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Gender Differences in Depressive Disorders in Children and Adolescents: Results from a Clinical Sample

Lucia Emanuela ANDREI[a, b, c], Ilinca MIHAILESCU[a, b], Alexandra Mariana BUICA[a, b], Mihaela MOISE[c, d], Iuliana DOBRESCU[a], Florina RAD[a, b]

[a]Child and Adolescent Psychiatry Department, Faculty of Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

[b]Child and Adolescent Psychiatry Department, "Prof. Dr. Al. Obregia" Clinical Hospital of Psychiatry, Bucharest, Romania

[c]IOSUD/PhD Department, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

[d]"Mina Minovici" Legal Medicine Institute, Bucharest, Romania

ABSTRACT

Objective: *Adolescence is a unique period of significant neurodevelopmental changes that can increase vulnerability to mental health problems. We are currently witnessing an increase in depressive symptoms among adolescents, with suicide being among the top three causes of death for young people aged 10-25 years (1, 2, 3). In depressive disorders (DD) there are significant differences between genders in terms of symptomatology, risk factors, evolution and prognosis. Thus, the objective of our study is to investigate gender differences among children and adolescent patients admitted for evaluation of depressive symptomatology to our clinic.*

Material and methods: *The current study is an analytical, non-experimental, retrospective study on children and adolescents admitted to the Pediatric psychiatry clinic at "Prof. Dr. Al. Obregia" Clinical Psychiatry Hospital in Bucharest, Romania, between 1 January 2020 and 30 June 2024, who were diagnosed with DD. Descriptive analysis of the qualitative and quantitative variables was performed. The variables were processed and analyzed using Microsoft Office Excel 2007 and Microsoft Power BI 2024.*

Results: *The present study included 915 patients (77.04% females, 22.96% males) aged 9-17 years, with a mean age of 15.42 ± 1.79. Most patients [43.83% (34.21% females, 9.62% males)] were diagnosed with severe depressive episode without psychotic symptoms. Suicidal ideation or suicidal attempts at admission were identified in 30% of our patients (24% females, 6% males). In the analyzed time period, pediatric patients have been increasingly diagnosed with depressive disorders: from 120 patients diagnosed in 2020 to 265 in 2023 and 120 in the first half of 2024.*

Address for correspondence:
Mihaela Moise
Mailing address: "Mina Minovici" Legal Medicine Institute, 9-11 Vitan-Bârzeşti 9-11 Road, Bucharest 077160, Romania
Email: mihaela.stancu@drd.umfcd.ro

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Conclusions: *Our study shows an increase in DD and suicidality in pediatric patients, with important differences among genders in terms of clinical aspects, severity and evolution, thus highlighting the need for early identification and targeted therapeutical interventions.*

Keywords: depression, children, adolescents, gender differences, suicide, COVID-19.

INTRODUCTION

Childhood is the developmental period from birth to adolescence characterized by rapid physical, cognitive, emotional and social growth, while adolescence is the transitional stage between childhood and adulthood, typically ranging from 10 to 19 years. They are shaped by biological, psychological, social, cultural and environmental factors that influence long-term mental, emotional and social well-being, as well as development of mental health disorders (3). In recent years, studies have been showing an increase in depressive symptoms among children and adolescents, with major depressive disorders (MDD) rising sharply from early to middle adolescence. Approximately 20% of adolescents worldwide experience mental disorders in any given year, with anxiety and depression being the most common (1, 4), and suicide among the top three causes of death for young people aged 10-25 (5). Beginning in adolescence, females are at an increased risk compared to males for common mental illnesses such as DD (6, 7, 8). The lockdown and COVID-19 related worries were significant stress factors, contributing to the development of anxious and depressive disorders, with female gender being the highest risk factor for these symptoms (9, 10). Poor mental health has important consequences for the broader health and long-term development of children and adolescents and is associated with several outcomes such as unemployment, higher alcohol, tobacco and illicit substances use, adolescent pregnancy, school dropout and delinquent behaviors. Thus, research on child and adolescent mental health and raising awareness among medical professionals regarding the clinical aspects, risk factors, gender differences and dynamics of mental health conditions are of utmost importance in current times. ❑

MATERIALS AND METHODS

We conducted an analytical, non-experimental, descriptive study on children and adolescents admitted in the inpatient child psychiatry clinic at "Prof. Dr. Al. Obregia" Clinical Psychiatry Hospital in Bucharest, Romania, who were diagnosed with depressive disorders between 1 January 2020 and 30 June 2024. A child and adolescent psychiatrist diagnosed DD and other psychiatric conditions using the ICD-10 (International Classification of Diseases, 10th Revision) criteria, with confirmation through structured psychiatric interviews (11). A retrospective analysis of the subjects' data was conducted using medical electronic records from the clinic's database. We analyzed characteristics, severity and dynamics of patients' diagnoses, including suicidal behaviors. All variables were subjected to descriptive analysis for the socio-demographic and clinical data; mean and standard deviation (SD) were calculated for patients' age. The variables were processed and analyzed using Microsoft Office Excel 2007 and Microsoft Power BI 2024. Descriptive analysis of the qualitative and quantitative variables was performed. ❑

RESULTS

Patients' socio-demographic data are illustrated in Table 1. From a total of 915 patients, 705 were females (77.04%) and 210 (22.96%) males. Most subjects (66.76%) came from an urban environment, while 33.22% resided in a rural area. From what is currently known, an urban environment can be a risk factor for adolescent mental health problems (12). In each group, the mean age at admission was similar [15.38 years (SD ± 1.79) for girls and 15.56 (SD ± 1.78) for boys], with most patients (85.34%) belonging to the 14-17 years age range. Patients belonging to the 9-12 years age category (47–39 females, eight males) represent 5.13% of our group, while the current literature suggests an incidence of de-

TABLE 1. Socio-demographic data of patients

	Female (F) (n)	F (%)	Male (M) (n)	M (%)	Total (n)	Total (%)
Patients	705	77.04%	210	22.96%	915	100%
Age (years)						
9	3	0.32%	2	0.21%	5	0.54%
10	2	0.21%	3	0.32%	5	0.54%
11	8	1%	1	0.10%	9	0.98%
12	26	2.84%	2	0.21%	28	3.06%
13	70	7.65%	17	1.85%	87	9.50%
14	117	12.78%	28	3.06%	145	15.84%
15	124	13.55%	33	3.60%	157	17.15%
16	130	14.20%	56	6.12%	186	20.32%
17	225	24.59%	68	7.43%	293	32.02%
Mean age (years)	15.38 (SD ± 1.79)		15.56 (SD ± 1.78)		15.42 (SD ± 1.79)	
Age range						
9-13 years	109	11.91%	25	2.73%	134	14.64%
14-17 years	596	65.13%	185	20.21%	781	85.34%
Living area						
Urban	470	51.36%	141	15.40%	611	66.76%
Rural	235	25.68%	69	7.54%	304	33.22%

TABLE 2. Suicidal behaviors at admission

ICD-10 code	ICD-10 diagnosis	Female (n)	Female (%)	Male (n)	Male (%)
R45.81	Suicidal ideation	209	22.84%	53	5.79%
X64	Intentional self-poisoning by and exposure to other and unspecified drugs, medicaments and biological substances	4	0.43%	0	0.00%
X60	Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics	1	0.10%	0	0.00%
X61	Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs	1	0.10%	2	0.20%
X70	Intentional self-harm by hanging strangulation and suffocation	1	0.10%	0	0.00%
X78	Intentional self-harm by sharp object	2	0.20%	0	0.00%
Total		218	23.82%	55	6.01%

pression of 2%-3% for children aged 6-12 years old (13), the rates being similar for boys and girls (14). The incidence of depression increases with age, gender differences emerging between ages 12 and 15 (15). Girls' depression symptoms accelerate early in adolescence, while boys' depression symptoms accelerate later in adolescence (16). A dramatic shift occurs by age 13, reversing the trend in depression rates, and by age 15, females are approximately twice as likely as males to have experienced an episode of depression. Considering age ranges, in our study group, patients aged 9-13 years represent 14.64% of cases, while adolescents aged between 14-17 years represent 85.34% of the group. This is consistent with previous data showing that the prevalence rates of depressive disorders nearly double from age 13 (4.5%) to 16 (8.7%) (8).

Suicidality among children and adolescents represents a significant concern, with trends, methods and associated factors that require careful consideration. As shown in Table 2, in the studied group, 273 patients (218 girls, 55 boys) were specifically admitted to our clinic for suicidal ideation or intentional self-harming behaviors. The high percentage (30%) of patients who were hospitalized for such difficulties could be explained by the profile of the clinic, the only one in a significant geographic area where children and adolescents can be admitted in severe situations that represent psychiatric emergencies, such as suicidality. Another explanation could be that adolescents with MDD are more likely to attempt suicide, as it has been previously shown (8, 12). The differences between girls and boys in our lot are consistent with data from the literature, which show that although in the last years suicide rates have increased among both sexes, rates among girls have increased disproportionately (6, 17).

TABLE 3. Diagnoses – types of depressive episodes and disorders

Main diagnosis (ICD 10 code)	Female (n)	Female (%)	Male (n)	Male (%)	Total (n)	Total (%)
F31.3 Bipolar affective disorder, current episode of mild or moderate depression	5	0.55%	0	0.00%	5	0.55%
F31.4 Bipolar affective disorder, current episode of severe depression without psychotic symptoms	2	0.22%	0	0.00%	2	0.22%
F31.5 Bipolar affective disorder, current episode of severe depression with psychotic symptoms	1	0.11%	3	0.33%	4	0.44%
F31.6 Bipolar affective disorder, current mixed episode	8	0.87%	5	0.55%	13	1.42%
F32.00 Mild depressive episode, not specified as occurring in the postnatal period	46	5.03%	15	1.64%	61	6.67%
F32.10 Moderate depressive episode, not specified as occurring in the postnatal period	**198**	**21.64%**	**51**	**5.57%**	**249**	**27.21%**
F32.11 Moderate depressive episode, occurring in the postnatal period	6	0.55%	0	0.00%	6	0.66%
F32.20 Severe depressive episode without psychotic symptoms, unspecified as occurring in the postnatal period	**313**	**34.21%**	**88**	**9.62%**	**401**	**43.83%**
F32.21 Severe depressive episode without psychotic symptoms, occurring in the postnatal period	6	0.55%	0	0.00%	5	0.66%
F32.30 Severe depressive episode with psychotic symptoms, unspecified as occurring in the postnatal period	38	4.15%	20	2.19%	58	6.34%
F32.31 Severe depressive episode with psychotic symptoms, occurring in the postnatal period	2	0.22%	0	0.00%	2	0.22%
F32.80 Other depressive episodes, unspecified as occurring in the postnatal period	24	2.62%	12	1.31%	35	3.94%
F33.0 Recurrent depressive disorder, mild current episode	2	0.22%	0	0.00%	2	0.22%
F33.1 Recurrent depressive disorder, moderate current episode	6	0.66%	5	0.55%	11	1.20%
F33.2 Recurrent depressive disorder, severe current episode without psychotic symptoms	43	4.70%	10	1.09%	53	5.79%
F33.3 Recurrent depressive disorder, severe current episode with psychotic symptoms	3	4.70%	0	0.00%	3	0.33%
F33.8 Other recurrent depressive disorders	3	0.33%	0	0.00%	3	0.33%
Total					915	100.00%

Table 3 summarizes the main diagnoses that were formulated according to ICD-10 criteria (11) for the patients in our study group. Most subjects [49.62% (38.91% females, 10.71% males)] were diagnosed with a severe depressive episode without psychotic symptoms, followed by moderate depressive episodes diagnosed in 28.41% of the studied patients (22.3% females, 6.12% males). Similar rates were found for mild depressive episodes (6.89%) and severe depressive episodes with psychotic symptoms (6.67%). These results concur with previous data which show that the severity of pediatric depressive episodes can vary. Older adolescents tend to have more severe episodes, with girls being twice as likely as boys to develop MDD (6, 8, 18, 19).

Bipolar disorder (BD) is another important consideration when evaluating a depressed pediatric patient, as some patients with MDD may subsequently meet the criteria for BD (6). In our group, 2.63% of patients (1.75% girls, 0.88% boys) were diagnosed with a current bipolar depressive episode, most of them being diagnosed with a current episode of mild or moderate depression (0.55%). Figures 1, 2 and 3 show these differences between depressive disorders in the female and the male gender, as well as the depressive disorders evolution over the analyzed period.

Looking at diagnoses' evolution over the years, we identified that children and adolescents have been increasingly diagnosed with DD, from 120 patients diagnosed in 2020 to 184 in 2021, 226 in 2022, 265 in 2023 and 120 in the first half of 2024.

While there are several theories related to factors that may contribute to an increase in the prevalence of depressive disorders in children and adolescents, focusing on both genetic and epigenetic factors, during this particular period of time that was analyzed in our study, we should take into account a major factor, which is the COVID-19 pandemic. Many studies have found a higher prevalence of depressive symptoms in children and adolescents during the pandemic compared to pre-pandemic times (9, 10, 20, 21). ❑

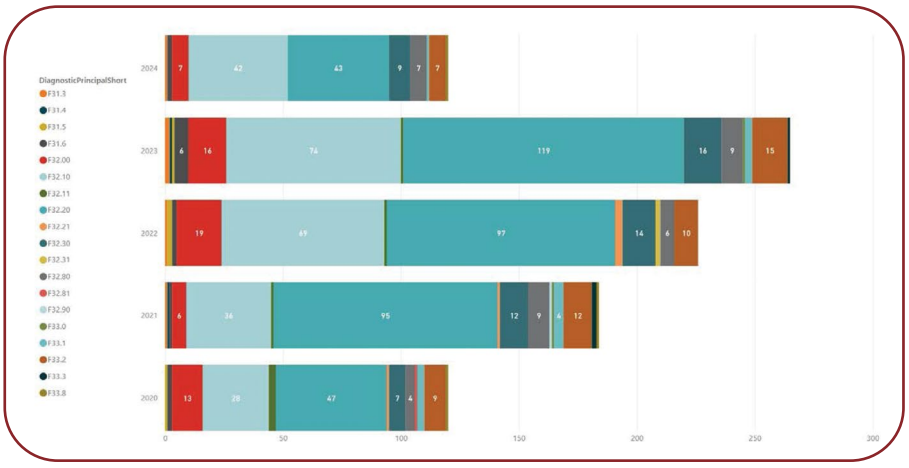

FIGURE 1. Diagnoses *per* year – total

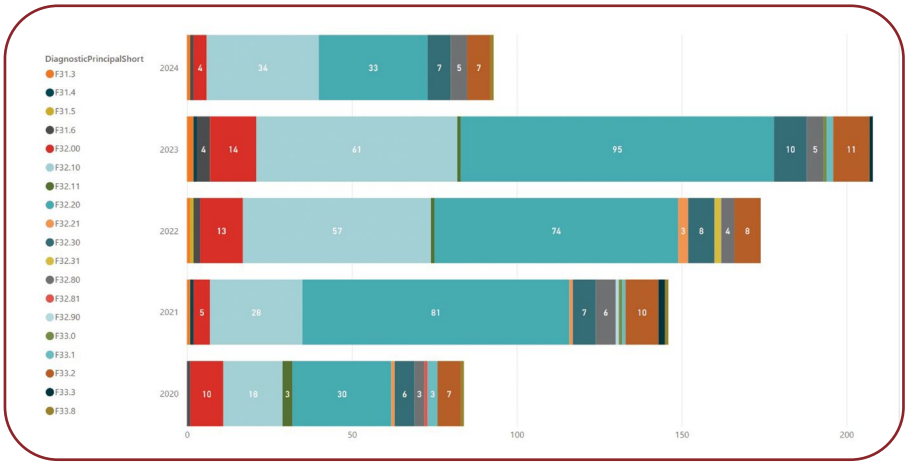

FIGURE 2. Diagnoses *per* year – girls

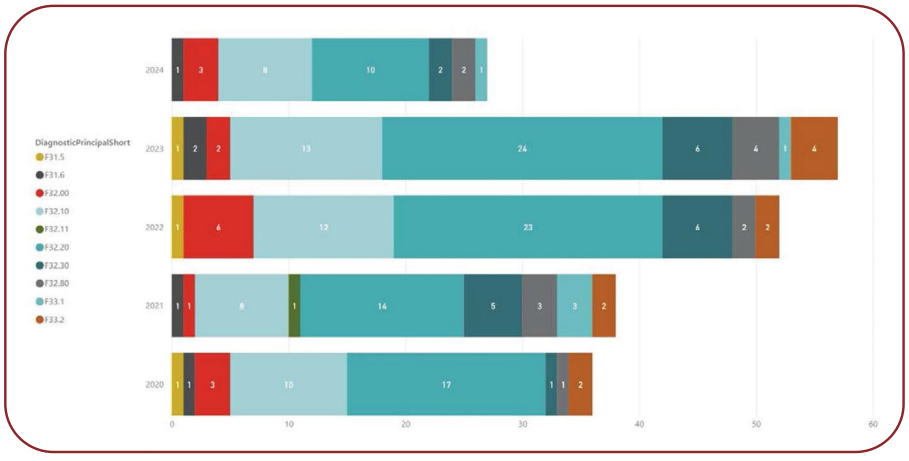

FIGURE 3. Diagnoses *per* year – boys

DISCUSSION

Age

In our group, the mean age was 15.42 (SD ± 1.79), with most patients (85.34%) belonging to the 14-17 years age range. Avenevoli et al indicated in one study that 12-month prevalence rates nearly double from age 13 (4.5%) to 16 (8.7%). Adolescents with MDD, as well as subclinical levels of depressive symptoms are more likely to attempt suicide, take impulsive risks, and engage in substance use (8). The trajectory of depression through childhood and

adolescence is marked by an increasing prevalence with age, notable gender differences emerging in early to mid-adolescence, and distinct symptomatology patterns compared to adults (3, 23).

Environment

In our study, most patients reside in an urban environment (66.76%), while 33.22% live in a rural area. Neuroscience tells us that childhood and adolescence are dynamic periods of brain development, strongly influenced by environmental factors (24). Generally, urban children and adolescents are more likely to experience stress from academic competition, exposure to violence, noise pollution and socioeconomic disparities, which are known risk factors for disorders such as depression but have better access to mental health professionals and specialized care (25). In rural areas, stigma around mental health issues tends to be stronger, leading to reluctance in seeking treatment and accessing mental health services, which could be one of the causes behind the smaller number of this lot in our study (26, 27).

Gender differences

In our study group there were 705 female (77.04%) participants and 210 (22.96%) male subjects. Adolescent girls may have been exposed to a greater degree to depression risk factors in recent years (28-30). Studies show that females have a higher lifetime prevalence of mood or anxiety disorders than males. Projecting from age-specific incidence proportions, the cumulative incidence of depression between the ages of 12-17 is 13.6% among male and 36.1% among female subjects (6-8, 16, 20, 28, 31-34). Several social factors contribute to depression in adolescent girls: they experience more interpersonal stressors than boys, which have been shown to partially mediate the gender difference in teen depression (35, 36). Moreover, adolescent girls may be more at risk for depression contagion within peer relationships. Depressed boys however, may unconsciously display anger instead of sadness and are less likely to seek medical help, possibly due to depression being seen as "feminine". Understanding the specific ways in which depression manifests in adolescent boys, along with potential contributing factors, is crucial for accurate diagnosis and effective intervention (7, 13, 37, 38).

Depressive episode severity

The majority of patients in our study group [49.62% (38.91% females, 10.71% males)] were diagnosed with a severe depressive episode without psychotic symptoms, followed by moderate depressive episodes (28.41%). The severity of DD in children and adolescents can vary. Older adolescents tend to have more severe episodes of depression compared to younger counterparts. The complex interplay of age, gender, emotion regulation and life events contribute to the severity of depressive episodes in adolescence, highlighting the need for early intervention and tailored treatment approaches (6, 8, 18, 19).

Suicidality

In our research we identified 273 patients (218 girls, 55 boys) who were specifically admitted to our clinic for suicidal ideation or intentional self-harming behaviors. Pediatric suicide attempts are a significant concern, with trends, methods, and associated factors that require careful consideration (6, 17, 31, 32). A study in Catalonia found a strong increase in the number of suicide attempts among adolescents starting after the end of confinement measures in September 2020, with the change particularly prominent among girls, topping at a 195% increase (39). Epidemiological data in the USA show a similar tendency after analyzing emergency unit visits for suicidality, at first showing a decrease of suicidal behavior in adolescents aged 12-17 years old during spring 2020 (first phase of the COVID-19 pandemic) and then a progressive increase of up to 50% among adolescent girls during the winter 2021, compared to the same periods in 2019, while staying constant in adolescent boys (40).

Bipolar depression

Our research found that 2.63% of patients (1.75% girls, 0.88% boys) were diagnosed with a current bipolar depressive episode, most of them being diagnosed with a current episode of mild or moderate depression (0.55%). Gender differences in bipolar disorder during adolescence are well-documented, and can influence symptom presentation, course of illness, comorbidi-

ties and response to treatment. While girls tend to develop BD later than boys often closer to mid-to-late adolescence and for them depression tends to be more prominent than manic episodes, boys are more likely to have a more severe, chronic course. Girls have a higher risk of suicidal ideation and attempts, while boys have fewer attempts but a higher lethality of attempts, meaning they are more likely to die by suicide (32, 37).

COVID-19 pandemic impact

We identified that children and adolescents have been increasingly diagnosed with DD in the analyzed period. During the pandemic years, increased feelings of fear and concern regarding COVID-19 were found to be cross-sectionally associated with higher levels of depressive and anxious symptoms in children and adolescents, as well as projections of increased suicidality because of indirect impacts of COVID-19 (9, 10, 20, 39, 41, 42). Studies focused on older adolescents (more than 15 years old) observed that they tended to exhibit more depressive symptoms and higher levels of COVID-19 related stress, compared to younger children. In most studies, girls reported higher levels of worry, concern, and fear regarding COVID-19, as well as more notable declines in general mental health during the pandemic, being at a higher risk than boys of developing symptoms of anxiety and depression (20, 41, 42). ❑

CONCLUSIONS

Understanding gender-specific differences in depressive disorders is critical for developing effective prevention and intervention approaches to address mental health problems and reduce the risk of suicide in young people. Considering the clinical standpoint, our findings highlight various aspects of pediatric depressive disorders, offering valuable insights for specialized evaluations and emphasizing the need for targeted therapeutic interventions tailored to each individual. The findings presented can help raise awareness among clinicians and specialists working with young individuals about the rising prevalence of depressive disorders and suicidality, ensuring that affected patients are referred for specialized evaluation. Our research could also generate hypotheses for future studies enabling more complex designs, such as longitudinal studies. ❑

Institutional review board statement: The present study was conducted in accordance with the Declaration of Helsinki and approved by the "Prof. Dr. Al. Obregia" Clinical Psychiatry Hospital Ethics Committee (protocol code 3292, approval date: February 1st, 2023).

Conflicts of interest: none declared.

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