

HOSPITALISATION IN CHILD NEUROPSYCHIATRY: A CASE STUDY ALONG A FIVE-YEAR EPIDEMIOLOGICAL-CLINICAL TREND

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Abstract

Objective: In Italy, the number of patients admitted to child and adolescent neuropsychiatry services has almost doubled in the last 10 years. Despite this significant increase in demand, there is still a paucity of literature on mental disorders in the paediatric population. Therefore, we investigated and described the clinical and socio-demographic characteristics of a sample of young Italian inpatients with psychiatric disorders. The aim was to contribute to the jet scarce literature on this topic, while also providing useful information for the clinical-care organisation of mental health services dedicated to children and adolescents.

Method: In this retrospective cohort study, data were collected from 361 hospitalised patients aged 1 to 18 who had been admitted to a Child Neuropsychiatry Unit in Northern Italy, from January 2016 to December 2020. Descriptive analyses, Univariate Analysis of Variance (ANOVA), and Chi-square tests were applied.

Results: During a five-year timeline, a higher admission rate for females was recorded, and the average age of inpatients was 13.4 years (SD = 3.01). Most of the admissions occurred through the Paediatric Emergency Department, and suicidal behaviour was the most frequent reason for admission. At discharge, affective disorders were the main diagnoses, which were also found to be the most frequent in patients with self-injurious behaviours. Non-suicidal self-injury, which was mainly reported as occurring in order to obtain relief from suffering, regarded 40.8% of the total sample. Almost half of the subjects reported suicidal ideation, and 21.1% attempted suicide. The mean hospitalisation length significantly decreased from 2016–2018 to 2019–2020. In general, patients with psychotic disorders had the longest stays.

Conclusions: Ad hoc diagnostic–therapeutic protocols should be developed for psychiatric emergencies, and health personnel should be adequately trained to manage acute psychiatric conditions in developmental age. Primary and secondary prevention programs should be implemented to promptly recognise and treat mental health issues in this age group.

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1. Introduction

Hospitalisation during early developmental ages in patients with psychiatric disorders is still under considerable debate. Although treatment in a structured and controlled hospital setting is highly recommended for certain situations, many studies have suggested that, whenever possible, treatments should enable children or adolescents to remain in their social and family context. If hospitalisation is necessary, protocols emphasise the admission of young psychiatric patients

in hospitals with specific characteristics according to age and type of disorder, and at the shortest possible distance from the place of residence and subsequent care, in order to facilitate post-discharge treatment. In fact, continuity of care after psychiatric hospitalisation is crucial for children and adolescents, both to monitor the response to treatment and in terms of therapeutic compliance, prevention of relapse, and readmission following hospitalisation (Cheng et al., 2017).

A study on the trend of child neuropsychiatric admissions from 2007 to 2017 in North-Western Italy

showed a substantial change in child and adolescent hospital services over time, with a major increase in psychiatric admissions and a parallel decrease in neurological admissions (Amianto et al., 2021). Moreover, recent studies have reported that psychotic symptoms, depressive symptoms, and suicidal and non-suicidal self-injury (NSSI) are the most common reasons for hospital admission (Geng et al., 2020). Italian studies on the prevalence of young neuropsychiatric inpatients after accessing Emergency Departments confirmed suicidal and non-suicidal self-harm to be the main reasons for admission (Zanato et al., 2021; Zilli et al., 2017).

However, "psychiatric hospitalisation" is not synonymous with a "psychiatric emergency". Indeed, hospitalisation may represent an essential step in the treatment pathway, even for conditions which do not constitute an emergency; at the same time, not all people who access the Emergency Department present with a clinical condition requiring hospitalisation (Calderoni et al., 2008).

In recent years, despite the implementation of mental health care for children and young people, a notable increase in youth mental health problems addressed in emergency has occurred (Benarous et al., 2019; Gandhi et al., 2016). Nevertheless, epidemiological data on the rates of emergency neuropsychiatric consultations resulting in hospitalisation differ widely in the literature, and, due to the heterogeneity of psychiatric services across countries, it is difficult to generalise the results; for example, differently from the American paediatric mental health care system, access to outpatient services is free or almost free of charge in most European countries (Benarous et al., 2019; Calderoni et al., 2008).

1.1. Aim of the study

Considering the general increase in paediatric psychiatric emergencies, the characterisation of the hospital as a place of acute care, and the serious problems of overcrowding and lack of hospital beds, there is a need for studies to identify the characteristics of users accessing psychiatric hospitalisation and the reasons for doing so. The final purpose should be to provide useful information for the clinical-care organisation of mental health services dedicated to children and adolescents, thus creating efficient and effective treatment pathways, from patient admission to hospitalisation, protected discharge, and territorial care.

Therefore, this study aimed to provide an epidemiological-clinical analysis of the population of children and adolescents admitted to an Italian Child Neuropsychiatry Unit, which is a regional hub centre for psychiatric admissions in developmental ages, considering a five-year period. Specifically, we described the socio-demographic and clinical features of inpatients, considering both the overall period and single years. Particular attention was paid to those variables known in the literature to be risk factors for psychopathology, and to the elements characterising hospitalisation, such as the reason for and method of admission, length of stay, diagnosis at discharge, treatment plan, post-discharge planning, and possible relapses.

2. Materials and Methods

2.1 Procedures

We conducted an observational retrospective cohort

study based on data collected over five years, from January 2016 to December 2020. The research was conducted through a careful review of paper-based and computerised clinical records of inpatients. Specifically, we examined:

- Reports of medical examinations occurred at the time of hospitalisation and during the course of hospitalisation;
- Reports of neuropsychiatric and psychological interviews with patients and their parents;
- Discharge reports in which diagnosis and therapeutic, pharmacological, and post-discharge plans were signalled.

The research was approved by the Institutional Ethics Committee of the Padua University Hospital (CESC Prot. 0044914 of 13.07.2021), and in accordance with the Declaration of Helsinki. All data were treated anonymously and for research purposes only.

2.2 Participants

We enrolled all patients hospitalised for at least 24 hours at the Child Neuropsychiatry Unit of the Padua University Hospital in the period between the 1st January 2016 and 31st December 2020. The total number of hospitalisations was 361, of which 252 were female and 109 were male. The youngest was 1 year old, the oldest was 18 years old.

The access to the Child Neuropsychiatry Unit included: scheduled and urgent (through Emergency Department) admission; psychopathological and differential diagnosis; and pharmacological treatment and psychotherapy.

During hospitalisation, each patient was monitored by two (or more) child neuropsychiatrists, each of them focused on a specific area: medical examinations and pharmacotherapy, daily psychiatric interviews with the patient, and twice-weekly clinical interviews with parents/caregivers of the patient.

This multidisciplinary approach to the hospitalised patient encompassed not only the clinical diagnostic and therapeutic field, but also school continuity and educational activities.

2.3. Variables

In order to describe the population under study, the collected data were grouped into the following areas: demographic, anamnestic, social, and family data; clinical and psychopathological data; hospitalisation-related data; and post-discharge data.

Demographical, anamnestic, social, and family data:

- Age at the time of hospitalisation;
- Gender: female/male;
- Ethnicity: Caucasian/Latin/African/Asian/other (e.g., mixed);
- Immigration history (born in Italy/immigrated after birth);
- Number of siblings;
- Mother and father's age;
- Parents' marital status: married/separated/widowed/other (e.g., in foster care);
- Mother and father's school qualifications;
- Mother and father's employment status: worker/not worker/retiree/other;
- Psychiatric familiarity: yes/no;
- Health family problems: yes/no;
- Intra-family problems (conflict between parents, con-

flict between the patient and his parents, conflict between the patient and his siblings, other family relational difficulties or socio-economic difficulties which increase the intra-family stress);

- Schooling: education level;
- School problems (low academic performance, unjustified absences, rule-breaking, etc.);
- Peer relationships (good/conflictual/social withdrawal);
- Bullying/cyberbullying.

Clinical and psycho-behavioural variables:

- Patient's chronic pathologies;
- Traumatic life events;
- Alcohol use (yes/no);
- Substance use (yes/no);
- Smoking (yes/no);
- Suicidality: suicidal ideation (yes/no); suicide attempt (yes/no); method of suicide attempt (drug or substance poisoning/self-cutting/other);
- Non-suicidal self-injury (absent/occasional (less than 5 times per year)/repetitive (more than 5 times per year); self-injured body part (single/multiple); age of the onset of NSSI; need for sutures; reason for NSSI acts (self-punishment/emotional relief/both of them/other/unknown);
- Eating problems (focus on food and self-body image; eating disorder (ED), age of the onset of eating problems; BMI at the time of diagnosis).

Data related to hospitalisation:

- Reason for hospitalisation: suicidal ideation/suicide attempts, anxiety symptoms, ED, psychomotor agitation/aggression, psychotic symptoms, functional symptoms, NSSI, other, such as therapy modification, completion of clinical examinations;
- Access mode: Emergency Department, transfer from another hospital/neuropsychiatric consult, outpatient examination, scheduled admission;
- Diagnosis at discharge according to ICD-10 (World Health Organization [WHO],1993) code (affective syndromes: F30-39, neurotic, stress-related and somatoform disorders: F40-48, syndromes and disorders associated with physiological disturbances: F50-59, syndromes and behavioural disorders with onset usually occurring in childhood/adolescence: F90-98, schizophrenia, schizotypal personality disorder, and delusional syndromes: F20-29, other: Z codes);
- Post-discharge services: district neuropsychiatric outpatient services, semi-residential or diurnal care services, residential care services (educational, therapeutic, rehabilitation centres), private outpatient services, eating disorders centres, other.

Regarding pharmacotherapy at the time of discharge, data collected were:

- Pharmacotherapy (yes/no);
- Monotherapy/polytherapy;
- Therapy based on neuroleptics (the number and the generation of drugs were considered);
- Therapy based on antidepressants (SSRI and/or other antidepressants);
- Therapy based on mood stabilisers (yes/no);
- Therapy based on benzodiazepines (yes/no).

In case of polytherapy, pharmacological combinations were considered (neuroleptics, neuroleptics+ antidepressants+mood stabilisers+ benzodiazepines, mood stabilisers, antidepressants, benzodiazepines, benzodiazepines+neuroleptics, neuroleptics+ mood stabilisers, neuroleptics+ benzodiazepines+ mood

stabilisers, neuroleptics+antidepressants, neuroleptics+ benzodiazepines +antidepressants, benzodiazepines +antidepressants, neuroleptics+antidepressants +mood stabilisers, benzodiazepines+ mood stabilisers, antidepressants+mood stabilisers).

2.4. Data analysis

Data analysis was conducted using the Jamovi statistical software (The jamovi project, 2021).

First, descriptive statistics (mean, standard deviation) and frequency tables were calculated.

Subsequently, an ANOVA was conducted, using the length of hospitalisation (days) as the dependent variable, while hospitalisation year (2 levels: 2016–2018 vs. 2019–2020) and re-hospitalisation (2 levels: yes vs. no) were the independent variables.

Furthermore, based on the literature on risk factors for psychiatric disorders in developmental ages, we used the Chi-square test for categorical variables to investigate if there were significant associations between re-hospitalisation and school and social problems.

Particular attention was then paid to self-injurious behaviours: we analysed the association between the presence of non-suicidal self-injury (NSSI) and sex, bullying/cyberbullying, use/abuse of alcohol, substance use/abuse, and EDs. With regard the latter, we excluded from analyses those patients (N=5) who did not receive any diagnosis.

Statistical significance was set at $p < 0.05$.

3. Results

3.1. Socio-demographic characteristics

In the five-year period studied, there were 361 hospitalisations lasting 24 hours or more. An analysis of the hospitalisations showed a clear prevalence of female patients (69.8%). However, an increase in the number of male patients was observed over the years (**figure 1**).

The average age of hospitalised patients was 13.4 years (SD = 3.01); in particular, the average age for female patients was 13.6 years (SD = 2.89), and that for male patients was 12.7 years (SD = 3.18). The distribution of the average age (expressed in years) of the patients admitted during the five-year period showed a gradual, slight increase from 12.8 years old in 2016 to 13.7 years old in 2020.

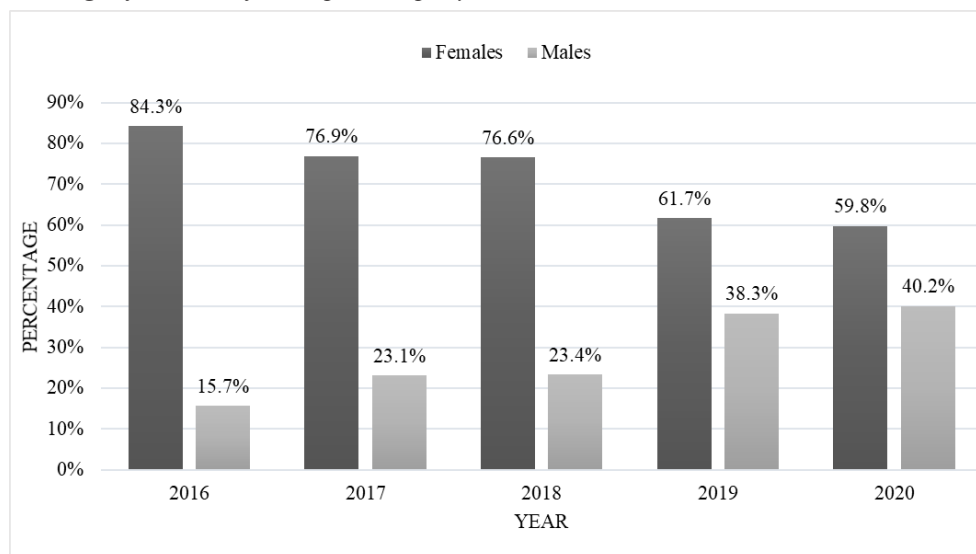
The majority of patients were Caucasian (88.8%), while 4.5% were African, 2.2% Latin, 2.2% Asian, and 2.2% other (e.g., Indian, mixed ethnicity). In addition, 14.6% of the whole sample were not born in Italy and had a history of immigration from another country.

The absolute frequencies and percentages of the family and socio-demographic variables are presented in **table 1**.

3.2. Clinical-behavioural characteristics

3.2.1. Tobacco, alcohol, and substance use

Tobacco use was reported by 10.6% of the sample, while alcohol use/abuse by 9.2% of the sample. A total of 8.4% of patients reported frequent or sporadic use of drugs, or having tried them at least once. Specifically, in most cases, these were substances belonging to the cannabinoid class. The average age of patients reporting substance use/abuse was 15.4 years (SD = 1.17), while for alcohol use/abuse it was 15.6 years (SD = 1.17).

Figure 1. Percentage of male and female patients per year

3.2.2. Eating Disorders (EDs)

In the population under study, 77 patients (21.6%) manifested a problem focused on food and nutrition and/or body image, and 39 patients (10.9%) suffered from an ED, such as anorexia nervosa (AN), bulimia nervosa (BN), or binge eating disorder (BED). The average onset age was 12.7 years (SD = 2.35) in 2016, 12.1 years (SD = 1.04) in 2017, 11.6 years (SD = 1.61) in 2018, 10.9 years (SD = 3.22) in 2019, and 12.5 years (SD = 13.5) in 2020.

3.2.3. Suicide ideation and attempts, and NSSI

Overall, almost half of the sample (47.4%) reported suicide ideation, and 21.1% had made at least one suicide attempt. Specifically, among girls, 53% reported suicidal ideation (against 34.3% of boys) and 25.8% attempted suicide as opposed to 10.1% of boys).

The mean age of patients who attempted suicide was 14.4 years, and these acts were carried out in 44.7% of cases by incongruous ingestion of drugs or toxic substances, in 9.2% by cutting veins, and in 46.1% by defenestration or hanging.

Non-suicidal self-injury was reported by 40.8% of inpatients; it was occasional in 55.8% of cases and habitual (more than 5 times per year) in the remaining 44.2%. The most frequent diagnosis among those with NSSI was affective syndromes (57%), followed by stress-related and somatoform disorders (21.5%).

The presence of NSSI was significantly associated with gender ($\chi^2(1) = 8.77, p = 0.003$), and bullying/cyberbullying ($\chi^2(1) = 8.44, p = 0.004$). Specifically, the presence of NSSI was more frequent in girls (82.9% against 17.1% of boys); moreover, those who did not experience bullying/cyberbullying were less likely to report NSSI (81.6% of patients without past experiences of bullying/cyberbullying did not present with self-injurious behaviours). No other significant associations emerged.

By investigating the mean age of NSSI onset, we noted that in 2019 self-injury was reported by younger patients (mean age = 11.3, SD = 3.22) than in the other years (2016: mean age = 13.1, SD = 1.33; 2017: mean age = 13.7, SD = 1.04; 2018: mean age = 13.1, SD = 1.61; 2020: mean age = 13.5, SD = 1.38). With regard to the motivations of such behaviours, search for relief

from negative affective states emerged in 53.3% of patients, and self-punishment in 10.4%. In 2.2% both motivations were reported, while in 12.6% self-injury was linked to other motivations (compulsive drive, emulation of classmates, search for relational attention).

The graph below (**figure 2**) shows the percentages of NSSI, suicidal ideation, and attempted suicide, calculated on the whole sample per year.

3.3. Hospitalisation and post-discharge projects

3.3.1. Reason and mode of admission

The main reason for access over the five years concerned anti-conservative ideation/attempted suicide (22.5% of the total). These were followed by aggression/psychomotor agitation (18.1%), EDs (13.9%), somatoform and functional symptoms (9.7%), anxiety symptoms (7.8%), NSSI (7.2%), psychotic symptoms (5.3%), and other (e.g., modification of therapy, completion of assessment, 15.5%). Pertaining to hospitalization reason per year, from 2016 to 2019 the main reason was suicide ideation/attempts (21.6%, 21.5%, 28.1%, 25.8% respectively), while in 2018 it was aggression/psychomotor agitation (26.4%).

Generally speaking, patients hospitalised for suicide behaviours, NSSI, and psychotic disorders were on average 14.7 years old (SD=1.46), 14.8 years old (SD = 1.21), and 15.5 years old (SD = 1.24), respectively. As for psychomotor agitation, functional symptoms, and anxiety symptoms, the average age was 11.8 years old (SD = 2.95), 12.4 (SD = 2.75) and 13.6 years old (SD = 2.44), respectively.

Regarding hospitalisation mode, 51.9% occurred via the emergency room, while 9.2% followed an outpatient visit. Scheduled admissions were 12.5%. A total of 26.4% of patients were transferred from another department and/or were hospitalised after a consultation. Specifically, access via the emergency room most often occurred for suicidal ideation/thoughts (29.6%), aggression and psychomotor agitation (21%), EDs (13.4%), and NSSI (8.6%), while planned hospitalisations mainly occurred for diagnostic investigation or therapy modification (35.6%).

Table 1. Absolute frequencies and percentages of family and socio-demographic variables

Variable	Levels	N (%)
Number of siblings	<3 siblings	319 (89.4%)
	≥3 siblings	38 (10.6%)
Parents	Married/cohabitant	233 (65.4%)
	Separated	98 (27.5%)
	Widower/widow	11 (3.1%)
	Other	14 (3.9%)
Maternal education level	Elementary/middle school	16 (4.5%)
	High school	23 (6.4%)
	Degree	30 (8.4%)
	Not known	290 (80.8%)
Paternal education level	Elementary/middle school	11 (3.1%)
	High school	23 (6.4%)
	Degree	22 (6.1%)
	Not known	304 (84.4%)
Maternal employment status	Employed	141 (39.5%)
	Unemployed	56 (15.7%)
	Retired	1 (0.3%)
	Not known	159 (44.5%)
Paternal employment status	Employed	181 (50.7%)
	Unemployed	7 (2.0%)
	Retired	5 (1.4%)
	Not known	164 (45.9%)
Intra-family problems	Yes	180 (51.6%)
	No	169 (48.4%)
Psychiatric family history	Yes	204 (57.8%)
	No	149 (42.2%)
Physical health problems in family members	Yes	202 (56.9%)
	No	153 (43.1%)
Socialisation with peers	Good	147 (43.1%)
	Difficult / conflicted	134 (39.3%)
	Social withdrawal	60 (17.6%)
Schooling	Nursery school	2 (0.6%)
	Kindergarten	3 (0.9%)
	Elementary school	48 (13.8%)
	Middle school	128 (36.9%)
School problems	High school	166 (47.8%)
	Yes	227 (64.9%)
Bullying/ cyberbullying	No	123 (35.1%)
	Yes	104 (29.8%)
Traumatic events (divorce or separation of parents, family bereavement, domestic violence and/or sexual abuse, etc.)	No	245 (70.2%)
	Yes	172 (50.6%)
	No	179 (49.4%)

3.3.2. Previous access to neuropsychiatric services

Before hospitalisation, 80.6% of the patients had already been referred to a neuropsychiatry service, or had sought support for mental health difficulties or disorders.

Over the five-year period, it was the first hospitalisation for 76.5% of cases, while 23.5% were readmitted after a previous hospitalisation. Overall, 81.1% of patients had only one hospitalisation, 10.5% were hospitalised twice, 3.7% were admitted three times, 3.4% were admitted four times, 1% were hospitalised five times, and 0.3% were hospitalised six times.

Figure 3 shows the frequencies of re-hospitalisations for each year out of the total number of hospitalisations in the same year.

The Chi-square test showed that re-hospitalisation was associated with socialisation difficulties ($\chi^2(2)$

= 14.4; $p < 0.001$) and school problems ($\chi^2(1) = 12.8$; $p < 0.001$). Specifically, patients that were re-hospitalised were more likely to report social difficulties/social withdrawal (74.7%) and school problems (81.5%), compared to those who did not present with recidivism (51.2% and 59.9%, respectively).

3.3.3. Length of hospitalisation

The average length of hospitalisation over the five years was 21.0 days (SD = 19.4); specifically, 21.7 days on average in 2016 (SD = 20.2), 22.0 days on average in 2017 (SD = 18.4), 25.3 days on average in 2018 (SD = 23.6), 19.2 days on average in 2019 (SD = 17.3), and 18.8 days on average in 2020 (SD = 18.1).

With regard to ICD-10 diagnosis, patients with psychotic disorders (F20-29) had the longest stays ($M_{\text{days}} = 35.0$, SD = 26.0), followed by disorders associated with

Figure 2. Frequencies (percentage) of NSSI, suicidal thoughts, and suicide attempts per year

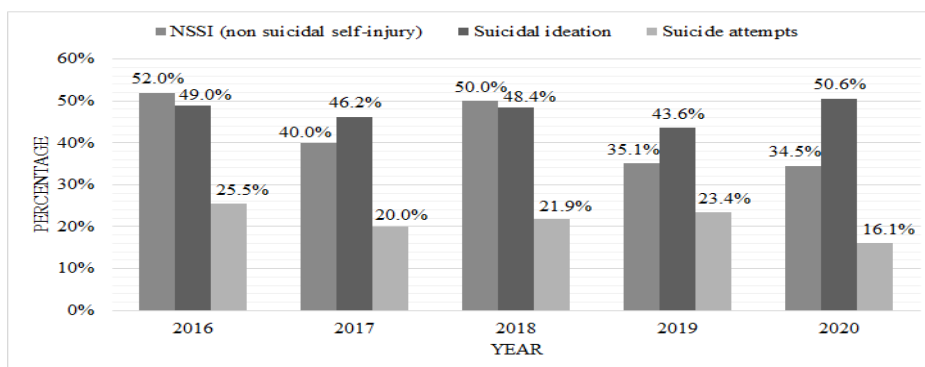
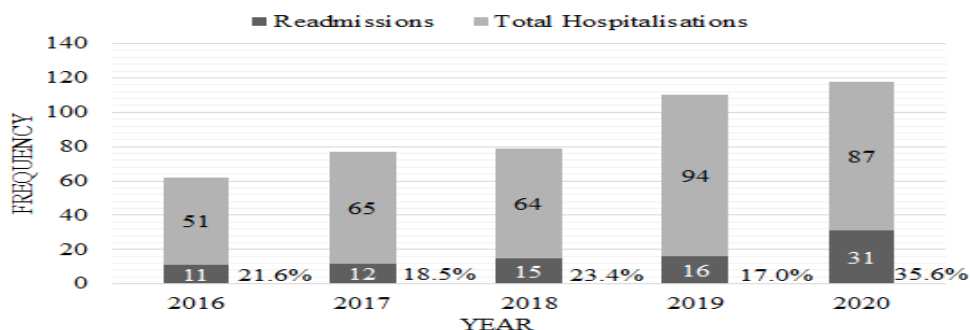


Figure 3. Frequencies of re-admissions (“Readmissions”) calculated based on the total number of hospitalisations (“Total Hospitalisations”) per year



alteration of physiological functions (including EDs) ($M_{days} = 31.2$, $SD = 24.8$), syndromes and behavioural disorders with onset usually occurring in childhood/adolescence ($M_{days} = 24.3$, $SD = 22.2$), affective syndromes ($M_{days} = 22.6$, $SD = 18.3$), and neurotic, stress-related, and somatoform disorders ($M_{days} = 14.3$, $SD = 9.58$).

The ANOVA, conducted using the length of hospitalisation as the dependent variable, showed a significant effect for the year (i.e., 2016–2018 triennium vs. 2019–2020 biennium) ($F(1,355) = 4.27$; $p = 0.040$). Specifically, the mean hospitalisation length significantly decreased from 2016–2018 to 2019–2020 ($M_{2016-2018} = 24$, $SE = 1.60$; $M_{2019-2020} = 19.8$, $SE = 1.55$). In contrast, no statistically significant difference was found concerning recidivism.

3.3.4. ICD-10 diagnosis at discharge

According to ICD-10 criteria, over the five-year period considered, affective disorders (F30-39) were the most frequent diagnoses, representing 39% of the total hospitalisations (43.7% of the primary diagnosis). Following in order of frequency were:

Neurotic, stress-related, somatoform, and other nonpsychotic mental disorders (F40-48): 27% (18.8% of the primary diagnosis);

Behavioural and emotional disorders with onset usually occurring in childhood and adolescence: (F90-98) 13% (10.4% primary diagnosis);

Behavioural syndromes associated with physiological disturbances and physical factors (F50-59): 10.6% (10.4% of the primary diagnosis);

Schizophrenia, schizotypal, delusional, and other

non-mood psychotic disorders (F20-29): 6.6% (8.5% primary diagnosis);

Other (Z ICD-10 diagnosis): 3.8% (8.4% of the primary diagnosis).

Figure 4 shows the percentage frequencies of the primary ICD-10 diagnosis calculated for each single year of the study.

At least one psychiatric comorbidity was found in 67% of the total sample, and the second most frequently recorded diagnosis was anxiety, dissociative, stress-related, and somatoform disorders (F40-48) (35.8% of patients with this as a secondary diagnosis).

Table 2 shows the percentage frequencies of the first, second, and third ICD-10 diagnosis at discharge, considering the entire five-year period.

3.3.5. Drug therapy at discharge

At discharge, 284 patients (79.3% of the total) received a drug therapy, 71.1% of which involved polypharmacy.

The most widely prescribed drugs were neuroleptics, taken by 220 patients (77.5%). There were 132 prescriptions for antidepressants (46.5%), 100 prescriptions for mood stabilisers (35.2%), and 141 prescriptions for benzodiazepines (49.6%).

Overall, regarding the 220 patients on neuroleptic therapy, 80.9% of these were taking a single drug, while 19.1% used a combination of two antipsychotics.

Considering the patients taking a single neuroleptic, 53.9% of these used a second-generation antipsychotic, 41.6% a third-generation antipsychotic, and the remaining 4.5% a first-generation antipsychotic. In

Figure 4. Frequencies (percentage) of the primary ICD-10 diagnosis per year

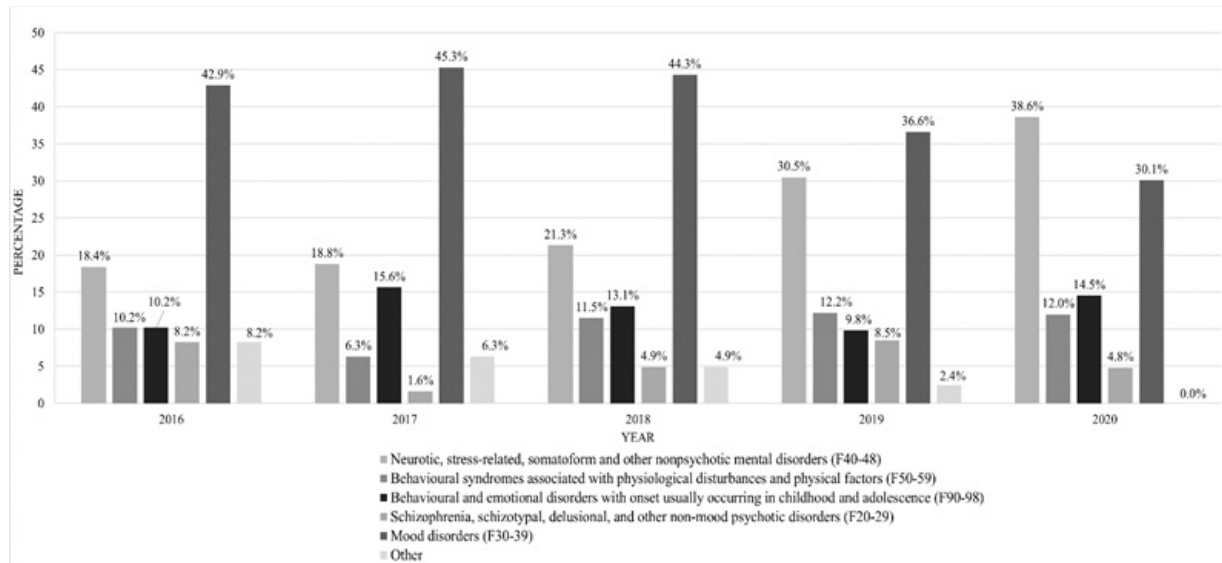


Table 2. Frequencies (%) of the first, second, and third ICD-10 diagnoses considering the five-year period

ICD-10 diagnosis	% 1 st diagnosis	% 2 nd diagnosis	% 3 rd diagnosis
Mood disorders (F30-39)	38.9%	9.8%	3.6%
Neurotic, stress-related, somatoform and other nonpsychotic mental disorders (F40-48)	26.8%	35.8%	16.3%
Behavioural syndromes associated with physiological disturbances and physical factors (F50-59)	10.6%	2,8%	1.1%
Behavioural and emotional disorders with onset usually occurring in childhood and adolescence (F90-98)	12.7%	12.7%	2.9%
Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders (F20-29)	5.6%	0.9%	0.4%
Other	3.8%	7.6%	6.9%
None	1.5%	30.4%	68.8%

contrast, when a combination of multiple neuroleptics was used, the most frequent combination was a second-generation drug plus a third-generation drug.

Considering therapy with antidepressants, 114 patients (40.1%) took a Selective Serotonin Reuptake Inhibitor (SSRI), and 18 (6.3%) another antidepressant not belonging to the SSRI class (e.g., mirtazapine, venlafaxine, etc.).

Table 3 shows the combination of drug therapies at discharge, reporting the absolute frequencies and the percentages calculated on the whole sample.

3.3.6. Post-discharge projects

At discharge, 270 patients (87.1%) received psychotherapy, and 55 patients (15%) also had an educational-rehabilitative intervention. Regarding post-discharge projects:

- 57.5% of patients were admitted to district outpatient services;
- 9.8% were admitted to private outpatient services;
- 6.6% were admitted to semi-residential structures or day-care centres (accredited private);
- 8.7% were admitted to residential facilities (educational, therapeutic, rehabilitation centres);
- 4.3% were admitted to eating disorder centres;
- 11.6% did not receive any of the aforementioned interventions.

With regard specifically to those who had been re-hospitalised, 42.2% were admitted to district outpatient services, 13.3% to semi-residential or day-care structures, 21.7% to residential facilities, 9.6% to private outpatient services, 2.4% to ED centres, and 10.8% to “other”.

4. Discussion

The present study aimed to investigate the clinical and socio-demographic characteristics of a population of Italian children and adolescents with psychiatric issues hospitalised at a Child Neuropsychiatry Unit in the period between January 2016 and December 2020.

The average age of inpatients was 13 years old, and it remained stable over the five years. Although the majority of inpatients were female (69.8%), in accordance with the literature (Frigerio et al., 2009), in the last years an increase of male inpatients was registered, rising from 15.7% in 2016 to 38.3% in 2019 to 40.2% in 2020. This result, seemingly discordant with the data reported in an Italian study by Amianto et al. (2021), could be interpreted in the light of the fact that the main reason for male patients’ hospitalisation was acute ingravescence of behavioural disorders, and the Neuropsychiatry Unit where this study was conducted is one of the few which enables urgent hospitalisation.

Table 3. Absolute frequencies and percentages of the drug therapies prescribed at discharge

Drug therapy	N (%)
No therapy	74 (20.7%)
Neuroleptics	49 (13.7%)
Neuroleptics + antidepressants + mood stabilisers + benzodiazepines	19 (5.3%)
Mood stabilisers	13 (3.6%)
Antidepressants	16 (4.5%)
Benzodiazepines	11 (3.1%)
Benzodiazepines + neuroleptics	26 (7.3%)
Neuroleptics + mood stabilisers	19 (5.3%)
Neuroleptics + benzodiazepines + mood stabilisers	31 (8.7%)
Neuroleptics + antidepressants	33 (9.2%)
Neuroleptics + benzodiazepines + antidepressants	39 (10.9%)
Benzodiazepines + antidepressants	11 (3.1%)
Neuroleptics + antidepressants + mood stabilisers	5 (1.4%)
Benzodiazepines + mood stabilisers	8 (2.2%)
Antidepressants + mood stabilisers	4 (1.1%)

In addition to individual features, many studies investigated familiar and contextual factors which could influence the use of personal resources and the choice of hospitalisation. As opposed to adult psychiatry, in the paediatric population the factors determining the choice of hospitalisation include parental inability to manage the child crisis and absence of parental collaboration with mental health professionals (Costello et al., 1991; Golubchik et al., 2013). Regarding the socio-familial context, most patients reported changes in their family nucleus, which have been associated with a higher risk of mental health problems (Lee & McLanahan, 2015). One-third of the sample lived in a single-parent family (27.5% separated parents, 3.1% parent's death). Cases of child abandonment, loss of parental authority, and family instability with foster care were reported in the remaining 3.9%. These results highlighted the importance of family functioning during childhood and adolescence, and the relevance of the assessment of the family context in children with mental difficulties. Indeed, in the child neuropsychiatry field, the inability to guarantee a safe and collaborative family environment could be a relevant factor to consider in the decision process relating to hospitalisation (Gatta et al., 2016; Golubchik et al., 2013). Furthermore, it was observed that more than half of inpatients reported intra-family conflictual relationships; in these cases, hospitalisation could offer a safe environment where patients and their parents could recover with supportive mediation.

As far as family background is concerned, psychiatric disorders in family members were reported in more than half of patients (57.8%). The literature supports the heredity of psychiatric disorders, but it is possible that the impairment related to mental problems and their impact on the family nucleus and parent-son relationship increase the emotional stress experienced by the child/adolescent (Arroyo-Borrell et al., 2017; Forehand et al., 1991; Hintermair, 2006; Hirshfeld-Becker et al., 2012). This had a greater role in cases of parent's physical health problems, registered in 56.9% of the sample. Furthermore, a greater awareness of mental health problems reported by families which were already aware of the psychiatric pathology could increase mental care seeking and access to mental health services.

Another particularly recurring theme in our study population was the presence of traumatic life events, such as violent separation between parents, complicated grief, domestic violence, and sexual abuse, all

described by the literature as risk factors (Auersperg et al., 2019; Lackova Rebicova et al., 2019). In these situations, where the family and environmental balance is broken, and the child's psychopathological symptoms figure with a great reactive component, the protective role of hospitalisation was emphasised, because it enabled the stabilisation of post-traumatic symptoms and the beginning of clinical therapy, even with the collaboration of district outpatient services.

Pertaining to the social and environmental context of the study population, conflictual or difficult peer relationships were reported in more than one third of the sample (39.3%), and social withdrawal in 17.6%. Furthermore, 29.8% of the sample reported being bullied and/or being cyberbullied. Such phenomena are widespread among young people in the general population, too. For example, an analysis of the Italian National Institute of Statistics (ISTAT, 2019) reported that the 19.8% of interviewed youths aged 11 to 17 were the victim of bullying one or more times per month, while cyberbullying was experienced by 22.2% of all bullying victims. Our data highlighted the pivotal role played by peer relationships in affecting the mental health of children and adolescents. In particular, negative experiences with peers may pose a risk for psychological suffering which, in turn, may evolve into a mental disorder. Therefore, specific interventions promoting the establishment of positive and supportive peer relationships are needed, in order to foster the psychological well-being of this vulnerable population and prevent the onset of psychiatric diseases.

With regard to hospitalisation, only 12.5% of admissions were scheduled, while more than half occurred under urgency, through the Emergency Department. The presence of a paediatric Emergency Department, as in our case, facilitates urgent access by youths, in the case of breaking of the balance between the subject and the environmental context (e.g., suicidal behaviour, aggression and psychomotor agitation) (Calderoni et al., 2008; Morini et al., 2016). The majority of hospitalisations related to suicidal behaviours, aggression, psychomotor agitation, NSSI, and EDs occurred through the Emergency Department. Scheduled hospitalisations mainly occurred for diagnostic investigation or for therapy modification. Specifically, patients hospitalised urgently for suicidal behaviour, NSSI, and psychotic disorders had an average age of 14.7 years old (SD=1.46), 14.8 years old (SD=1.21), and 15.5 years old (SD=1.24),

respectively. For psychomotor agitation, functional symptoms, and anxiety symptoms, the average age was 11.8 years old (SD= 2.95), 12.4 (SD=2.75), and 13.6 (SD=2.44), respectively. These results highlighted that anxiety states and internalising problems could reveal themselves through somatic symptoms, motor agitation, or physical discomfort, especially in younger patients, whose psychic system is still developing, and symptoms are often considered by parents as an expression of an organic illness (Militeri, 2021). Moreover, in our sample, the majority of the patients (80.6%) had been previously seen by mental health professionals. These data could offer a point of reflection, since some clinical conditions in the developmental age could be managed by district outpatient services if intervention is timely. Otherwise, these cases may exhibit an acute ingravescence, which requires hospitalisation; hence the importance of prompt recognition of those signals which could underlie severe psychological suffering.

The literature suggested that analysis of the diagnoses at the time of discharge could be useful to describe the hospitalised population. In our sample, diagnoses with at least one comorbidity were frequently observed (67%). Among the primary diagnoses, affective syndromes (F30-39) were the most frequent, reported by 38.9% of patients, in accordance with the international literature (Case et al., 2007). Following in frequency order, patients also presented with neurotic, stress-related, and somatoform disorders (F40-48), emotional and behavioural disorders and syndromes (F90-98), and syndromes and disorders associated with physiological disturbances, such as EDs (F50-59). Although the most frequent primary diagnoses of hospitalised patients were affective syndromes, the most frequent disorders, in absolute terms, were neurotic, stress-related, and somatoform disorders, which constituted the main secondary diagnoses. The literature confirmed the widespread presence of neuropsychiatric comorbidities between mood disorders, especially between depression and anxiety, often with somatoform expression (Gatta et al., 2015; Lieb et al., 2007; Melton et al., 2016).

Another recurring phenomenon reported by our sample, often associated with internalising disorders, was suicidal and non-suicidal self-injury. NSSI was reported by 40.8% of inpatients, although it was the reason for hospitalisation in only 7.2% of cases. For example, among 94 patients hospitalised during 2019, 13 of these reported occasional NSSI and 20 repetitive NSSI (more than 5 times per year), but only one patient reported NSSI as the reason for hospitalisation.

In spite of being widespread, NSSI was less common compared to other psychiatric symptoms. A great reluctance among adolescents to seek help for self-harm was noted; it was often kept hidden, with no parental awareness of self-harming (Michelmore & Hindley, 2012). In our study, the onset of NSSI occurred long before hospitalisation. During hospitalisation, NSSI reasons were investigated, and in more than half of cases the reason was emotional relief. NSSI is an increasingly frequent phenomenon associated with a great variety of mental disorders in developmental ages; therefore, many authors have highlighted the need to investigate its presence, in particular in high-risk groups of patients (O'Reilly et al., 2016). In our study, we observed the primary diagnosis of mood disorder as being the most frequent in patients with NSSI. Moreover, NSSI was found to be significantly associated with gender, and, consistent with the literature, it was mainly reported by girls. We also investigated its association with some of the risk factors known in the literature, such

as alcohol use/abuse, being bullied or cyberbullied, and body image and eating disorders (Cipriano et al., 2020; Kiekens & Claes, 2020; Serafini et al., 2021). A significant association emerged only with history of bullying/cyberbullying. This confirmed the role of this experience as a risk factor for self-harm behaviours, and further supports the importance of positive peer relationships for the mental health of children and teenagers. With regard to suicidal behaviour, 170 patients (47.4%) presented an anti-conservative ideation, and there were 76 suicide attempts (21.1%). In line with what was expected, the most frequently used means (44.7%) was the incongruous ingestion of drugs and substances.

Another critical issue in the child neuropsychiatry field is represented by EDs. These are particularly frequent among adolescents, but unfortunately they are still underestimated (Qian et al., 2021). In our sample, 10.9% of hospitalised patients suffered from an ED according to ICD-10 criteria (i.e., anorexia nervosa, bulimia nervosa, binge eating disorder), and almost double this (21.6%) presented with a focus on food and nutrition and/or body image.

By investigating risk and/or harmful to physical and mental health behaviours, it emerged that 10.6% of the sample smoked cigarettes. Moreover, although diagnoses of substance and/or alcohol use/abuse were rare as first diagnoses, such habits are known to be associated with several psychiatric disorders, in addition to having detrimental effects on the psychological well-being of children, adolescents, and young people (Chambers et al., 2003; Parolin et al., 2018; Reece & Hulse, 2020). Therefore, preventive efforts could be particularly useful in the paediatric population to avoid smoking, alcohol, and substance use initiation, and to reduce the risk of negative psychological sequelae over time.

The average length of hospitalisation in the five-year period was 21 days (SD=19.4). Specifically, patients with psychotic disorders (F20-29) had the longest stays, with a mean of 35 days (SD=26.0), while those suffering from stress-related and somatoform syndromes (F40-48) were hospitalised for a shorter period, with a mean of 14.28 days (SD=9.58). Recently, research has suggested a reduction of the length of hospitalisations; for example, Case et al. (2007) observed that the median of all discharges reduced from 12.2 days in 1999 to 4.5 days in 2000. Nevertheless, evidence for the possible impact of such a phenomenon on re-hospitalisation rates is controversial. Some studies have observed a significant relationship with longer stays, while others, as in our case, did not find significant associations (Donisi et al., 2016; Zanato et al., 2021).

Re-hospitalisation was frequent in our sample (23.5%); 8.4% of patients with multiple hospitalisations suffered more than three relapses. Recidivism was found to be significantly associated with school and social problems. This could indicate that returning to school and to one's own social context after the protected experience of hospitalisation could be a particularly delicate moment, which therefore should be managed with educational interventions, to accompany in a protected way the patient and the family through the transition from hospital to territory. In fact, re-exposure to potential negative environmental factors, as well as to the stigma associated with mental health problems, could contribute to the patient's relapse. A recent Italian study estimated that, one year after discharge, more than a third of patients were readmitted to a psychiatric ward (Tedeschi et al., 2020). Psychiatric re-hospitalisation is also very common among children and adolescents. A

retrospective analysis on the admissions of American children aged 5 to 17 found that, after 30 days from discharge, re-admission rates for psychiatric disorders were higher than those for other health problems (Feng et al., 2017).

Pharmacotherapy and post-discharge projects need to be taken into consideration, too. The majority of the sample (79.3%) was prescribed a drug therapy, which was a polytherapy in 71.1% of cases. Psychotherapy was initiated for 87.1% of patients, and about half of the cases received an educational intervention. Pertaining to post-discharge projects, patients with recidivism were more frequently redirected to a residential treatment (i.e., educational, therapeutic, rehabilitation centres) or to district neuropsychiatry outpatient services, which enabled monitoring of the clinical situation over time. This is consistent with the fact that a rehabilitative multidisciplinary intensive treatment could constitute the best choice in the case of severe and complex clinical conditions.

In the last two years, in parallel with the increase in hospitalisation rates, a decrease in the length of hospitalisation was observed (19 day on average in the 2019–2020 biennium compared to 23.1 days on average in the 2016–2018 triennium). In light of these data, a reference to the COVID-19 pandemic is needed. It is possible that, during lockdowns and in the months after, many youths and their families found obstacles or gave up looking for professional help for their mental health disorders, thus reducing the expected access rates in 2020. 2019 represented a special case within our study because, in that period, the average ages of the onset of self-injurious behaviours and EDs were the lowest. From 2016 to 2019, the main access reason was suicidal ideation/attempts. In 2020, aggression and psychomotor agitation became the main reason. With respect to the variation in suicidal behaviours, an observational retrospective study conducted in France from January 2018 to June 2020 found that, during the COVID-19 lockdown (March–May 2020), the number of hospitalisations for suicidal behaviours in children and adolescents decreased by 50% (Mourouveye et al., 2021). However, results in the literature are still heterogeneous; therefore, presently, it is difficult to make predictions regarding the short and long-term effects of the pandemic on the mental health of young people, and the trend to be expected in admissions to child neuropsychiatry departments.

4.1 Conclusion

Our work clearly has some limitations due to its retrospective nature, and the fact that it was conducted in a single Italian neuropsychiatry unit. Moreover, it lacks follow-up of patients, which should be taken into consideration in future investigations. Despite this, we believe our study could provide useful information from the clinical–organisational standpoint.

First, the Emergency Department was found to be the main access mode, and ideation/attempted suicide was the most common hospitalisation reason. Therefore, diagnostic-therapeutic protocols for psychiatric emergencies should be developed, and healthcare workers, especially those in Emergency Departments, should be adequately trained to manage psychiatric acute conditions in the developmental ages. Moreover, the logistical organisation of hospitals accommodating such emergency situations should be implemented in order to define adequate spaces for patients with psychiatric symptomatology, such as

rooms dedicated to intensive short observation in the Emergency Department.

Subsequently, affective syndromes were found to be the main diagnoses at discharge, and often occurred with NSSI. Frequent problems in the familial, social, and scholastic context were also detected. Primary prevention should be implemented to raise awareness in and train parents, teachers, and educators on the topic of mental health in the developmental ages. Secondary prevention should also be implemented in terms of training and preparation of medical and nursing staff, in order to promptly recognise and treat psychiatric disorders, especially depression and related self-injurious behaviours.

A diagnostic-therapeutic program tailored to the specific situation of the patient and severity of the disorder, and a proper management of post-discharge, are crucial factors in reducing serious consequences in terms of increased mental suffering, relapses, and health costs (Amianto et al., 2021).

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