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An Eleven-Year Single-Centre Experience of Pediatric Intensive Care Unit Admissions Following Suicide Attempts in Portugal

Experiência de Onze Anos em Centro Único sobre Admissões em Unidade de Cuidados Intensivos Pediátricos após Tentativas de Suicídio em Portugal

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ABSTRACT

Adolescents with severe suicide attempts requiring intensive care represent a major public health challenge, with high morbidity and resource utilization. This retrospective study reviewed all cases of young people aged 10 to 18 years admitted to a pediatric intensive care unit between 2014 and 2024 following a suicide attempt. Eighteen cases were identified, predominantly female patients (72%) with a median age of 15.5 years. The most common methods were drug overdose (56%) and major trauma due to jumping from heights (39%). Most patients required invasive mechanical ventilation (89%), with a mean pediatric intensive care unit stay of 5.6 days and a total hospital stay of 29 days, markedly longer in trauma cases. No deaths occurred, but three patients developed severe sequelae. Family conflict, gender/sexuality concerns and school-related problems were frequent precipitating factors; only one patient had a previously recorded suicide attempt. Following discharge, 89% were referred for psychiatric follow-up, with post-discharge diagnoses of depression, anxiety, personality disorder and substance abuse. These findings highlight the need for systematic suicide risk screening in primary care and emergency settings, community- and family-based interventions, and structured post-discharge protocols to prevent recurrence and reduce long-term complications.
Keywords: Adolescent; Intensive Care Units, Pediatric; Portugal; Suicide, Attempted

RESUMO

As tentativas de suicídio graves em adolescentes que exigem cuidados intensivos representam um importante desafio de saúde pública, associado a elevada morbilidade e utilização de recursos. Este estudo retrospetivo analisou todos os casos de jovens entre os 10 e os 18 anos admitidos numa unidade de cuidados intensivos pediátricos entre 2014 e 2024 após uma tentativa de suicídio. Foram identificados dezoito casos, maioritariamente do sexo feminino (72%), com idade média de 15,5 anos. Os métodos mais comuns foram a sobredosagem medicamentosa (56%) e o trauma *major* por salto de altura (39%). A maioria dos doentes necessitou de ventilação mecânica invasiva (89%), com uma média de 5,6 dias de internamento na UCIP e 29 dias de internamento hospitalar total, significativamente mais prolongados nos casos de trauma. Não se registaram óbitos, mas três pacientes desenvolveram sequelas graves. O conflito familiar, questões relacionadas com género/sexualidade e problemas escolares foram fatores precipitantes frequentes; apenas um jovem tinha registo de tentativa prévia de suicídio. Após a alta, 89% foram referenciados para seguimento psiquiátrico, com diagnósticos posteriores de depressão, ansiedade, perturbação de personalidade e consumo de substâncias. Estes resultados reforçam a necessidade de rastreio sistemático do risco de suicídio nos cuidados primários e nos serviços de urgência, de intervenções comunitárias e familiares, e de protocolos estruturados de acompanhamento pós-alta para prevenir recorrências e reduzir complicações a longo prazo.
Palavras-chave: Adolescente; Portugal; Tentativa de Suicídio; Unidade de Cuidados Intensivos Pediátricos

INTRODUCTION

Suicide is the second leading cause of death among adolescents in Portugal and remains a pressing global concern.[1,2] Severe attempts requiring Pediatric Intensive Care Unit (PICU) admission pose considerable challenges for healthcare systems, both clinically and socially.[3-5] Understanding risk factors, methods employed, and outcomes is critical to inform prevention strategies and improve patient care.

This was a retrospective, observational study including adolescents (10 - 18 years) admitted to the PICU of a tertiary hospital between 2014 and 2024 after a suicide attempt (SA). Data collected included demographics, psychiatric history, method used, medical interventions, complications, and follow-up after discharge. Descriptive statistics were used to summarize demographic and clinical characteristics. Continuous variables were presented as medians and interquartile ranges (IQR) or means and standard deviations. Categorical variables were presented as frequencies and percentages. Analyses were performed using SPSS version 26.0. The aim was to characterize the clinical, demographic, and psychosocial profiles of adolescents admitted for severe SA.

Demographics

Eighteen cases of severe SA requiring PICU admission were identified. The median age was 15.5 years (IQR 4). Most patients (55.6%) were aged 16 - 18, 27.8% were 13 - 15, and 16.7% were 10 - 12 years. Female patients represented

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72.0%, and 83.3% were Portuguese.

Timing

The cases were fairly balanced across periods: 2015 - 2017 (four cases), 2018 - 2021 (seven cases), and 2022 - 2025 (seven cases). January, April, June, and November were the most frequent months for PICU admission (three each), followed by February, May, July, August, September, and December (one each).

Pre-event characteristics

Only one patient (5.6%) had a previously recorded SA, while 18.8% had missing data. Half had prior psychiatric or psychological follow-up. Depression (n = 7), anxiety (n = 5), and personality disorders (n = 3) were the most frequent; four had multiple diagnoses. Attention-deficit/hyperactivity disorder (ADHD), eating disorders, and conduct disorders appeared once each. Family conflict was the main precipitating factor (38.9%), followed by peer conflict and difficulties related to gender or sexuality (n = 2 each). Individual triggers included conflicts in adoptive families, relationship distress, exposure to community suicides, and academic pressure. In three cases, triggers were undetermined.

Self-harm cuts were present in five cases (28%), while thirteen had missing data on this variable.

Previous health visits

The final healthcare visit before SA varied: tonsillitis (n = 3), flu (n = 3), check-ups (n = 2), seizures (n = 2), and gynecologic conditions (n = 2). Single visits addressed allergies, metabolic problems, dermatophytosis, low back pain, headaches, or hematuria. The time between the last contact and SA ranged widely (4 - 3174 days, ~ 8.7 years), with a median of 82 days, suggesting that most attempts occurred months after the last clinical contact.

Methods used

Regarding the method used, more than half of the patients (n = 10) used drug intoxication, while 38.9% (n = 7) resorted to major trauma, in all cases jumping from heights**.** One patient attempted hanging. Ingested substances included psychotropics (sertraline, paroxetine, alprazolam, amitriptyline, trazodone, quetiapine, cyamemazine), antiepileptics (carbamazepine, valproic acid), and other medications (isoniazid, ropinirole, propafenone, amlodipine, perindopril). Alcohol appeared in two cases. Substance use (alcohol, benzodiazepines, cannabis, or opiates) was recorded in 22%, even though toxicological screening was absent in 33%, mostly among trauma cases (71%).

Severity and clinical results

Median PICU stay was 3.5 days (IQR 4), and total hospitalization 11.5 days (IQR 31). Invasive mechanical ventilation (IMV) was required in 89% (n = 16), lasting 4.4 ± 7.1 days on average. Inotropic support was necessary in eight cases (44%), while hemodiafiltration and extracorporeal membrane oxygenation (ECMO) were required in one patient. One patient underwent thoracentesis.

Complications

No deaths occurred. Acute complications included polytrauma (n = 5), limb fractures (n = 3), agitation (n = 3), and isolated cases of altered status, pneumothorax, pancreatitis, hypotension, cardiogenic shock, intracranial hypertension, and status epilepticus. Long-term complications included intensive care related infections (urinary tract infection and ventilator associated pneumonia) in three cases, and with a single case in each of the following: tracheostomy, dysphagia, pressure-induced skin injury, articular pain, osteoarthritis, hydrocephalus, gastrostomy, severe encephalopathy, and tetraparesis.

Self-harm method comparative analysis

Comparing intoxication and trauma, intoxication had shorter PICU and hospital stays. Median PICU stay was 3.5 (IQR 3.5) *versus* 2.5 (IQR 3.5); hospital stay 9.5 (IQR 33) *versus* 11.5 (IQR 33). Invasive mechanical ventilation was required in all but one per group. Inotropic support was equal (n = 4 in each).

Post-discharge follow-up

After discharge, 89% (n = 16) were referred to psychiatry. Diagnoses included depression (n = 7), personality disorder (n = 4), substance use disorder (n = 4), anxiety (n = 3), schizophrenia (n = 2), and ADHD (n = 1).

The results from this 11-year retrospective study provide relevant insights into adolescents needing intensive care

following SA. The female predominance aligns with international data showing that female patients attempt more often, while male patients employ more lethal methods.[6] Prior emergency visits showed no consistent pattern, suggesting limited predictive value for early detection.

Self-inflicted cuts in 28% reinforce the high overlap between non-suicidal self-injury (NSSI) and SA, supporting screening for NSSI as a predictor of future risk.[7] Family conflict, gender identity, and academic stress were the main triggers, which is consistent with psychosocial stressors identified in prior research.[8] Only 5.6% had prior attempts, below reported rates (~20%), implying underreporting or barriers to mental health access.[7]

Incomplete toxicology results, especially in trauma cases, emerge as a key gap. Identifying any substances used is essential, as drug or alcohol consumption can alter the medical response.[9] No in-hospital deaths occurred, indicating effective prehospital and critical care integration, although deaths before PICU admission may not have been captured.

The high IMV rate and severe sequelae such as encephalopathy and tetraparesis illustrate extreme severity and resource demands. Longer hospitalizations in trauma cases underline the need for early rehabilitation and structured follow-up. An 89% post-attempt psychiatric referral rate suggests adequate linkage to care; however, evidence indicates that nearly half may reattempt within one year.[10] Strengthened post-discharge monitoring and community-based interventions remain essential.

This study demonstrates the multifactorial nature of adolescent SA requiring intensive care, highlighting opportunities for earlier identification, coordinated management, and rehabilitation. The small sample size (n = 18) and retrospective design limit generalization but still provide meaningful epidemiological contributions. Prospective multicenter studies should validate standardized suicide risk screening tools in emergency/primary care settings, quantify the economic impact of preventive strategies *versus* hospitalization costs, develop family and school-based interventions targeting common triggers, and establish protocols for long-term neurorehabilitation in major trauma cases.

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AUTHOR CONTRIBUTIONS

JVL: Data collection and analysis, writing and critical review of the manuscript.
BFC: Writing and critical review of the manuscript.
CB, TCM, MJO, AR: Critical review of the manuscript.
All authors approved the final version to be published.

PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in October 2024.

DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

CONFLICTS OF INTEREST

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Table 1 – Summary of demographic, clinical and outcome characteristics

Characteristic	Result
Total patients	18
Age, median [IQR]	15,5 [4]
Female sex, n (%)	13 (72.0)
Portuguese nationality, n (%)	15 (83.3)
Previous suicide attempt, n (%)	1 (5.6)
Psychiatric follow-up, n (%)	9 (50.0)
Method – Major trauma, n (%)	7 (38.9)
Method – Intoxication, n (%)	10 (55.6)
Substance use at time of SA, n (%)	4 (22.2)
PICU stay, median [IQR] (days)	3.5 [4]
PICU stay, mean ± SD (days)	5.6 ± 8
Hospital stay, median [IQR] (days)	11.5 [31]
Hospital stay, mean ± SD (days)	29 ± 47.8
IMV required, n (%)	16 (89)
IMV duration, mean ± SD (n = 16)*	4.42 ± 7.06
Inotropic support, n (%)	8 (44)
Hemodiafiltration, n (%)	1 (5.6)
ECMO, n (%)	1 (5.6)
Mortality, n (%)	0 (0.0)
Psychiatric referral, n (%)	16 (89.0)

*: Only for those who needed IMV (n = 16)

Table 2 – Comparison of mean PICU and total hospital stay between intoxication and trauma cases

Method	**Mean PICU stay** (days) **± SD**	**Median hospital stay** (days)	**Mean hospital stay** (days) **± SD**	**IMV required n/total** (%)
Intoxication	2.00 ± 0.94	9.5; IQR: 33	7.90 ± 6.50	9/10 (90.0%)
Major trauma	11.00 ± 11.11	11.5; IQR: 33	59.29 ± 64.97	7/6 (85.7%)
Total	5.60 ± 8.00	11.5; IQR: 31	24.00 ± 47.88	16/18 (91.0%)