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Research paper

Two decades of hospital admissions for adolescents with depression in Spain

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ABSTRACT

Background: Depression in children and adolescents is a common mental disorder that impacts both physical health and emotional well-being, often resulting in impaired social functioning and academic performance. Identifying key trends and determinants of depression in young people is essential for early detection and timely intervention.

Methods: We conducted a retrospective analysis of all hospitalizations for depression among individuals aged 11 to 18 years in Spain, using data from the Spanish National Registry of Hospital Discharges between 2000 and 2021.

Results: Over a 22-year period, 9881 hospitalizations for depression were recorded among adolescents aged 11 to 18-years-old in Spain. Depression-related hospitalizations rose steadily, particularly over the last decade. From 2000 to 2021, the incidence increased by 1217 % ($p < 0.001$), peaking at 1779 admissions in 2021. Girls accounted for 74.3 % of all depression-related admissions. Depression was significantly associated with in-hospital suicidal behavior (OR 1.51 [1.35–1.69]). The median age at hospitalization was 16 years, though a shift toward younger ages was observed in 2021 ($p < 0.001$). Older age was the only significant predictor of in-hospital mortality ($p = 0.043$).

Conclusion: The number of adolescent hospitalizations for depression has increased sharply in Spain. Strengthening early detection in schools and ensuring timely intervention should be prioritized to mitigate the growing burden of youth mental health disorders.

1. Introduction

Mental health issues among children and adolescents have become a major global concern in recent years, with many experts describing it as a worldwide crisis (Benton et al., 2021; McGorry et al., 2024; Piao et al., 2022; Sacco et al., 2024). The recent COVID-19 pandemic has exacerbated this phenomenon (Ma et al., 2021; Oliveira et al., 2022).

Depression is one of the most prevalent mental illnesses among young population. Recent meta-analytic studies have shown that nearly 30 % of individuals aged 10 to 19 experience depression, with 8 % meeting criteria for major depressive disorder (MDD), and 4 % for dysthymia (Lu et al., 2024; Shorey et al., 2022). Prevalence varies by

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region, with higher rates reported in Western countries. In the United States, nearly 1 in 5 adolescents and young adults are affected by depression (Goodwin et al., 2022). In Europe, prevalence estimates range from 10 % to 20 %, depending on the country and the assessment methods used (Santomauro et al., 2021).

Certain groups within the youth population are more affected than others. Gender disparities are especially pronounced, with adolescent girls exhibiting higher rates of depression compared to boys, particularly following puberty (Stumper and Alloy, 2023). In addition, socioeconomic disadvantage, academic pressure, and increased social media use have been identified as contributing factors to rising depressive symptoms among youth (Twenge et al., 2019).

Multiple studies have examined youth depression rates over recent decades, with many reports showing an upward trend (Goodwin et al., 2022; Lu et al., 2024; Piao et al., 2022; Sacco et al., 2024; Twenge et al., 2019). However, other investigations have reported more stable or inconsistent patterns, depending on the population examined, methodological approaches, and diagnostic criteria applied (Castelpietra et al., 2022; Sourander et al., 2012; Zhu et al., 2025). In Spain, there is a notable lack of studies at national level assessing trends in the prevalence and/or incidence of depression among youth. One recent study, however, examined trends in mental health disorders—including depression—among children in Catalonia using data from 328 primary care centers between 2008 and 2022. Depression was the disorder with the highest growth rate, with an incidence rate ratio of 2.44 (Lozano-Sánchez et al., 2024).

Early-onset depression often recurs and may persist into adulthood, particularly when left untreated, and can signal the development of more severe mental illnesses later in life (Rohde et al., 2013). If unaddressed, depression in children and adolescents is also associated with an increased risk of substance use, poor academic and occupational outcomes, impaired social functioning, and a heightened risk of suicidal behavior (Andersen and Teicher, 2008; de Girolamo et al., 2012). Given the considerable economic (e.g., lost productivity, healthcare costs), health (e.g., elevated suicide risk, chronic comorbidities), and social (e.g., isolation, academic failure, stigma) consequences of early-onset depression, understanding its trends is essential for informing effective public policies and strategic investments (Keyes et al., 2024).

Although Spain does not have a specific national registry for depression that would allow for detailed monitoring across population groups, the Spanish National Registry of Hospital Discharges (SNRHD) offers a valuable alternative. This comprehensive database has been widely used to assess the incidence, prevalence, and trends of various health conditions, including mental disorders (Krass et al., 2021; Soriano et al., 2024a). In this study, we analyzed the clinical characteristics and temporal trends of adolescents hospitalized with depression in Spain between 2000 and 2021. Our aim is to generate insights that may help identify high-risk groups, inform early detection strategies, and guide the development of targeted intervention programs. These findings can also support health service planning and resource allocation by anticipating changing care demands over time.

2. Methods

2.1. Study design

We conducted a retrospective study of hospitalizations for depression among children and adolescents aged 11 to 18 years in Spain, using data from the Spanish National Registry of Hospital Discharges (SNRHD) for the period 2000–2021. These records have been incorporated into the Minimum Basic Data Set (MBDS) within the SNRHD (Ministerio de Sanidad). This administrative database contains extensive information about every patient discharged from hospitals and clinics throughout Spain, with data dating back to the 1990s. It serves various functions, such as budget planning and allocation, while also ensuring the availability of hospital beds and specialized healthcare personnel for different medical conditions. It has provided significant insights into various health conditions, including mental health conditions (Blasco-Fontecilla et al., 2025; Soriano et al., 2024a, 2024b), cancer (Bernal-Delgado et al., 2010), cardiovascular diseases (de Miguel-Díez et al., 2018), geriatric illnesses (Palacios-Fernandez et al., 2021), and COVID-19 (Ramos-Rincon et al., 2023).

We analyzed data from the SNRHD spanning the 22-year period between January 1, 2000, and December 31, 2021. Diagnoses and procedures were classified using the International Classification of Diseases (ICD), applying the Ninth Revision (ICD-9) up to 2015 and the Tenth Revision (ICD-10) from 2016 onward. In an initial phase, we examined overall trends in major mental disorders (Soriano et al., 2024a). We then focused on specific psychiatric conditions for more detailed analyses. For the present study on depression, the following codes were used: ICD-9 codes 296.2, 296.3, 311, 300.4, and 309.0; and ICD-10 codes F32, F33, and F34. We also assessed hospital outcome variables, including length of stay and in-hospital mortality.

2.2. Statistical analyses

The data are presented in both absolute numbers and percentages. Quantitative variables are described using the mean ± standard deviation (SD) or the median accompanied by interquartile ranges (IQR), whereas qualitative variables are expressed as proportions. The significance of differences between two independent proportions was evaluated utilizing the *Z*-ratio. As appropriate, bivariate comparisons of quantitative and qualitative variables were conducted employing the Mann-Whitney *U* test, Pearson's chi-squared test, or Fisher's exact test. Time trend analyses were performed utilizing the Kruskal-Wallis test for quantitative variables and the chi-squared test for qualitative variables.

The predictors of in-hospital mortality were examined through both univariate and multivariate analyses. The association measure is presented as odds ratio (OR) and 95 % confidence intervals (95 % CI). All statistical analyses were conducted utilizing IBM SPSS Statistics for Windows, version 25.0 (IBM Corp, Armonk, NY). All tests were bilateral; only *p*-values below 0.05 were deemed statistically significant.

2.3. Ethical aspects

The Spanish Ministry of Health provided the database upon request, having previously removed all potential patient identifiers. According to Spanish law, patient-informed consent was not necessary for this analysis. The study received approval from the Ethics Committee of Universidad Internacional de La Rioja (UNIR) (reference PI-022/2023; date: April 27th, 2023). All procedures complied with the ethical standards stated in the Revised Declaration of Helsinki, 2013. The database, named SPAIN-HOSPI-PSYCHO-YOUTH, is available for sharing upon request.

3. Results

During the 22-year study period, we identified 118,609 hospitalizations for psychiatric diagnoses among children and adolescents aged 11 to 19 years, representing 5.9 % of all hospital admissions in this age group (2,015,589 records). While total hospitalizations for all causes declined by 22 % and the adolescent population in Spain decreased by 27 %, psychiatric-related hospitalizations increased by 88 % (Fig. 1 and Table 1). By 2021—the final year of the study—psychiatric diagnoses accounted for 9.5 % of all adolescent admissions, compared to just 3.9 % in 2000 ($p < 0.001$). The overall trend in psychiatric hospitalizations among adolescents during this period was previously reported in a broader analysis (Soriano et al., 2024a).

Analyzing the data of adolescents hospitalized with depression, a clear increase in numbers was manifest. In 2000, there were 173 admissions of adolescents with depression identified as primary diagnosis. In 2016, when ICD coding was changed, there was an increase of 121 %

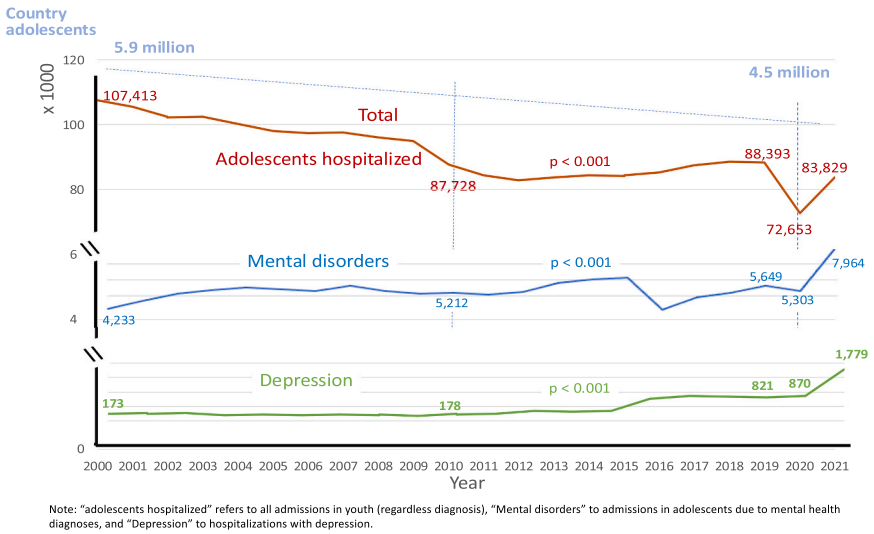

Fig. 1. Trends in hospital admissions among adolescents (aged 11–18) in Spain from 2000 to 2021.

Table 1
Annual hospitalizations in adolescents with depression in Spain.

Year	Hospitalizations in adolescents	Hospitalizations with mental disorders (% of adolescents hospitalizations)	Hospitalizations in adolescents with depression		
			No.	Rate x 10,000	Girls (%)
2000	107,413	4233 (3.9)	173	16,11	65.9
2001	105,491	4728 (4.5)	217	20,57	68.7
2002	102,388	5166 (5)	263	25,69	76.0
2003	102,493	5379 (5.2)	272	26,54	72.8
2004	100,163	5527 (5.5)	279	27,85	75.6
2005	98,038	5431 (5.5)	201	20,50	72.1
2006	97,298	5305 (5.4)	228	23,43	64.5
2007	97,612	5634 (5.7)	211	21,62	73.5
2008	96,141	5315 (5.5)	225	23,40	76.0
2009	94,932	5171 (5.4)	219	23,07	74.0
2010	87,728	5212 (5.9)	178	20,29	70.8
2011	84,312	5077 (6)	238	28,23	77.7
2012	82,837	5247 (6.3)	248	29,94	74.2
2013	83,655	5793 (6.9)	338	40,40	72.2
2014	84,422	6019 (7.1)	321	38,02	73.2
2015	84,349	6153 (7.3)	345	40,90	74.2
2016	85,376	4164 (4.8)	764	89,49	73.3
2017	87,428	4914 (5.6)	859	98,25	75.1
2018	88,638	5225 (5.9)	832	93,86	72.4
2019	88,393	5649 (6.4)	821	92,88	70.0
2020	72,653	5303 (7.3)	870	119,75	74.8
2021	83,829	7964 (9.5)	1779	212,22	80.1
TOTAL	2,015,589	118,609 (5.9)	9881	49.02	74.3

(it passed from 345 to 764 admissions). By 2019, the year before the COVID-19 pandemic surge, this figure had risen to 821. In 2021 there were 1779 hospitalizations of adolescents with depression. Using relative values (rate per 10,000 subjects), the incidence increased by 1217 % ($p < 0.001$) (Table 1).

Compared to adolescents hospitalized with other mental disorders, adolescents hospitalized with depression had significant differential features, remarkably 74.3 % were girls ($p < 0.001$). The median length of hospital stay was 7 days, two days longer than other psychiatric conditions. Nearly three-quarters of all hospitalizations in adolescents with depression registered during the study period occurred during the last decade (OR 3.04 [2.89; 3.18]). Although substance use disorders were the most common comorbidity overall in youth hospitalized with depression, suicidal behavior showed the strongest statistical association (OR 1.51 [1.35; 1.69]).

The median age of adolescents hospitalized with depression was 16 (interquartile range 14–17) ($p = 0.236$) (Table 2). Although it remained stable throughout the study period, admissions right after the COVID-19 surge in 2021 had a younger mean age ($p < 0.001$) (Fig. 2). Adolescents 14 to 17 years-old had the highest hospitalization rate (Fig. 3). As shown in Table 3, older age was the sole predictor of in-hospital mortality in adolescents ($p = 0.043$).

4. Discussion

In this nationwide retrospective study, we found a gradual rise in

Table 2
Mean features of adolescents hospitalized with depression in Spain.

	Depression	Rest of admissions with mental disorders	OR (95 % CI)	P value
Number	9881	108,728	–	–
Female sex (n, %)	7340 (74.3)	57,970 (53.2)	2.62 (2.14–2.65)	<0.001
Median (IQR) age (years-old)	16 (14–17)	16 (14–17)	0.97 (0.96–0.97)	<0.236
Median (IQR) in-hospital stay (days)	7 (3–15)	5 (2–12)	1.01 (1.00–1.02)	<0.051
In-hospital death (n, %)	18 (0.2)	262 (0.1)	0.75 (0.47–1,22)	0.248
Period (n, %)				<0.001
2000–2010	2466 (25.0)	54,635 (50.2)	1	
2011–2021	7415 (75.0)	54,093 (49.8)	3.04 (2.89–3.18)	
Other mental disorders (n, %)				
Substance use disorders	911 (9.2)	44,043 (40.5)	0.15 (0.14–0,16)	<0.001
Anxiety disorders	283 (2.9)	7220 (6.6)	0.41 (0.36–4.7)	<0.001
Bipolar disorder	18 (0.2)	2004 (1.9)	0.09 (0.06–0.15)	<0.001
Suicidal behavior	341 (3.5)	2514 (2.3)	1.51 (1.35–1.69)	<0.001
Intellectual disability	136 (1.4)	11,504 (10.6)	0.12 (0.10–0.14)	<0.001
ADHD	330 (3.3)	9962 (9.2)	0.34 (0.31–0.38)	<0,001
Psychosis & schizophrenia	136 (1.4)	6990 (6.4)	0.02 (0.17–0.24)	<0.001

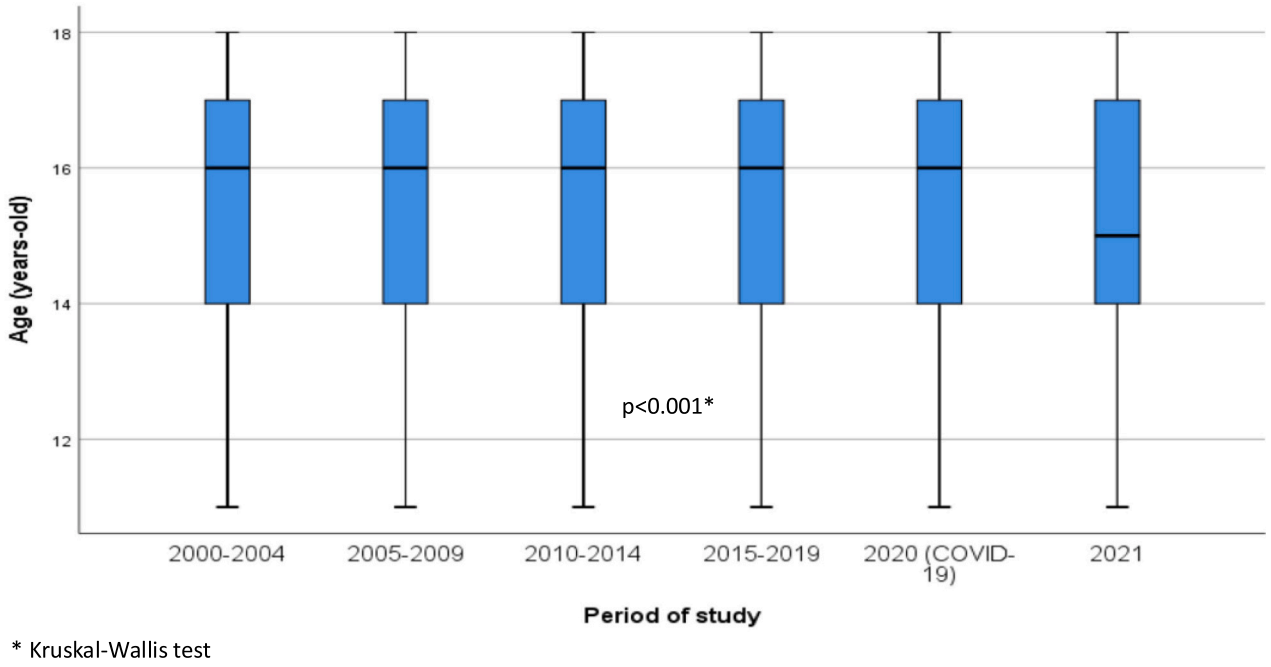

Fig. 2. Median age at hospitalization in adolescents with depression in Spain by periods.

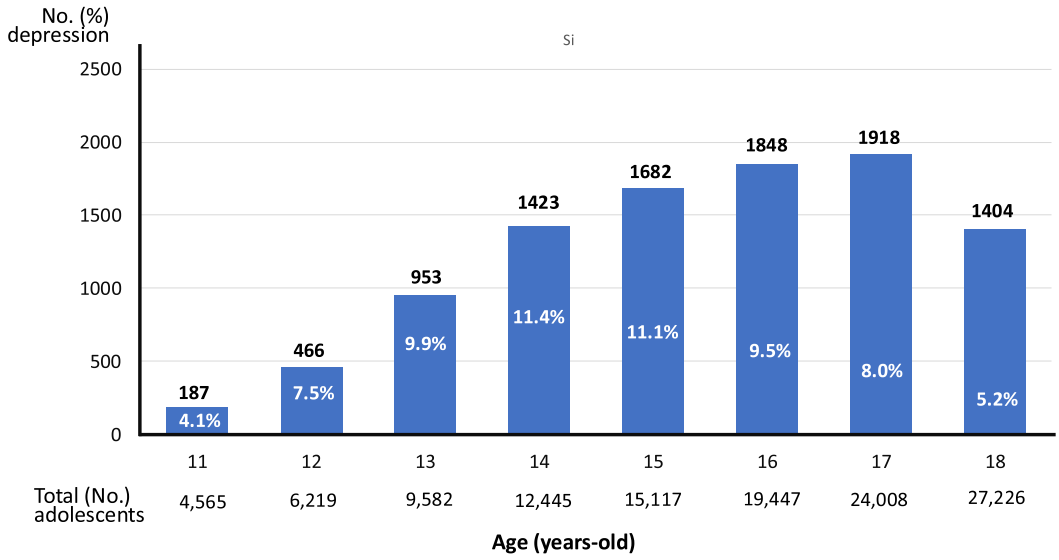

Fig. 3. Hospitalizations in adolescents with depression in Spain by age.

hospital admissions among adolescents with depression between years 2000 and 2021. This increase was particularly pronounced in 2021, right after the COVID-19 pandemic surge. Females comprised 74.3 % of admissions, with adolescents aged 14 to 17 years representing three out of four hospitalizations. Over time, the average admission age remained fairly stable at 16 years, although significantly younger ages were noticed in 2021, after COVID-19. In Spain, young admissions for depression had longer stays and a mortality rate one-tenth higher than other mental health issues. Therefore, it would be desirable to strengthen follow-up in this vulnerable population, given its strong association with premature death (Goueslard et al., 2024).

The main findings of our analysis—an increase in hospitalizations among young people with depression—are consistent with other studies that examined trends in adolescent psychiatric admissions (Arakelyan et al., 2023). Broader global estimates of youth depression burden have also been reported (Piao et al., 2022; Sacco et al., 2024; Shorey et al., 2022), though they did not focus on hospitalized patients. The data indicate two key points when admission rates increased: in 2016 when ICD-10 replaced ICD-9 in Spain for clinical diagnoses and hospital procedures, and in 2021 after the COVID-19 pandemic surge. Changes in the coding system might improve the identification and differentiation of depressive disorders and result in increased diagnosis rates, but there is no evidence supporting it (Fiest et al., 2014; Steinhausen and Erdin, 1991).

As noticed in other geographical regions, we found a significant impact of COVID-19 on mental health in youth in Spain (Krass et al., 2021; Ma et al., 2021; Oliveira et al., 2022; Santomauro et al., 2021). However, rising rates of hospital admissions in adolescents with depression began in 2011. As shown in Table 1, hospital admission rates in this population, which had been fluctuating around 20 per 10,000 admissions, steadily rose since 2011, reaching a peak of over 200 per 10,000 hospitalizations at the end of the study period. In other words,

Table 3
Predictors of in-hospital mortality in adolescents admitted with depression in Spain.

	Death (n = 18)	Alive (n = 9822)	OR (95 % CI)[a]	P value
Male sex (n, %)	8 (44.4)	2528 (25.7)	2.38 (0.91–5.85)	0.07
Median (IQR) age (years-old)	17 (16–18)	16 (15–17)	1.36 (1.01–1.84)	0.043
Latest decade (2011−2021) vs previous	11 (61.0)	7375 (75.1)	0.52 (0.20–1.34)	0.171
Comorbidity with mental disorders (n, %)				
Substance use disorders	1 (5.6)	907 (9,2)	0.58 (0.08–4.35)	1.00
Anxiety disorders	1 (5.6)	281 (2.9)	1.99 (0.27–15.1)	0.41
Bipolar disorder	0 (0.0)	18 (0.2)	NA	1.00
Intellectual disability	0 (0.0)	136 (1.4)	NA	1.00
ADHD	0 (0.0)	329 (3.3)	NA	1.00
Psychosis & schizophrenia	0 (0.0)	136 (1.4)	NA	1.00
Suicidal behavior	1 (5.6)	338 (3.4)	1.65 (0.22–12.4)	1.00

Note: ADHD, Attention deficit hyperactivity disorder; PTSD, postraumatic stress disorder; NA, not applicable; OR, odds ratio; CI, Confidence Interval.
[a] Multivariate analysis adjusted for age, sex and diagnosis.

the COVID-19 pandemic just behaved as a trigger for depressive disorders among Spanish adolescents, which could be traced back to 2010. If we split the study period into two parts, up to three-quarters of admissions occurred during the last decade.

Changing trends in social, political, and welfare factors might have influenced our results. On one hand, positive social changes have occurred, including increased awareness and literacy regarding mental illness, reduced stigma, and improved access to care services. The increase in hospitalizations might also be explained by structural changes in the availability of specialized inpatient units and beds for child and adolescent psychiatry (CAP). In the early 2000s, such resources were very limited in Spain. Their gradual increase over time would have facilitated access to hospitalization, particularly in more complex and/or severe cases. Unfortunately, national data on the number of CAP-specific beds neither in public nor private hospitals are not publicly available. The general data from the National Health System (SNS), which do not disaggregate by medical specialty, shows a reduction in the overall number of hospital beds per 100,000 inhabitants during the study period.

Another important factor that might have influenced our findings refers to the steadily increase in the number of health professionals specialized in CAP. In Spain, CAP was not officially recognized as a distinct medical specialty until 2023, and the first cohort of residents has yet to complete training (Sociedad Española de Psiquiatría y Salud Mental, 2023). So, until very recently, formal training was limited to master programs offered at a few institutions, such as the University of Navarra in Pamplona and Hospital Vall d'Hebrón in Barcelona. Overall, the number of certified specialists and pediatricians with an interest in CAP remained consistently low throughout the study period.

On the other hand, during this period, new potential or emerging risk factors that directly impact young people have emerged, including the rise and problematic use of social networks (Cunningham et al., 2021), increased social isolation (Prizeman et al., 2023), lifestyle changes (Hidaka, 2012), academic stress (Ang and Huan, 2006) or family instability (Christakis and Hale, 2025; Hardi et al., 2023).

Altogether, our results highlight the need for new healthcare policies accompanied by investments to increase mental health care resources, the number of professionals trained in child and adolescent psychiatry/psychology, and the establishment of effective prevention and intervention strategies.

The prevalence of hospitalizations due to depression in youth in Spain was twice as high in girls as in boys. While this pattern is in line with epidemiological studies at other regions showing higher rates of depression in adolescent females (Gjerde et al., 1988; Twenge et al., 2019), sex differences in hospitalization may also reflect other factors, including clinical presentation, help-seeking behavior, or healthcare provider decision-making.

There is a need for differentiated approaches to prevent and treat depression in young people (Fröjd et al., 2008). The psychiatric condition that exhibits the highest comorbidity with depression was suicidal behavior (suicidal ideation and suicide attempts). Depression is widely recognized as one of the primary risk factors for suicide among children and adolescents, with most adolescents who have taken their own lives having a prior history of depression (Mangione et al., 2022; Viswanathan et al., 2022). We collected 18 in-hospital deaths during the 22-years study period among adolescents hospitalized with depression in Spain, being older age the only predictor. This is aligned with the literature (Goueslard et al., 2024). While suicide is much less common among adolescents compared to older individuals, it remains one of the top three to four causes of death in this age group globally (GBD 2019 Adolescent Mortality Collaborators, 2021).

Despite the strengths of our study, several limitations must be noted, requiring further exploration. First, our data may represent only a small portion of a larger issue. Hospital admissions primarily involve severe or acute cases. Consequently, depression cases managed I daycare health units or facilities are excluded. Moreover, it is noteworthy that only a limited number of adolescents with depression are hospitalized, as most receive treatment in outpatient settings. Considering prevalence estimates (10–20 %) and the size of the Spanish adolescent population during the study period, the annual percentage of depressed adolescents who were hospitalized likely remained under 1 %. Therefore, the data presented here predominantly reflect severe or complicated cases and do not reflect all adolescents facing depression.

Second, the transition from the ICD-9 to the ICD-10 coding system could have influenced our trend analysis. While ICD-9 used broader codes for depressive disorders (e.g., 296.2, 296.3, and 311), the updated ICD-10 allowed for greater specificity and granularity, including F32 (depressive episodes), F33 (recurrent depressive disorder), and F34 (persistent mood disorders). This shift might have improved diagnostic sensitivity and contributed in some extent to increased MDD hospitalizations. Third, our analyses focused solely on adolescents aged 11 to 18, and therefore, we could not assess trends at earlier ages or their effects in adulthood.

Other constraints in our study emerge from its retrospective design. For example, it was impossible to review medical records in situations where ambiguous or missing data had to be verified. We could not determine whether some hospital admissions represented repeated hospitalisations for the same individual within the same year or how this may have been influenced by the availability of healthcare resources, such as beds and specialists. Furthermore, we could not recognize whether diagnosis of depression could be secondary to other medical conditions, such as acute surgery. The interpretation of absolute hospitalization numbers in our study should be interpreted cautiously and must consider the significant demographic changes in Spain during the study period. The child and adolescent population initially grew due to increased migration. However, it declined after 2008 as result of economic recession. These shifts led to a decrease from 5.9 to 4.5 million in adolescents, affecting the denominator in hospitalization rates. Therefore, relative measures (e.g., admissions per 10,000 adolescents) offer a more accurate value in our study.

Finally, it is important to note that only a small fraction of adolescents with depression are hospitalized, as the vast majority are treated in outpatient settings. Based on prevalence estimates (10–20 %) and the Spanish adolescent population size during the study period, the annual proportion of depressed adolescents who were hospitalized likely

remained below 1 %. Thus, the data presented here mainly reflect severe or complicated cases and may not be generalizable to all adolescents with depression.

Despite all these limitations, previous studies that have used the SNRHD database for other medical diagnoses (such as HIV, stroke, viral hepatitis, COVID-19, etc.) have shown that the large sample size tends to mitigate these potential biases (de Miguel-Díez et al., 2018; Ramos-Rincon et al., 2023; Soriano et al., 2024a).

5. Conclusions

This extensive nationwide retrospective study on adolescent hospitalizations in Spain reveals a significant increase in depression-related admissions over the past two decades, particularly following the outbreak of the COVID-19 pandemic. Overall depression was the main diagnosis in 8.3 % of all hospitalizations of youth with mental disorders. Our results prompt to encourage new health policies, including preventive strategies and more effective treatments. Provision of specialized infant and juvenile mental health services should be prioritized.

CRediT authorship contribution statement

Eduardo González-Fraile: Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Vicente Soriano:** Writing – review & editing, Validation, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **José Manuel Ramos:** Validation, Methodology, Formal analysis, Data curation. **Lucía Gallego:** Validation, Investigation. **María Pilar Berzosa-Grande:** Validation, Investigation. **María Inés López-Ibor:** Validation, Investigation. **Carlos Chiclana-Actis:** Validation, Investigation. **Gemma Mestre-Bach:** Validation, Investigation. **Manuel Faraco:** Validation, Investigation. **Héctor Pinargote:** Validation, Investigation. **Manuel Corpas:** Validation, Investigation. **Octavio Corral:** Validation, Investigation. **Hilario Blasco-Fontecilla:** Validation, Investigation.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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