

Pediatric emergency care admissions for somatic symptom disorders during the COVID 19 pandemic

Rossella Turco (✉ rossella-turco@hotmail.it)

Santobono-Pausilipon Children's Hospital

M. Russo

Santobono-Pausilipon Children's Hospital

S. Lenta

Santobono-Pausilipon Children's Hospital

A. Apicella

Santobono Children's Hospital

T. Gagliardo

Santobono-Pausilipon Children's Hospital

F. Savoia

Santobono Children's Hospital

A.M. Corona

Santobono-Pausilipon Children's Hospital

F. De Fazio

Santobono-Pausilipon Children's Hospital

P. Bernardo

Santobono-Pausilipon Children's Hospital

V. Tipo

Santobono Children's Hospital

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Abstract

Aims: During the COVID-19 pandemic, children and adolescents with a psychiatric disorder experienced exacerbation of their symptoms with more accesses in Emergency Department (ED). However, little is known about the experience of somatic symptom disorders (SSDs) during the COVID 19 pandemic in children. Therefore, we aimed to compare the rates of pediatric ED admissions for SSDs before and during COVID-19 pandemic and to understand whether the relative risk of ED admissions for SSDs changed between the two periods.

Methods: We enrolled all children admitted for SSDs in pediatric ED of Santobono-Pausilipon Hospital, Naples, Italy, from March 11th, 2020 to March 11th, 2021 (pandemic period) and in the same time period of the previous year (pre-pandemic period).

Results: We identified 205/95743 (0,21%) children with SSDs presenting in ED in pre-pandemic year and 160/40165 (0,39%) in pandemic year ($p < 0.05$). Considering the accesses for age we observed a decrease of the accesses for SSDs over 12 years old (IRR 0,59; CI 0,39-0,88) while we found no differences under 12 years old (IRR 0,87; CI 0.68-1,10).

Conclusions: In this retrospective study we found that despite the massive decrease of the pediatric admissions due to the COVID-19 pandemic, somatic symptom disorders admissions to the pediatric ED increased, suggesting an impact of the pandemic also on the pediatric psychiatric disorders.

Introduction

Coronavirus-19 (COVID-19) infection, caused by SARS-CoV 2, was declared a pandemic by the World Health Organization on March 11th, 2020 (1). COVID 19 radically changed medical practices and provision of health services in all specialties (2–3). Since the beginning of the pandemic a clear correlation between age and disease severity and mortality has been identified (4, 5). A systematic review of 1065 children infected with SARS-CoV-2 demonstrated uniformly mild phenotypes of disease, presenting mostly with self-limiting respiratory symptoms (6). Nevertheless, the impact of COVID-19 on children and their families has been high, not only because of the disease itself but also due to all the containment measures to reduce virus spread. Children and adolescents experienced a drastic routine disruption due to the loss of social interaction, the schools' closure and the interruption of recreational activities. The impact of these measures on the routine children's lifestyle is unexpected (7). Satcher and Kenned observed that anxiety and increased fear are the most common symptoms reported among people living under lockdown (8). Emergency departments (ED) are often the first point of care for children experiencing mental health emergencies, particularly when other services are inaccessible or unavailable (9). During the pandemic, children and adolescents with psychiatric disorders experienced exacerbation of their symptoms with more accesses in ED (10). However, little is known about the experience of somatic symptom disorders during the COVID 19 pandemic in children. Therefore, we aimed to investigate the impact of COVID 19 pandemic on the somatic symptom disorders in children

and to understand whether the relative risk of ED admissions for somatic symptom disorders changed between pandemic and pre-pandemic periods. Moreover we aimed to understand if children with somatic symptom disorders had a similar ED presentation pattern between the two periods.

Methods

This retrospective study was conducted at the Santobono-Pausilipon Children's Hospital of Naples, Italy. The inclusion criteria were:

1. Aged from 4 to 14 years old, admission to the pediatric ED;
2. Diagnosis of "Somatic Symptom and Related Disorders" according to the DSM V (11), that includes the diagnoses of somatic symptom disorders, illness anxiety disorder, conversion disorder (functional neurological symptom disorder), psychological factors affecting other medical conditions, factitious disorder, other specified somatic symptom and related disorder, and unspecified somatic symptom and related disorder.

The onset symptoms were classified in three large groups:

1. pain symptoms (head, abdomen, back, joints, extremities, chest, rectum, during menstruation, during sexual intercourse, or during urination);
2. gastrointestinal symptoms (nausea, bloating, vomiting other than during pregnancy, diarrhea, or intolerance of several different foods);
3. pseudo-neurological symptoms (conversion symptoms such as impaired coordination or balance, paralysis, or localized weakness, difficulty swallowing or lump in throat, aphonic, urinary retention, hallucinations, loss of touch or pain sensation, double vision, blindness, deafness, seizures; dissociative symptoms such as amnesia; or loss of consciousness other than fainting).

Data included demographic characteristics, gender, age and previous ED admissions. Moreover data concerning the psychiatric evaluation were collected as well as the need of psychiatric follow up. The data were anonymously recorded and analyzed. We excluded children with known psychiatric disorders or with chronic diseases as well as children with acute diseases that needed of the recovery or those with multiple accesses in the single month.

The study group was divided into the following two sub-groups:

- 1) pre-pandemic group: children admitted to the Pediatric ED from March 11th 2019 to March 11th 2020 ;
- 2) pandemic group: children admitted to the Pediatric ED from March 11th 2020 to March 11th 2021.

The overall Pediatric Emergency Department admissions were calculated in both pandemic and pre-pandemic periods.

Statistical analysis

ED visits are expressed in absolute frequencies and percentage change between pandemic and pre-pandemic period. Incidence rate ratios (IRR) were calculated using weekly ED access counts, modeled with a Poisson regression model. A COVID-19-related covariate assumed the value of 0 in the pre-pandemic year and the value of 1 in the same period of pandemic year. Poisson regression model was also carried out using as offset all ED accesses per week, in order to assess the change in pediatric somatic disorders adjusting by total ED accesses. All p-values were from 2-sided tests and results deemed statistically significant at $p < 0.05$. Data analysis was conducted using STATA version 13.1 (STATA Corp).

Results

In this retrospective study we identified a total of 95744 admissions to our pediatric ED in pre-pandemic year respect to a total of 40165 admissions in pandemic year (Fig. 1). Concerning the admission for somatic symptom disorders we collected 205 children in the pre-pandemic group (0.21%) and 160 (0.39%) in pandemic group. In particular evaluating the admission pattern during the year, we observed a significantly decrease of the access for somatic symptom disorders in the first quarter of the pandemic year (IRR 0.78; CI 0,64 - 0,96) respect to the pre-pandemic year, while there were no differences for the rest of the study periods (Table 1; Fig. 2). Nevertheless when we analyzed the ratio between the number of children admitted to the ED for somatic symptom disorders of both groups related to the total number of admission in ED in pandemic and pre-pandemic years, we found an incident rate ratio (IRR) of 1.86 (CI 1.51–2.29) in pandemic group respect to the pre-pandemic group ($p < 0.05$). The median age was 10.2 (4.2.-13.11) years in pre-pandemic group and 9.9 (4.10–13.9) years in pandemic group ($p = 0.29$). In pre-pandemic group 54% of children were female respect to the 45% in pandemic group ($p = 0.66$). Considering the accesses for age we observed a decrease of the admissions for somatic symptom disorders over 12 years old between the pandemic and pre-pandemic groups (IRR 0.59;CI 0.39–0.88), while no differences were found for the others age groups (IRR 0,87; CI 0.68-1,10). Related to gender, female had a lower number of accesses for somatic symptom disorders to the ED in pandemic group respect to the pre-pandemic group (IRR 0.66, CI 0.49–0.88; $p < 0.05$).

Table 1

Incidence Rates for Emergency Department Admissions for Somatic symptoms in pre pandemic (11th March 2019-10th March 2020) and pandemic period (11th March 2020-11th March 2021).

	1 Mar-30 Jun	1 Jul-30 Oct	1 Nov-28 Feb	Total
Overall				
Pre-pandemic	63	84	58	205
Pandemic	42	72	46	160
IRR (95% CI)	0,67 (0,45-0,99)	0,86 (0,63-1,18)	0,79 (0,54-1,17)	0,78 (0,64-0,96)
Age <12 yy				
Pre-pandemic	41	60	41	142
Pandemic	34	50	39	123
IRR (95% CI)	0,83 (0,53-1,31)	0,83 (0,57-1,21)	0,95 (0,61-1,47)	0,87 (0,68-1,10)
Age 12-14 yy				
Pre-pandemic	22	24	17	63
Pandemic	8	22	7	37
IRR (95% CI)	0,36 (0,16-0,82)	0,92 (0,51-1,63)	0,41 (0,17-0,99)	0,59 (0,39-0,88)
Female				
Pre-pandemic	33	45	33	111
Pandemic	19	35	19	73
IRR (95% CI)	0,58 (0,33-1,01)	0,78 (0,50-1,21)	0,58 (0,33-1,01)	0,66 (0,49-0,88)
Male				
Pre-pandemic	30	39	25	94
Pandemic	23	37	27	87
IRR (95% CI)	0,77 (0,44-1,31)	0,95 (0,61-1,49)	1,08 (0,63-1,86)	0,93 (0,69-1,24)

When we adjusted the frequencies of somatic symptoms disorders for total number of access, we found a significant difference between pandemic and pre-pandemic groups for chest pain (IRR: 4.17, $p < 0.05$), breathing difficulties (IRR: 3.46; $p < 0.05$), anxiety (IRR: 2.12, $p < 0.05$), general discomfort (IRR: 1.60; $p < 0.05$), anorexia (IRR: 3.34; $p < 0.05$), dysphagia (IRR: 2.68; $p < 0.5$) and tachycardia (IRR 2,19; $p < 0.05$). No differences between the two studied groups were found about constipation, abdominal pain, paraesthesia, dizziness, fainting/pre-syncope, asthenia, headache, nausea and vomiting (Table 2). When

classifying the somatic symptoms disorders in the 3 subtypes (pain, gastrointestinal and pseudo-neurological symptoms) and adjusting the data for the total numbers of accesses at the ED, we found that gastrointestinal symptom's presentation was more frequent in the pandemic group respect to the pre-pandemic group (IRR 3.28,) (Table 3).

Table 2
Type of somatic symptoms complained during the pandemic and pre-pandemic period

	Pre-pandemic year	Post pandemic year	IRR (IC95%)	P value	IRR based on the total	P value Based on the total
Total accesses	95743	40165				
Number of Accesses for somatic symptom disorders	205	160	0,78 (0,64-0,96)	<0.05	1,86 (1,51-2,29)	<0.05
Dizziness	9	3	0,33 (0,09-1,23)	0,10	0,79 (0,22-2,94)	0,73
Abdominal pain	30	15	0,50 (0,27-0,93)	<0,05	1,19 (0,64-2,22)	0,78
Headache	11	8	0,73 (0,29-1,81)	0,50	1,73 (0,70-4,31)	0,24
Nausea	2	2	1,00 (0,14-7,12)	1	2,38 (0,34-16,92)	0,39
General Discomfort	67	45	0,67 (0,46-0,98)	<0,05	1,60 (1,10-2,34)	<0,05
Breathing difficulties	31	45	1,46 (0,92-2,30)	0,11	3,46 (2,19-5,47)	<0,05
Chest pain	8	14	1,75 (0,74-4,18)	0,20	4,17 (1,75-9,94)	<0,05

Table 3

Differences of presentation of somatic symptoms divided in three subgroups according to DSM V in pre-pandemic and post pandemic year, respectively.

	Pre-pandemic year	Pandemic year	Variation(%)	Results adjusted for total pediatric ED accesses
Pain symptoms group	49	37	-24	IRR 1.80 (1.17–2.76) P < 0.01
Gastrointestinal symptoms group	16	22	38	IRR 3.28 (1.72–6.24) P < 0.01
Pseudo-neurological group	170	130	-24	IRR 1.82 (1.45–2.29) P < 0.01

A total of 15.6% needed of neuropsychiatric consultation in ED in the pandemic group respect to 9.7% in the pre-pandemic group (IRR: 2.98, $p < 0.05$).

Discussion

In this retrospective study we demonstrated a significant increase of the admissions rate for somatic symptom disorders in the pandemic year respect to the previous year. We observed these findings despite the massive decrease of the pediatric admissions due to the COVID-19 pandemic in agreement with the data reported by other Italian centers (12), especially in the first 8 weeks of the COVID-19-induced social lockdown (13).

As well-renowned COVID 19 pandemic forced a reorganization of the ED, imposing filter to accesses, which in turn has reduced all admissions to the emergency rooms other than for COVID-19 infection. Hartnett et al have already reported that the mean weekly number of ED visits for children < 14 years' old reduced of approximately 70% during March 29-April 25 2020 respect to the corresponding period in 2019, for asthma, otitis, sprain and strain-related injuries while it increased of 69% for psychosocial factors (14). Moreover Leeb et al found that compared with 2019, the proportion of mental-health related visits in ED for children aged 5–11 years old and 12–17 increased approximately 24% and 31% respectively (15). In particular, analyzing the admission pattern for somatic symptom disorders during the pandemic and pre-pandemic year we found that the admissions rate were significantly lower in the first quarter of the pandemic period respect to the corresponding period of the pre-pandemic year and similar in the rest of the year. Our results are consistent with other Italian data (13, 16, 17) where, during the first two months of COVID-19 lockdown, no significant changes were found in hospitalization rate or in the prevalence distribution of the primary reason for the psychiatric ED visit (13), while a significant increase was recorded in the following months (16, 17). This trend was partly due to a return to social life after

months of isolation and on the other hand to the onset of neuropsychological issues that led parents conducting their children to pediatric ED.

Although children demonstrated to have milder clinical manifestations when infected by SARS-COV2 respect to the adults (18), they certainly experienced considerable discomfort. As a matter of fact, during the pandemic year a spread of psychological problems in children with an increased prevalence of symptoms like anxiety, fearness and breathing difficulties have been reported (19, –23). Singh et al in a recent review on the impact of COVID-19 on mental health of children showed high levels of stress, insomnia, poor appetite and inattentiveness (24). Xie et al moreover found that 22.6% and 18.9% of children and pre-adolescent in Hubei reported symptoms of depression and anxiety, independently of demographic characteristics (25). Children presented to our ED complained in particular chest pain, breathing difficulties, anxiety, insomnia, fearness, anorexia, dysphagia and tachycardia with a significant difference respect to the pre-pandemic year, while we didn't find any differences for other somatic disorders. It is well-known that somatic symptoms disorders are highly prevalent in the general pediatric population with major presentation symptoms such as abdominal pain, headache and seizures (26). Considering the somatic symptoms disorders subtypes we found a major presentation of gastrointestinal symptoms after COVID 19 pandemic respect to the others pattern presentation. This finding is in contrast with Solmi et al which reported a prevalence of pain and pseudo neurological subtypes. Further studies however are needed to understand if the general changing of routine, habits and life style due to COVID-19 pandemic led to a overspread of the gastrointestinal somatic symptoms disorders pattern. The reasons of this significant increase is still not completely understood. Recently, Brooks et al. (27) conducted a systematic review of 3166 published articles revealed that lockdown may lead to anxiety, anger, sleep disorder, depression and post-traumatic stress disorder (PTSD) among the children. Sprang and Silman (28) also observed four times higher PTSD score among the children who had lived under lockdown than those who had not. However, the level of psychological impacts of lockdown is related to various factors such as lifestyle, society and culture (29, 30). For sure children had to change their daily routines suffering a lack of social interactions with the closure of the schools and kindergartens. They had also to challenge new fears, potentially with a lot of unanswered questions like the possibility of losing or being separated from their parents. Changing behavior during pandemic as reduction of the outdoor physical activity, diets' modifications and increasing of the time spending in front of screens may have contributed to the spreading of the somatic disorders in children. Moreover the number of children exposed to direct or indirect domestic violence and abuses seems to be increased (31–33). In most studies, girls reported higher levels of worry, concern, and fear regarding COVID-19 (25, 33, 34–36), compared with boys. Two different studies observed that girls exhibited equivalent changes in depressive symptoms related to the COVID-19 pandemic compared with boys (17, 37). Differently, in our population we didn't find any difference with regards to gender but evaluating the rate of somatic disorders admissions in ED for gender we found that male had more admissions respect to female, under 12 years of age. This data was in line with Uccella et al which demonstrated in a recent survey on the impact of Covid 19 on the behavior, that adolescents seemed less affected than younger children (17).

The elevated number of admissions for somatic symptoms disorders led to an increase of neuropsychiatric consultations with the need to improve the mental health assistance in our ED.

We acknowledge that our results have to be interpreted with cautions taking into account our study limitations. First, our data are restricted to ED visits, and as such, may not be generalizable to the general population outside and do not fully capture the incidence of somatic symptoms disorders among children who did not present to a tertiary pediatric ED. Second, being a retrospective study, it is possible that some somatic disorders may have been missed. Third, in our study we did not investigate the impact of COVID-19 infections in the children included in the analysis, which may have specifically contributed to some of the reported symptoms.

In conclusion in our population we observed an increased rate of somatic symptom disorders admissions in ED during the pandemic respect to the corresponding previous year that let us reflect on a great impact of the COVID 19 infection also on the pediatric behavior. The consequences of this phenomena on the pediatric population is unknown and undetectable and further studies may will be needed to monitor them and the correlation to the onset of new psychiatric disorders in the involved children.

Declarations

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Competing Interests

The authors have no relevant financial or non-financial interests to disclose

Author Contributions

Rossella Turco, Marina Russo, Vincenzo Tipo contributed to the study conception and design. Material preparation, data collection and analysis were performed by Alberto M Corona, Selvaggia Lenta, Andrea Apicella, Thaililjia Gagliardo, Floriana De Fazio. The first draft of the manuscript was written by Rossella Turco, Marina Russo, Pia Bernardo, Fabio Savoia and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate: This is an observational study. The Santobono-Pausilipon Research Ethics Committee has confirmed that no ethical approval is required.

Consent to participate: not applicable

Consent to publish: not applicable

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Figures

Figure 1

Emergency Department admissions in pre and pandemic year

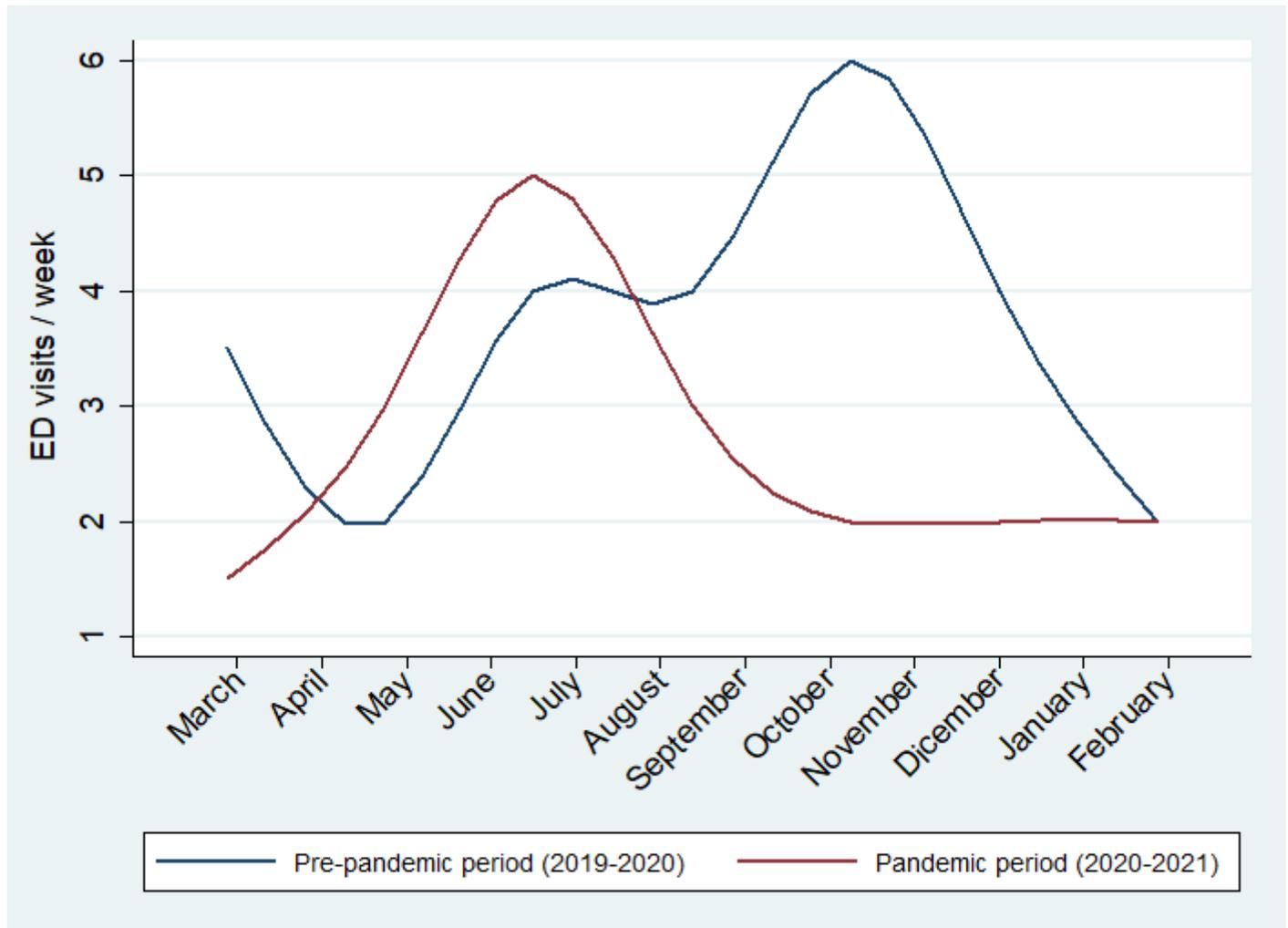


Figure 2

Emergency Department admissions among children with somatic disorders in pandemic year compared to pre-pandemic year