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Hospital Admissions for Eating Disorders in Children and Adolescents in Spain: A Population-Based Study

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ABSTRACT

Objective: Limited evidence exists regarding the impact of the COVID-19 pandemic on the onset and trajectory of eating disorders (EDs) among young in Spain. This study aims to analyze the characteristics and recent trends in hospital admissions for EDs within the pediatric population.

Methods: A retrospective analysis was conducted on hospital admissions for EDs among patients aged 10–19 years between 2016 and 2022. The main outcomes examined included hospital rates (overall, stratified by ED type and age group), psychiatric comorbidities, and length of stay.

Results: A total of 8275 hospitalizations due to EDs were identified, constituting 1 in 6 hospital admissions for mental illness and behavioral disorders. Predominant characteristics of this population included female sex (93%), aged 15–19 years (58.3%), admission primarily for anorexia nervosa (71.6%), and psychiatric comorbidity (35.6%). Hospital admissions for EDs in the pediatric population showed an increasing trend, with an annual average increase of 11.1% (95% CI: 2.6, 22.6). This rise was led by children aged 10–14 years, with a yearly increase in EDs hospitalization rates of 28.4% (95% CI: 13.5, 56.3) since 2019. Each discharge related to EDs was associated with a median stay of 24 days (IQR: 10, 40).

Discussion: Efforts in community healthcare should prioritize early detection and intervention for symptoms indicative of EDs in the pediatric population, aiming to mitigate the severity of cases requiring hospitalization. These findings underscore the necessity for targeted health planning policies to address the growing burden of EDs among Spanish youth.

1 | Introduction

Eating disorders (EDs) are multifaceted, severe, and potentially life-threatening conditions characterized by abnormal behaviors related to eating or weight control, which significantly impair physical health and disrupt psychosocial functioning, particularly when comorbidities are present (Treasure, Duarte, and Schmidt 2020).

EDs can affect individuals across all age groups, genders, sexual orientations, ethnicities, and geographical locations, with more pronounced gender differences observed in

Summary

- The present study aims to examine the demographic and clinical characteristics, and evaluate the hospital trends of admissions for eating disorders in adolescents and children in Spain.
- Trends in hospital admissions for eating disorders indicate an increase in recent years mainly in children and in youth with additional psychiatric comorbidities.
- These results show the need for specific health planning policies to address this growing increase among the Spanish young population.

adolescents compared to adults (Lindvall Dahlgren, Stedal, and Wisting 2017). Adolescent girls and young women are particularly vulnerable to developing EDs, notably Anorexia Nervosa (AN), which typically manifests before the age of 30 and appears to have a declining age of onset (Steinhausen and Jensen 2015). While the precise etiology remains elusive, a combination of genetic, biological, behavioral, psychological, and social factors is implicated in predisposing individuals to these disorders (Stice et al. 2017).

The COVID-19 pandemic in Spain began in March 2020, with a state of emergency and strict lockdown from March 14 to June 21, 2020. National social distancing and mobility restrictions varied by region. Post-lockdown, Spain saw successive infection waves with regional restrictions (Radics and Christidis 2022). The pandemic and confinement measures significantly impacted mental health, especially among vulnerable individuals. Those with EDs experienced worse mental health outcomes, leading to increased hospitalizations for EDs (Auger et al. 2023; Giacomini et al. 2022; Milliren, Richmond, and Hudgins 2023), particularly among children and adolescents (Auger et al. 2023; Giacomini et al. 2022).

Some studies suggest that factors such as reduced access to healthcare, lifestyle modifications, and social isolation may have contributed to the exacerbation of eating symptomatology during this period. These changes have significantly disrupted the nutrition and exercise routines of children and adolescents, potentially serving as triggers for the development of abnormal eating behaviors in susceptible individuals (Otto et al. 2021).

Although studies in Europe have evidenced an increase in hospital admissions for EDs during the pandemic (Giacomini et al. 2022; Gilsbach et al. 2022), there are limited population-based studies using clinical-administrative data to analyze this issue (Jo Driscoll et al. 2023).

However, in Spain, there is a paucity of evidence regarding the impact of the pandemic on the emergence and progression of eating symptomatology in young patients. Therefore, the objective of this study was to examine the epidemiological characteristics of pediatric patients admitted for EDs in Spain, and to explore trends in prevalence between 2016 and 2022.

2 | Methods

We conducted a retrospective study utilizing hospital discharge data from the Minimum Basic Data Set of acute hospitals within the National Health System (CMBD-H).

The CMBD-H serves as a population-based registry mandated for all public acute care hospitals in Spain, maintained by the Ministry of Health. It furnishes demographic and clinical information for each episode, age, sex, principal diagnosis, up to 19 secondary diagnoses, principal procedure, up to 19 secondary procedures, discharge status, and length of stay. Diagnoses were coded utilizing the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). As these data are de-identified, informed consent was not required.

All hospital discharges involving patients aged 10 to 19 years admitted for EDs between January 1, 2016, and December 31, 2022, with an F50 code (EDs, ICD-10-CM) as the principal diagnosis were included.

2.1 | Study Variables

Study variables comprised the prevalence of EDs, type of admission (non-elective, elective), reason for hospital admission, psychiatric comorbidities, and length of stay, stratified by specific age groups (10–14 years: children, 15–19 years: adolescents). (ICD-10 Codes: Table S1).

2.2 | Statistical Analysis

We calculated hospitalization rates per 100,000 children utilizing the annual population as the denominator, provided by the Spanish National Statistics Institute (INE).

To examine trends in hospitalization rates by age group and type of disorder, we employed Joinpoint regression models (Kim et al. 2000). These models are generalized linear models assuming a Poisson distribution. They enable the quantification of the Average Annual Percent Change (AAPC) for the entire study period and the Annual Percent Change (APC) for each identified trend, along with their respective 95% confidence intervals (Clegg et al. 2009).

All statistical analyses were conducted using STATA 17 (StataCorp. LP, College Station, TX) and Joinpoint Regression version 4.7.0.0. Statistical significance was defined as $p < 0.05$.

3 | Results

Between 2016 and 2022, Spain recorded 48,776 hospitalizations of pediatric individuals (aged 10–19 years) for mental and behavioral disorders. EDs accounted for 8275 admissions, constituting 17% of the total. Before the pandemic (2016–2019), ED admissions ranged from 15% to 16% of all mental disorder admissions, peaking at 18.9% in 2021 (Figure S1). Notably, children aged 10–14 years had a higher proportion of admissions, accounting

for 1 in 4 psychiatric admissions compared to 1 in 7 among 15–19-year-olds (Figure S2).

Table 1 presents the demographic and clinical characteristics of hospital admissions for EDs. Females represented 92.7% of the cohort. Urgent admissions predominated, with 15–19-year-olds comprising nearly 60% of hospitalizations. Anorexia Nervosa (AN) was the most common diagnosis (71.6%), prevalent in both 10–14 (73.0%) and 15–19 (70.6%) age groups. Psychiatric comorbidities were present in 35.6% of patients, more frequently in 15–19-year-olds. Average hospitalization duration was 24 days (IQR: 10–40 days), totaling 34,504 days annually.

3.1 | Hospitalization Rates and Trend Analysis

The hospitalization rate for EDs among patients aged 10–19 years was 19.4 per 100,000 population in 2016 and increased to 32.7 in 2022, representing an average annual increase of 11.1% (95% CI: 2.6, 22.6) (Table 2, Figure S3).

When analyzing by age group, hospitalization rates for EDs in patients aged 10–14 years experienced an average annual of 13.9% (95% CI: 8.8, 21.7) during the study period. An inflection point was detected in 2019, with stable rates between 2016 and 2019, followed by an annual increase of 26.6% (95% CI: 12.1, 53.0) from 2019 to 2022. However, in hospitalization rates for patients aged 15–19 years, no inflection point was detected, with an average annual increase of 8.2% (95% CI: −2.5, 22.0) **(**Table 2**).**

AN was the primary reason for hospital admissions (Table S2, Figure S4). The rate increased from 13.7 per 100,000 in 2016 to 22.9 in 2022, with an average annual of 10.7% (95% CI: 1.3, 23.4). This rise is driven by increased hospitalizations among patients aged 10–14, rising from 10.2 per 100,000 population in 2016 to 21.5 per 100,000 population in 2022, an average annual increase of 12.9% (95% CI: 7.7, 20.5). An inflection point was discerned in 2019, with an average annual of 3.0% (95% CI: −17.0, 24.7) between 2016 and 2019. Subsequently, from 2019 to 2022, a notable annual increase of 23.9% (95% CI: 8.8, 49.3) was observed. Conversely, no significant changes were noted in hospitalization rates for AN among adolescents aged 15–19 years.

The second most common reason for admission was unspecified EDs (ICD-10: F50.9), with a hospitalization rate of 3.4 admissions per 100,000 population among patients aged 10–19 in 2016,

TABLE 1 | General characteristics of hospital admissions for EDs in children and youth divided by age group.

	Total	10–14 years	15–19 years	*p*[a]
Number of admissions	8275	3450	4825	
Sex, female	7669 (92.7)	3162 (91.6)	4507 (93.4)	0.002
Type of admission				0.001
Non-elective	5239 (63.8)	2251 (65.9)	2988 (62.4)	
Elective	2970 (36.2)	1166 (34.1)	1804 (37.6)	
Hospital admission				<0.001
Anorexia nervosa	5923 (71.6)	2518 (73.0)	3405 (70.6)	
Bulimia nervosa	361 (4.6)	55 (1.6)	306 (6.4)	
Other eating disorders	422 (5.1)	229 (6.6)	193 (4.0)	
Eating disorder, unspecified	1569 (19.0)	648 (18.8)	921 (19.1)	
Main psychiatric comorbidities				<0.001
No	5330 (64.4)	2437 (70.6)	2893 (60.0)	
Yes	2945 (35.6)	1013 (29.4)	1932 (40.0)	
Mood disorders	759 (25.8)	264 (26.1)	495 (25.6)	0.795
Personality disorders	610 (20.7)	115 (11.4)	495 (25.6)	<0.001
Adaptive reaction to stress	547 (18.6)	211 (20.8)	336 (17.4)	0.023
Substance use disorders	397 (13.5)	40 (4.0)	357 (18.5)	<0.001
Suicidal ideation	419 (5.1)	149 (4.3)	270 (5.6)	0.009
Personal history of self-harm	410 (5.0)	121 (3.5)	289 (6.0)	<0.001
Family history of mental and behavioral disorders	1051 (12.7)	390 (11.3)	661 (13.7)	0.001
Median stay (IQR) in days[b]	24 (10, 40)	26 (11, 40)	23 (9, 40)	0.0032

Abbreviation: IQR, interquartile range.
[a]Chi^2 test.
[b]Mann–Whitney U test.

TABLE 2 | Joinpoint regression analysis of hospital admissions due to EDs in Spain, by age and presence or absence of mental comorbidity, in 2016–2022 period.

	Average rate per 100,000		Annual average percent change	Average percent change	
	2016	2022	2016–2022	Trend 1	Trend 2
			% (95% CI)	% (95% CI)	% (95% CI)
All	19.4	32.7	11.1* (2.6, 22.6)		
10–14 years	14.4	30.4	13.9* (8.8, 21.7)	2016–19: 2.6 (−17.6, 22.5)	2019–22: 26.6* (12.1, 53.0)
15–19 years	24.7	35.0	8.2 (−2.5, 22.0)		
Mental comorbidity					
All ages	6.4	13.2	16.3* (3.3, 36.2)		
10–14 years	4.2	10.6	19.8* (12.8, 27.1)	2016–2019: −3.2 (−26.0, 11.2)	2019–2022: 48.4* (32.8, 76.5)
15–19 years	8.8	15.8	12.7* (3.3, 26.0)		
No mental comorbidity					
All ages	13.0	19.5	8.4* (4.1, 13.5)		
10–14 years	10.2	19.8	12.1* (8.0, 17.2)		
15–19 years	15.9	19.2	5.3 (−2.6, 15.1)		

*$p < 0.05$.

which increased to 6.2 in 2022, signifying a 12% increase (95% CI: 7.1, 18.3). This upward trajectory persisted across both age groups, with an average annual increase of 13.7% (95% CI: 2.6, 30.3) among children aged 10–14 and 10.3% (95% CI: 4.2, 18.3) among adolescents aged 15–19.

The subsequent most frequent cause of admission was other types of EDs (ICD-10: F50.8), with a hospitalization rate of 1.0 cases per 100,000 population in 2006 increasing to 2.5 in 2022, marking an average annual increase of 20.1 (95% CI: 7.3, 55.2). This upward trajectory persists in both age groups (Figure S3, Table S2).

Hospitalization rates for bulimia nervosa (BN) exhibited stability throughout the study period among patients aged 10–19, with an admission rate of 1.2 per 100,000 population in 2016 and 1.1 in 2022. These rates remained constant over the study duration, with an average annual percentage change of −2.7 (95% CI: −9.2, 4.0). This consistent pattern is observed across both age groups (Figure S3, Table S2).

4 | Discussion

This is the first nationwide study to analyze the characteristics and trends of hospital admissions for EDs within the pediatric population, spanning both pre- and post-pandemic periods. Key findings from this analysis include: (1) Over the span of the last 7 years, admission rates for EDs have shown a consistent upward trend, increasing at an average annual rate of 11% (95% CI: 2.6, 22.6); (2) Children and adolescents presenting with EDs alongside other comorbid mental disorders have exhibited a twofold increase in hospital admissions compared to those solely diagnosed with EDs; (3) The surge in hospital admissions is primarily driven by the cohort of children aged 10–14 years, showing an annual increase of 26.6% (95% CI: 12.1, 53.0) from the pre-COVID-19 period (2019) to the conclusion of the study period. Notably, this escalation is particularly pronounced among individuals presenting with an additional comorbid mental disorder, showing a 48.4% increase in admission rates during the same timeframe (95% CI: 32.8, 76.5); AN was the predominant disorder, representing 71.6% of admissions. Trends in various types of EDs increased generally, except for BN, which remained stable throughout the study period. The diagnosis of "other eating disorders" (ICD-10: F50.8) in children aged 10–14 years exhibited the most significant increase, with an annual rise of 73.7% (95% CI: 43.7, 147.0) since 2019.

In Spain, an increase in hospital admissions for mental and behavioral disorders in youth has been evident in recent years, with EDs being one of the main contributors. A study conducted in Castile and León (in Spain) before the onset of the pandemic revealed that 24% of psychiatric admissions for individuals under 18 years old were attributed to EDs. Notably, this age group exhibited a consistent upward trajectory throughout the study period, spanning from 2005 to 2017, with an annual increase of 7.8% (Llanes-Álvarez et al. 2019).

Our study findings reveal a consistent upward trajectory in hospitalizations for EDs, both during and following the COVID-19 pandemic. Similar trends have been observed in other European countries, the USA, and Canada (Giacomini et al. 2022; Milliren, Richmond, and Hudgins 2023; Toigo et al. 2024). Our

findings indicate that while hospitalization rates for EDs in 2022 showed signs of decline, they remain elevated compared to pre-pandemic periods. It is hypothesized that the SARS-CoV-2 pandemic has exerted a notable influence on the population, particularly among children and adolescents, potentially intensifying and accelerating pre-existing mental health conditions (Hartman-Munick et al. 2022). Lockdown measures during the pandemic weakened community support, straining healthcare, limiting social interactions, and closing educational institutions, thus increasing social isolation—a risk factor for mental illness (Buitrago Ramírez et al. 2021). Additionally, heightened concerns about body image and weight gain, amplified by social media, may have exacerbated ED symptoms (Fernández-Aranda et al. 2020).

Our findings show that 35.6% of ED cases had a comorbid mental or behavioral disorder, with mood and personality disorders being most prevalent. Hospitalization rates for EDs with psychiatric comorbidities increased by 16.3% annually (95% CI: 3.3, 36.2), from 6.4 per 100,000 in 2016 to 13.2 per 100,000 in 2022. This highlights the bidirectional relationship between EDs and psychiatric conditions, increasing the burden, disability, and risk of subsequent medical conditions (McGrath et al. 2020; Momen et al. 2020; van Hoeken and Hoek 2020).

Suicidality is highly prevalent among individuals with EDs (Cliffe et al. 2023). However, our results found a prevalence of suicidal ideation of only 5.1% and prior self-harm of 5.0% among hospitalized pediatric individuals with EDs. A retrospective cohort study from the United Kingdom (Cliffe et al. 2020) estimated a prevalence of 7.1% for suicide attempts requiring hospitalization in patients with EDs. Our data likely underestimate suicidal ideation in adolescents admitted for EDs, as patients may not disclose these thoughts or they may not be specifically diagnosed. The low rate of previous suicide attempts may be due to the fact that only those requiring hospitalization are recorded. This underscores the need for comprehensive screening for suicidal thoughts and behaviors in this population.

In Spain, the average hospital stay for patients with EDs between 2016 and 2022 was 29 days (median: 24 days, IQR: 10–40), exceeding other countries' durations (9–21 days) (Liang et al. 2018; Manaboriboon et al. 2024; Patel et al. 2018; Toigo et al. 2024); these disparities may stem from various factors such as the presence of associated comorbidities or the severity of the ED itself (J. Morris, Simpson, and Voy 2015).

Consistent with findings from other studies (Toigo et al. 2024), young people have higher hospitalization rates for EDs than children (29.5 vs. 20.0 per 100,000). Notably, the distribution of ED subtypes among hospitalized children and adolescents has demonstrated variability in recent years within our setting. While AN remains the most prevalent diagnosis, accounting for 71.6% of admissions, unspecified EDs (19.0%) and other EDs (ICD-10 code F50.8) (5.1%)—which have not been extensively described in prior studies (Lopez-de-Andres et al. 2010)—comprise a notable proportion of admissions. Among these, the group of children aged 10–14 contributes significantly to F50.8. These observed differences may stem from changes in medical coding practices (including revisions to the DSM and ICD criteria) as well as the emergence of earlier and nonspecific manifestations of EDs necessitating hospitalization (A. Morris, Elliott, and Madden 2022). Importantly, the early onset of EDs requiring hospitalization may indicate greater severity and a heightened likelihood of developing more complex disorders later in life, thereby predisposing individuals to increased morbidity, mortality, and disability (Gore et al. 2011).

The limitations of our study are inherent to research based on retrospectively collected clinical-administrative data. The quality of the data depends on the accuracy of clinical coding. Participation in the national database is mandatory, and national guidelines govern the use of the coding system. It is noteworthy that we may have underestimated personal history of self-injury, as only those requiring hospitalization are recorded. Additionally, crucial information such as the previous treatment history and socioeconomic status is unavailable, which could potentially be associated with outcomes or enhance their interpretation. Furthermore, the utilization of different diagnostic manuals, such as the DSM and ICD, each with distinct clinical criteria, poses challenges to the comparability of estimates between countries.

Despite its limitations, data derived from the CMBD-H offer valuable insights into the landscape of psychiatric disorders. Our study highlights evidence suggesting that the COVID-19 pandemic and its aftermath may have exacerbated the risk for severe manifestations of EDs necessitating hospitalization. Such exacerbation could potentially impede the transition to functional adulthood, amplifying morbidity, mortality, economic burdens, and emotional tolls on patients and their families.

These findings underscore the urgency for targeted interventions and policies aimed at mitigating the impact of the pandemic on individuals with EDs. By addressing these challenges head-on, healthcare systems can strive to provide comprehensive support, promote early detection, and ensure timely intervention to alleviate the burden imposed by EDs on affected individuals and their communities.

5 | Conclusions

Between 2016 and 2022, pediatric admissions for EDs surged by 70%, peaking in 2021. Adolescents aged 15–19 had the highest rates, but the trend notably increased among 10–14-year-olds. In light of these concerning trends, primary care providers are strongly encouraged to implement selective screenings to enable early detection of EDs and prompt initiation of treatment. By proactively identifying and addressing these issues at an early stage, healthcare professionals can play a crucial role in mitigating the adverse impacts of EDs on youth.

Author Contributions

Pilar Vázquez-Giraldo: writing – original draft, writing – review and editing. **Ainoa Muñoz-Sanjosé:** conceptualization, supervision,

writing – review and editing. **Teresa López-Cuadrado:** conceptualization, formal analysis, methodology, supervision, writing – original draft, writing – review and editing.

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Ethics Statement

This study was approved by the Research Ethics Committee of the Spanish Institute of Health Carlos III.

Consent

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data come from anonymized registries. As a result of the confidentiality agreement signed with the Ministry of Health, the data from this study cannot be shared with third parties. The authors did not have special access privileges. Should any researcher wish to gain access to these data, they can do so by applying directly to the Ministry through the following link https://www.sanidad.gob.es/en/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBD.htm.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.