descriptive study. Patients under 16 years of age consulting due to mental health-related disorders during the pre- (07/01/2018-07/01/2019) and post-lockdown (07/01/2020-07/01/2021) periods were included. The frequency of mental health diagnoses, need for drug administration, hospitalization, and re-consultations were compared. **Results**: 760 patients were included, 399 pre-lockdown and 361 post-lockdown. After the lockdown, there was a 45.7% increase in the frequency of mental health-related consultations with respect to the total number of emergency consultations. Behavioral alterations were the most frequent reason for consultation in both groups (34.3% vs. 36.6%, $p = 0.54$). In the post-lockdown period, consultations related to self-harm attempts (16.3% vs. 24.4%, $p < 0.01$) and the diagnosis of depression (7.5% vs. 18.5%, $p < 0.01$) increased significantly. There was an increase

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of 58.8% in patients who were hospitalized with respect to the total number of ED patients (0.17% vs. 0.27%, p = 0.003) and in the number of re-consultations (12% vs. 17.8%, p = 0.026). No differences were observed in days of hospitalization (7 days [IQR 4-13] vs. 9 days [IQR 9-14], p0.45). **Conclusion**: In the post-lockdown period, the proportion of pediatric patients presenting to the ED with mental health disturbances increased.

Introduction

The SARS-CoV-2 pandemic confinement has led to an increase in the prevalence of psychiatric pathology in all age groups[1]. Social distancing, school closures and information overload, among other factors, have contributed to children being a particularly vulnerable population. This has been reflected in visits to pediatric emergency departments (PED)[2,3].

Worldwide, the prevalence of pediatric mental health problems before the pandemic was 13.4%, with anxiety standing out at 6.5% and 2.6% of depression[4]. Regarding pediatric emergency department visits, between 5% and 6.7%[5,6] were related to mental health problems. However, in Spain, these consultations accounted for 0.21% of PED visits, where the most frequent reasons for consultation were behavior disorder (36.76%), followed by anxiety (20.58%) and suicidal ideation or attempt (13.23%)[7].

The first studies related to mental health in pediatric population during SARS-CoV-2 pandemic confinement were carried out in China. An increase in the prevalence of mental health problems was observed, accounting up to a 20% for anxiety and depression[8-12].

In a recent meta-analysis including patients from different countries, the most frequently diagnosed psychiatric disorders in children and adolescents in the period of confinement and immediately after were, in order of frequency, irritability, depression, and anxiety[13]. In a study carried out in Spanish and Italian population, up to 85.7% of the children presented mood changes during this period and the most frequent clinical manifestations were concentration difficulty, irritability and motor restlessness[14].

In addition, other studies conducted in Italy and the United States have shown an increase in eating disorders[15], self-harm attempts and suicides in the pediatric age group[16]. Also, there has been an increase in somatic symptoms and in the number of visits to the emergency department due to pathology without organic cause[17], many regarding concern about SARS-CoV-2 infection.

In Spain, since May 2020, the measures implemented during confinement began to be progressively withdrawn. Subsequently, international studies[13,18] reported an increase in psychiatric pathology and an increase of 47.1%[19] in ED visits due to these reasons, revealing that confinement had negatively affected one of every seven children[20]. In Spain, there is current evidence that confinement during the pandemic has affected the mood and behavior of children under 16 years of age. In 2017, 19% of parents expressed that their children had many worries, which has currently increased to 30%[21], highlighting the importance of determining the need for measures for its prevention and early treatment.

The objective of the study was to compare the frequency, reasons for consultation, discharge diagnoses and admission rate of patients with mental health problems visiting the Emergency Department of a Spanish hospital before and after confinement.

Patients and Method

Retrospective study conducted in the Pediatric Emergency Unit of a tertiary-level hospital in the Community of Madrid, Spain. The confinement period in Spain was established on March 14, 2020, ending on June 21, 2020. All patients under 16 years of age who visited the emergency department and whose main reason for consultation at triage was related to mental health problems were systematically included. Two cohorts of patients delimited by the referred period were established as follows: pre-confinement (from July 1, 2018, to July 1, 2019) and post-confinement (from July 1, 2020, to July 1, 2021). The reasons for consultation in the triage system of our center (TRIPED) were analyzed[22], selecting those related to mental health disorders: "anxiety/distress", "agitation", "behavioral disturbance", "sleep disturbance", "hallucinations", "aggressive behavior", "suicide attempt", and "sadness". Patients who were referred to the ED from other centers with direct admission to the Psychiatry Unit were excluded.

Data collection was performed through the electronic medical records of patients in our center. Demographic variables included sex and age; clinical variables included psychiatric history, previous admission due to mental health-related pathology and baseline treatment; and clinical characteristics of the episode included reasons for consultation at triage, need for ED

treatment, discharge diagnosis, discharge destination, discharge treatment, need for psychology or psychiatry appointment at discharge, and re-consultation.

This study was approved by the Ethics and Drug Research Committee of the center where the study was carried out.

Statistical analysis

A descriptive analysis was performed using absolute frequencies and percentages for the analysis of qualitative variables and, for quantitative variables, means with standard deviations or medians with interquartile range according to the symmetry of the distributions. Comparison of proportions was performed using Pearson's χ^2 test and Fisher's exact test as appropriate, and comparison of quantitative variables was performed using Student's t-test for normal distributions and Mann Whitney U test for non-normal distributions. Statistical significance was established at $p < 0.05$. The statistical software SPSS Inc, version 25 was used.

Results

A total of 760 patients were included: 399 in the pre-confinement cohort and 361 in the post-confinement cohort. A total of 57,686 patients were seen in the ED in the first period and 35,322 in the second period. Table 1 details the demographic and clinical characteristics of each cohort.

The frequency of the reasons for consultation related to mental health increased from 0.70% in the pre-confinement period to 1.02% in the post-confinement period, which implied a relative increase of 45.7% ($p < 0.001$). Behavioral disturbance was the most frequent reason for consultation in both cohorts. In the post-confinement period, there was a decrease in the relative frequency of agitation due to an increase in self-harm attempts. Figure 1 shows the percentage of each reason of consultation in each group.

During their stay in the Emergency Department, 43 patients in each group required some type of pharmacological treatment (10.8% in the pre-confinement group, 11.9% in the post-confinement group; $p = 0.622$), with anxiolytics being the most frequently administered (90.7% and 90.7%, respectively; $p = 1.000$) followed by neuroleptics (25.5% and 23.3%, respectively; $p = 0.802$).

At discharge, the most frequent diagnoses in both periods were behavioral disturbance and anxiety. Table 1 shows the diagnoses at discharge in each of the study groups.

No differences were observed in the percentage of patients who required admission with respect to those who visited the ED due to mental health-related reasons (25.7% in the pre-confinement group and 26.4% in the post-confinement group). On the other hand, regarding the total number of patients who visited the ED in the two periods, the percentage of patients who required admission due to psychiatric symptoms increased significantly by 58.8% (0.17% versus 0.27%

Table 1. Demographic and clinical characteristics of each cohort

Variables	Preconfinement N = 399 (%)	Postconfinement N = 361 (%)	p
Age (years)*	14 (12-14)	14 (13-15)	**< 0.001**
Gender (male)	200 (50.1)	239 (66.2)	**< 0.001**
Psyquiatric background:	301 (75.4)	242 (67.0)	**0.010**
- Anxiety	45 (15.6)	50 (20.7)	0.082
- Depression	86 (28.5)	96 (39.7)	**0.006**
- Behaviour disorder	101 (33.5)	73 (30.0)	0.400
- Autism spectrum disorder	54 (13.5)	30 (8.3)	0.076
- Attention Deficit hyperactivity disorder	76 (25.2)	21 (8.7)	**< 0.001**
- Other	49 (16.2)	37 (15.2)	0.754
Previous admission due to mental health-related pathology	120 (30.0)	104 (28.8)	0.702
Baseline treatment:	238 (59.6)	200 (55.4)	0.237
- Anxiolytics	99 (41.6)	116 (58.0)	**0.001**
- Antidepressives	150 (63.0)	126 (63.0)	0.996
- Neuroleptics	162 (68.0)	119 (59.5)	0.063
- Other	49 (20.5)	29 (14.5)	0.097

Proportion comparison with χ^2 de Pearson test and quantitative data with U de Mann Whitney test. *Quantitative variables are expressed as absolute frequencies (percentage). *Qualitative variables are expressed as median (p25-p75).

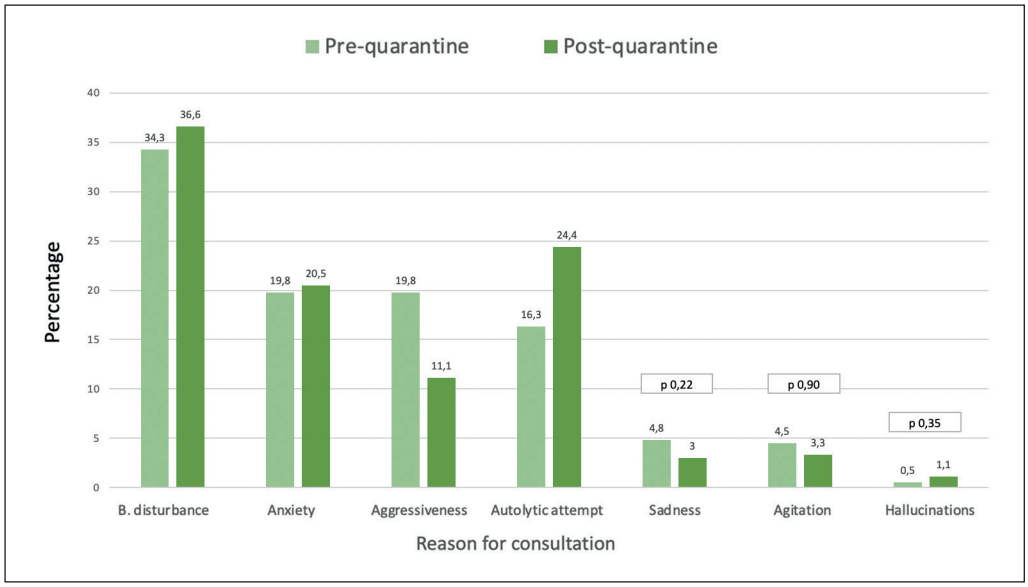

Figure 1. Comparison of mental health-related consultations at a PED before and after confinement**.** Proportion comparison with Pearson's χ^2 test or Fisher exact test.

Table 2. Comparison of the discharge diagnosis between pre and postconfinement

	Preconfinement N = 399 (%)	Postconfinement N = 361 (%)	p
Behavior disturbamce	155 (38.8)	110 (30.5)	**0.016**
Anxiety	90 (22.6)	67 (18.6)	0.174
Selfinflicted injuries/autolytic attempt	46 (11.5)	55 (15.2)	0.133
Hetero/autoaggresion	38 (9.5)	26 (7.2)	0.250
Depression/Emotion disorder	30 (7.5)	66 (18.3)	**< 0.001**
Other	18 (4.5)	14 (3.9)	0.664
Psycosis	6 (1.5)	10 (2.8)	0.225
Pharmacological overdose	5 (1.3)	9 (2.5)	0.204
Non-pharmacollogical overdose	4 (1.0)	1 (0.3)	0.376
Eating disorder	4 (1.0)	2 (0.6)	0.689
Agitation	3 (0.8)	1 (0.3)	0.626

Proportion comparison with χ^2 Pearson test or Fisher exact test. *Variables are expressed as absolute frequencies (percentage).

in the pre- and post-confinement groups, respectively; p = 0.003). The median hospital stay was 7 days (IQR 4-13) and 9 days (IQR 9-14), respectively (p = 0.453).

Patients who required treatment after visiting the ED increased from 24.3% in the pre-confinement period to 40.7% in the post-confinement period (p < 0.001). After confinement, there was an increase in the number of appointments to the Pediatric Psychiatry outpatient department (79% vs. 87.9%; p = 0.001) and an increase in the number of reconsultations (12% in the pre-confinement period and 17.8% in the post-confinement period; p = 0.026).

Discussion

This is the first study to evaluate the impact of confinement due to the SARS-CoV-2 pandemic on the reasons for mental health-related consultations in children under 16 years of age consulting in a pediatric emergency department.

The results obtained show an increase of almost 50% in the number of visits to the ED for mental health-related consultations after the confinement period. Similarly, Carison A et al. report an increase of 47.1%[19] in emergency department visits due to these

reasons in the Australian population after the period of maximum measures against SARS-CoV-2 transmission. This increase could be related to reduced access to psychology and psychiatry consultations and the disruption of daily routines caused by confinement, both at school and at home. Also, the economic problems in the family environment caused by the closure of stores and decrease of tourism, as well as the loss of direct contact with friends and peers due to the confinement, have been important risk factors that have affected the pediatric and adolescent population[21] since this already vulnerable population needs contact with people of the same age.

In addition, as described in other studies[19], an increase in the percentage of women who consulted due to these reasons in the same period has been observed. This has been related to the fact that female patients usually have higher rates of anxiety and self-harm attempts, reasons for consultation that also increase in the presence of stressors. Possibly, the pandemic, the confinement, and distancing measures implemented as a consequence may be involved as triggering or precipitating factors of pathologies related to mental health in this group of patients[6,7,9,10,13,23].

Regarding the reasons for consultation in the ED related to psychiatric pathology, behavioral alterations continue to be the most frequent reason for consultation in the post-confinement cohort. However, there was also a worrying increase in consultations due to self-harm attempts, which could be related to the increase in the number of patients with a diagnosis of depression at discharge. These results are consistent with those published by other authors, who describe a significant increase in the risk of suicide assessed by the Ask Suicide-Screening Questions (ASQ) questionnaire[24].

Although the most frequent diagnosis in the post-confinement period continues to be behavioral disturbance, a significant increase in depression was detected, having doubled its frequency after the period of confinement. This is consistent with previous studies, which had reported an increase in the depression rate that ranges from 22.6% to 43.7%. It has been related to the reduction of social interaction during confinement and to the greater difficulty of contact with psychologists[6,25]. In contrast, in our study, no increase in anxiety diagnoses was detected compared with other publications[25].

Moreover, an increase in the initiation of pharmacological treatment at discharge from the PED after the period of confinement was detected. This could be associated to the percentage increase of patients with no psychiatric history who consulted in the post-confinement period with respect to the pre-confinement period. Therefore, it seems important to carry out studies aimed at identifying risk factors in patients with no previous mental health problems in order to be able to intervene at an early stage.

The significant increase in the prevalence of patients attended at the PED due to mental health-related reasons, the number of self-harm attempts, and the initiation of pharmacological treatment, may justify an increase in the number of patients requiring admission over the total number of patients attended in the emergency department. We did not observe differences in the days of hospital stay or in the need for treatment in the ED, which could indicate that the increase in frequency was not accompanied by an increase in severity.

The increase in re-consultations is a phenomenon already described in the literature. Thus, an Australian study[19] raises the possibility that this increase is due to restrictions in outpatient and primary care during the period of confinement, turning the ED being a quick access route for psychiatric care.

Despite the increase in the number of mental health-related consultations in the ED detected after confinement, it is important to note that the problem of mental health disorders in the child and adolescent population had already been detected before the confinement was implemented during the SARS-CoV-2 pandemic. A Canadian study had already observed an increase in emergency department visits due to suicidal drug intoxication between 2010 and 2015[26], which may mean that the pandemic and the intense and prolonged confinement may have precipitated and triggered a phenomenon that was already of concern.

Given the increase in the number of pediatric patients with mental health disorders, it is essential to propose possible action plans for the prevention and early detection of these cases. Kumar et al.[13] and Rider et al.[27] proposed different options to mitigate the effect that confinement has had on these patients, such as educational interventions (psychological support and information on healthy lifestyle habits through educational websites), communication of truthful information regarding the pandemic, and information on sleep hygiene, exercise, and healthy eating through face-to-face or telematic consultations. In addition, it is a priority to promote and improve the training of health professionals for the early detection of symptoms and early treatment of this pathology.

In this context, the Mental Health Strategy of the National Health System has been published in Spain for the period from 2022 to 2026, in which there is a strategic line aimed at mental health in childhood and adolescence. Among the postulated objectives figure the promotion, prevention, early detection, and care of mental health problems in the child and adolescent population, as well as addressing discrimination and social stigmatization in this age group[28].

This study has several limitations, including its single-center and retrospective design. Data collection was performed through the electronic medical records of the patients at our center, which meant a loss of data due to the absence of information in the medical records. Also, it was impossible to obtain follow-up data on patients who have been referred to other centers due to a lack of hospital beds, since the clinical history of the patients is not electronically centralized. Besides, our center has daily access to management by a child and adolescent psychiatrist during full working hours, which could have caused other centers to refer patients to our ED, making it difficult to extrapolate our results. Furthermore, although the discharge diagnoses have been collected according to the international classification of diseases ICD-10, it is worth noting that some diagnostic coding may have been included in another code, underestimating some diagnoses. However, these considerations affect the pre- and post-confinement study period equally.

Conclusion

The SARS-CoV-2 pandemic is associated with an increase in the proportion of patients visiting the emergency department with mental health disorders in the pediatric population. The rapid and effective implementation of a plan for the prevention, detection, and treatment of these patients is critical to improve the future of the pediatric population.

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

Rights to privacy and informed consent: This study was approved by the respective Research Ethics Committee, which, according to the study's characteristics, has accepted the non-use of Informed Consent.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

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