Characteristics of psychiatric emergency department visits in children and adolescents: A cross-sectional observational study focusing on children and adolescents in out-of-home care.

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ABSTRACT

Background: Limited knowledge exists about children and adolescents presenting to psychiatric emergency departments (PEDs). To effectively plan and improve conditions for children presenting with acute psychiatric challenges, the aim of this study was to examine the demographic and clinical characteristics of children and adolescents presenting to the PED at Aalborg University Hospital, Denmark.

A secondary aim was to identify disparities by comparing the prevalence of mental disorders and clinical presentations between children in out-of-home care (OHC) and those in in-home care (IHC), in order to enhance understanding of the unique challenges faced by children in OHC during psychiatric crises.

Methods: In this cross-sectional observational study, a retrospective review was conducted of all PED notes (n=384) for children (0-18 years) at Aalborg University Hospital, Denmark, from October 2022 to December 2023.

Results: Between October 1, 2022 and December 31, 2023, 388 PED visits were recorded, and the final study sample included 384 PED notes. The majority (78.7%) were girls, with a median age of 15 years. Suicidal ideation was the primary referral reason in 73.7% of visits. Children in out-of-home care (OHC) accounted for 23.7% of the sample. Children in OHC exhibited significantly higher rates of psychotic symptoms (39.6% vs. 16.0%, $p < 0.001$), aggressive behaviour (24.3% vs. 14.7%, $p = 0.035$), and previous suicide attempts (35.2% vs. 18.8%, $p = 0.001$) compared to children in in-home care (IHC). Children in OHC were also more likely to be admitted to a psychiatric unit (44.0% vs. 18.8%, $p < 0.001$).

Discussion and conclusion: This study reveals that girls are overrepresented in PED visits. Children in OHC made up nearly a quarter of PED visits, despite being a small fraction of the general population in Denmark. These children exhibited higher prevalence of psychiatric diagnoses and more severity in psychiatric symptoms, including psychosis and suicidal behaviour compared to children in IHC. Given that children in OHC represent a significant part of children seen in the PED, the PED could serve as an important place for identifying these children, who may require greater support.

DANSK RESUMÈ

Baggrund: Antallet af børn og unge under 18 år med psykiske udfordringer er stigende. Op mod 15% af børn og unge i Danmark henvises i dag til børne- og ungdomspsykiatrien før de er fyldt 15 år (15). Flertallet af børn og unge bliver ikke udredt inden for de lovbestemte 30 dage, og der er risiko for at deres situation bliver mere alvorlig i ventetiden (20). Akutte børne- og ungdomspsykiatriske behandlingstilbud er i Danmark stadig under udvikling (15). I Region Nordjylland er der én psykiatrisk skadestue, der kan benyttes af børn og unge, der har behov for akut psykiatrisk hjælp. Der er begrænset viden om børn og unge, der henvender sig med akutte psykiatriske problemstillinger i psykiatrisk skadestue. Formålet med dette projekt var at undersøge de demografiske og kliniske karakteristika for børn og unge, der henvender sig i psykiatrisk skadestue på Aalborg Universitetshospital, Danmark. Et sekundært formål var at belyse forskelle i prævalensen af psykiske lidelser og kliniske præsentationer mellem børn og unge, der er anbragt uden for hjemmet (OHC) og børn og unge, der bor hos deres forældre (IHC), for at opnå en bedre forståelse af de særlige udfordringer, som anbragte børn kan stå overfor i forbindelse med psykiatriske kriser.

Metoder: Projektet er et tværsnitsstudie baseret på en systematisk gennemgang og indhentning af data fra alle skadestuekontakter på børn og unge under 18 år, der henvendte sig i Psykiatrisk skadestue i Aalborg i perioden fra 1. oktober 2022 til 31.december 2023. Datasættet er baseret på gennemgang af 384 psykiatriske skadestuenotater med henblik på indhentning af oplysninger om blandt andet køn, alder, årsag til henvendelse, psykiatriske diagnoser og problemstillinger samt tidligere skadestuekontakter.

Resultater: I perioden fra 1. oktober 2022 til 31. december 2023 blev der registreret 388 besøg på psykiatrisk skadestue, og den endelige studiepopulation bestod af 384 notater. Majoriteten (78,7%) var piger, med en medianalder på 15 år. Selvmordstanker og/eller planer var den primære henvisningsårsag i 73,7% af tilfældene. Anbragte børn og unge udgjorde 23,7% af populationen. Disse børn og unge havde signifikant højere forekomst af psykiatriske diagnoser og adskilte sig i klinisk præsentation i forhold til at have højere forekomst af bl.a. psykotiske symptomer (39,6% vs. 16,0%, $p < 0,001$), aggressiv adfærd (24,3% vs. 14,7%, $p = 0,035$) og tidligere selvmordsforsøg (35,2% vs. 18,8%, $p = 0,001$) sammenlignet med børn i IHC. Børn i OHC var også mere tilbøjelige til at blive indlagt på psykiatrisk afdeling (44,0% vs. 18,8%, $p < 0,001$).

Diskussion og konklusion: Dette projekt viser, at piger er overrepræsenterede blandt børn og unge, der præsenterer sig i psykiatrisk skadestue. Børn i OHC udgjorde næsten en fjerdedel af besøgene i psykiatrisk skadestue, på trods af at de kun udgør en lille del af den generelle befolkning i Danmark. Disse børn havde en højere prævalens af psykiske lidelser og mere påfaldende psykiatriske symptomer, herunder psykosesymptomer og selvmordsadfærd, og de krævede mere intensiv behandling i form af indlæggelse sammenlignet med børn i IHC. Da børn i OHC udgør en væsentlig del af de børn og unge, der søger hjælp i psykiatrisk skadestue, kan skadestuen potentielt spille en central rolle i at identificere disse børn og unge samt at sikre, at de får den nødvendige støtte og behandling.

ABBREVIATIONS:

ADHD	Attention-Deficit/Hyperactivity Disorder
ASD	Autism spectrum disorder
CAMHS	Child and Adolescent Mental Health Services
IHC	In-home care
OCD	Obsessive-compulsive disorder
OHC	Out-of-home care
PED	Psychiatric Emergency Department
PPED	Paediatric Psychiatric Emergency department
SSRIs	Selective serotonin reuptake inhibitors
STB	Suicidal Thoughts and Behaviours

1. BACKGROUND

Children and adolescents under the age of 18 represent approximately one-third of the world's population (1), and almost one in five young individuals in Europe is found to suffer from a mental disorder (2). In Denmark, the number of children diagnosed with a mental disorder before the age of 15 doubled between 2010 and 2017 (3). The majority of mental disorders in the general population appear by age 14, but in many cases, they remain undiagnosed and untreated into adulthood (2). Mental disorders within this population can have significantly consequences, impacting health, education, and overall well-being, with many mental disorders persisting into adulthood (4).

Despite these implications, only about one third of children with mental disorders in high-resources countries in Europe receive care from mental health services (5).
This leaves a significant proportion of children undiagnosed and without contact with mental health services, resulting in unmet needs for appropriate support and treatment.
For some of these children, the psychiatric emergency department (PED) may serve as their first point of contact with the hospital mental healthcare system (6). The PED provides acute care for children experiencing a psychiatric crisis, offering crisis interventions and determining next steps for treatment recommendations. Additionally, the PED plays a role in ensuring linkage to the next level of care and ensuring appropriate follow-up care.

Over the past few decades, an increase in children presenting to the PED has been observed in the United States (7). Similarly, a Danish study reported a rise in visits to the Paediatric Psychiatric emergency department (PPED) at Glostrup Hospital, Copenhagen, from 1,069 visits in 2012 to 2,062 visits in 2017 (8). This increase may reflect a growing need for psychiatric care for children and adolescents, including emergency settings. However, research characterizing the specific population of children presenting to PEDs remains limited. Given the essential role that PEDs play in managing acute crises, it is essential that these services provide comprehensive and coordinated care to both patients and their families. To further improve outcomes for children presenting at PEDs, it is necessary to thoroughly characterize this patient population and evaluate the characteristics of their PED visits.

Children in out-of-home care (OHC), defined as children placed in foster care or residential

institutions, have been found to have nearly four times greater prevalence of mental disorders compared to the general population (9). A study on foster youths in Norway reported that 48.8% of these individuals showed signs of mental health problems (10). Additionally, research indicates that children in OHC face an increased risk of mental health problems, suicidal thoughts and behaviours (STB), as well as higher mortality rates than the general population (11). This finding emphasized the need to detect and treat mental disorders in this vulnerable group. However, previous research has shown that the mental health needs of children in OHC often go unmet (10). Moreover, another study has shown that referrals for children in care are significantly more likely to be rejected by Child and Adolescent Mental Health Services (CAMHS) compared to referrals for children living at home (12), which may further limit these children's access to specialized support.

Given these vulnerabilities and barriers, there is a need to explore whether this high-risk group is overrepresented in PEDs, as they may be more likely to end up in crisis due to their heightened risk of STB and mental disorders, alongside potential limitations in the availability of preventive and outpatient care. This underscores the importance of describing the clinical presentation for children in OHC experiencing mental health crises to better inform about early intervention strategies and tailored support strategies.

The aim of this study is to examine the demographic and clinical characteristics of children and adolescents who presented to the psychiatric emergency department (PED) at Aalborg University Hospital, Denmark, during the period from October 1, 2022, to December 31, 2023. A secondary aim is to compare the prevalence of mental disorders and clinical presentations between children in out-of-home care (OHC) and those in in-home care (IHC) who present to the PED. This secondary aim is intended to uncover potential disparities and deepen our understanding of the unique challenges faced by children in OHC during psychiatric crises.

This study will contribute to the development of future interventions by describing and analysing the current population, thereby enhancing the understanding of the needs that future interventions should address. The study is an exploratory study, with no hypothesis formulated in advance.

2. METHODS

2.1 Study design and sample

This is a cross-sectional, observational study. A retrospective systematic review was conducted based on psychiatric emergency department (PED) notes. All PED notes from children under 18 years, who attended the psychiatry emergency department, Aalborg University Hospital, Denmark from 1st October 2022 to 31st December 2023 were included in the study. In 2022, 364 children were assessed at the PED in Aalborg, while 282 children were assessed in 2023. This study includes PED notes from the fourth quarter of 2022 (106 notes) and the entirety of 2023, encompassing a total of 388 emergency notes. Emergency notes that were missing were excluded, resulting in a final sample of 384 PED notes (Figure 1).

The psychiatry emergency department at Aalborg University Hospital, Denmark, is the only PED in the North Denmark Region. In 2023, the population under 18 years in the catchment area was approximately 112,000 (17).
The Psychiatric Emergency Department in Aalborg is open 24 hours a day throughout the year. All children who attend the emergency department during regular hours are assessed by a child and adolescent psychiatrist. If the visit occurs outside of regular hours, the patient will be seen by an adult psychiatrist but the patient will be discussed with a child and adolescent psychiatrist at the time of the evaluation.

2.2 Data collection and variables assessed

Data were obtained from systematic review of all PED notes from this period. These notes were reviewed by the author of the thesis (graduate level medical student) after training by the thesis supervisor (ASH, child and adolescent psychiatrist).
All information and variables assessed in this study were extracted directly from the PED notes. A bespoke form, developed specifically for this study, was used to systematically collect data. This form was designed to ensure that all variables were based on the information available in the PED notes.

Data collected included sociodemographic characteristics, including whether the children were placed in out-of-home care, and information regarding the reason for referral to the PED. Information on previous contacts with the PED and other child and adolescent psychiatric services (second-line service) was also collected.

Previously established psychiatric diagnoses were categorized into broader diagnostic groups according to ICD-10, as outlined in Table 3.

Assessments of patients' well-being and functional impairment at the time of the PED visit were based on information provided in the PED notes, including descriptions of behavioural changes, such as self-harm, social isolation, aggressive behaviour, affective reactions/episodes and disrupted sleep, as well as other relevant factors.

Additional variables including psychiatric symptoms, description of suicidal thoughts, suicide risk assessments were collected. Lastly, treatment recommendations were noted, based on psychiatric follow-up needs, including whether admission, outpatient follow-up, or if no psychiatric follow-up was required at the time of the PED visit.

Furthermore, additional data and variables related to PED visits were collected during the review process. However, these were not utilized in this study.

2.3 Statistical analysis

Descriptive statistics are reported as frequencies (n) and percentages (%) for all categorical variables, and as median and interquartile range (IQR) for the numerical variable "age at visit" (Table 1).

The sample was divided into two groups: Group 1: Children in Out-of-home care (OHC) and Group 2: Children in In-home care (IHC). Out-of-home care (OHC) was defined as all children and adolescents living in foster care or residential homes.

The potential differences in various variables between these groups were investigated and analysed using a Chi-squared test, with the corresponding p-values presented in Table 2 and Table 3. Mann-Whitney U-test was utilized for the continuous variable "Age".

Logistic regression was used to examine further associations. Logistic regression analyses were made for all variables that showed significant differences between children in OHC and those in IHC. The independent variable was OHC, while the dependent variables included psychiatric service contact, specific psychiatric diagnoses, psychiatric symptoms, suicidal behaviour, and treatment recommendations. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to quantify the strength of these associations. Bivariate logistic regression was used to analyse each dependent variable individually in relation to OHC (Table 4).

The level of statistical significance was set at $p < 0.05$ for all analyses. All data processing and statistical analyses were executed using Stata Statistical Software.

2.4 Systematic literature search

A search of the literature was conducted using PubMed and Embase, with filters set to identify publications in English. The search covered publications from 2000 to 2024.

The search combined terms related to: service setting or type of service (e.g. emergency department, emergency services, psychiatric emergency department); age group (e.g. child, children, adolescent, youth); and disorders (e.g. mental health, mental disorders, psychiatric disorders). MESH terms were also included to enhance the search. The inclusion criteria included a primary focus on PED visits by children and/or adolescent with mental disorders or presenting problems.

Additionally, a subsequent systematic literature search was performed to examine mental health outcomes among children in OHC. This secondary search focused on identifying studies that explored mental disorders, symptoms, and treatment needs within this population.

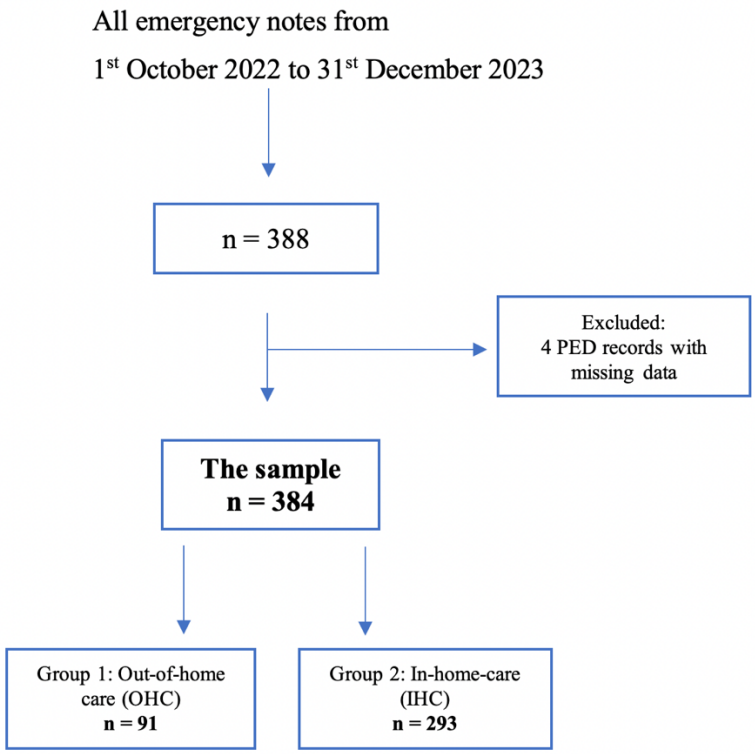


Figure 1: Flowchart of selected study sample.

3. RESULTS

3.1 Study sample

Between October 1, 2022, and December 31, 2023, there were 388 visits to the psychiatric emergency department (PED) in Aalborg by children and adolescents. However, four notes could not be retrieved (Fig. 1), and as a result, the final sample included 384 visits. A proportion of children were seen more than once during the study period, leading to 187 unique children in the sample.

Table 1: Characteristics of the sample: Psychiatric emergency department visits by children and adolescents.

	Total sample	
	n	**%**
Sociodemographic characteristics		
Sex		
Girls	302	**(78.7)**
Boys	82	(21.4)
Age		
Mean age	14.97	
95% conf. interval	14.78-15.16	
Median age	**15**	
IQR (25%, 75%)	14-16	
Placed in foster care or residential home	91	**(23.7)**
Reasons for referral to the PED		
Suicidal ideation or planning	283	**(73.7)**
Self-harm	56	(14.6)
Psychotic symptoms	38	(9.9)
Affective reaction/episode	42	(10.9)
Eating disorder symptoms	5	(1.3)
Anxiety and OCD symptoms	18	(4.7)
Depressive symptoms	28	(7.3)
Behavioural disorder symptoms	2	(0.5)
Other reason	81	(21.1)
Unknown	4	(1.0)
Medical assessment		
Child and adolescent psychiatrist	28	(7.4)
Child and adolescent psychiatrist and social worker	118	(31.3)
Adult psychiatrist	216	**(57.3)**
Medical student	15	(4.0)
Timing of visit		
8-14	119	(31.0)
14-23	184	**(47.9)**
23-8	84	(21.1)
Previous contact with hospital services for psychiatric assessment		
Outpatient CAMHS	198	**(51.6)**
Psychiatric emergency department (PED)	155	**(40.4)**
Inpatient admissions	71	**(18.5)**
No previous contacts indicated	138	**(35.9)**
Previously established diagnosis		
Yes, had a prior diagnosis	196	**(51.0)**
No prior diagnosis	164	(42.7)
Unknown	24	(6.3)
Psychiatric medication treatment		

Yes, currently in treatment	133	(34.6)
Previously in treatment	16	(4.2)
No, never been in treatment	147	(38.3)
Unknown	88	(22.9)
Type of medication		
ADHD medications	50	(13.0)
SSRIs	41	(10.7)
Melatonin	75	(19.5)
Antipsychotics	42	(10.9)
Other	10	(2.6)
Treatment recommendations		
Inpatient admissions	95	**(24.9)**
Outpatient follow up	148	**(38.7)**
No current need for psychiatric care	107	**(28.0)**

3.2 Clinical and sociodemographic characteristics of psychiatric emergency visits

Table 1 presents the sociodemographic and clinical presentations of the study sample. Among the total sample of PED visits (n = 384), 78.7% (n = 302) were girls, and the median age was 15 years (IQR: 14-16). A total of 23.7% of the sample were placed in foster care or residential homes. The primary reason for referral to the PED was suicidal ideation or planning, accounting for 73.7% of the cases. The majority of visits to the PED occurred after 14:00, with 47.9% taking place between 14:00 and 23:00 and 21.1% occurring between 23:00 and 8:00. Additionally, the majority of the medical assessments were conducted by adult psychiatrists (57.3%).

Over one-third (35.9%) of the children had no previous contact with hospital services for psychiatric assessment, while the remaining majority had varying degrees of previous interactions: 51.6% had engaged with outpatient CAMHS, 40.4% had visited the PED and 18.5% had previous been admitted to a psychiatric unit.

At the time of the PED visit, 51.0 % of the patients had an established diagnosis. The four most common diagnoses included attention deficit disorder (ADHD/ADD, 22.6%), followed by autism spectrum disorder (ASD, 16.5%), reaction to severe stress and adjustment disorders (13.5%) and affective disorders (8.1%) (Table 3).

Treatment recommendations indicated that 24.9% of the patients were admitted to a psychiatric unit. Outpatient follow-up was recommended for 38.7%, and 28.0% were assessed as not requiring immediate psychiatric care.

3.3 Differences between children in Out-of-Home Care (OHC) and In-Home Care (IHC)

Children in out-of-home care (OHC) accounted for 23.7% of the PED visits, with a median age of 16 years.

As shown in Table 2, significant differences were observed in previous psychiatric contact between children in OHC and in IHC. Patients in IHC had less frequent previous psychiatric contact compared to patients in OHC (15.4% vs. 42.3%, $p < 0.001$). The children in OHC had more previous contacts with both CAMHS, the PED (65.9% vs. 32.4%, $p < 0.001$), and inpatient admissions to child and adolescent psychiatry unit, with these differences being statistically significant. For children in OHC the most frequently used resource was outpatient CAMHS (70.3%); however, at the time of the PED visit, only 58.2% of the patients were currently in contact with outpatient CAMHS.

Table 2 demonstrates that children in IHC had significantly fewer established diagnoses at the time of the emergency visit compared to OHC (50.2% vs 18.7%, $p < 0.001$). Table 3 shows the most common diagnoses in OHC were attention-deficit disorder (ADHD/ADD, 23.1%), and reaction to severe stress and adjustment disorders (23.1%), followed by attachment disorder (18.7%) and affective disorders (15.4%) (Table 3).

Table 2: Characteristics of the total sample, and comparison between children in out-of-home care (OHC) and in-home care (IHC). The table presents frequencies(n), percentages (%) and p-values.

	Total sample		**Out-of-home care (OHC)**		**In-home care (IHC)**		**OHC vs IHC**
	n= 384	%	n= 91	%	n= 293	%	P-value
Sociodemographic characteristics							
Age							
Mean	14.97		15.45		14.82		
95% conf. interval	14.78-15.16		15.12-15.78		14.59-15.05		
Median age	15		**16**		**15**		0.008
IQR (25%, 75%)	14-16		15-17		14-16		
Gender							
Girls	302	(78.7)	74	(81.3)	228	(77.8)	0.476
Boys	82	(21.4)	17	(18.7)	65	(22.2)	0.476
Reason for visit to PED							
Suicidal ideation	283	(71.7)	65	(71.4)	218	(74.4)	0.574
Self-harm	56	(14.6)	17	(18.7)	39	(13.3)	0.205
Psychotic symptoms	38	(9.9)	11	(12.1)	27	(9.2)	0.423
Affective reaction/episode	42	(10.9)	13	(14.3)	29	(9.9)	0.241
Depressive symptoms	28	(7.3)	3	(3.3)	25	(8.5)	0.093
Previous contact with hospital services							
Outpatient CAMHS	198	(51.6)	64	**(70.3)**	134	(45.7)	**< 0.001**
PED: Emergency department	155	(40.4)	60	**(65.9)**	95	(32.4)	**< 0.001**
Inpatient admissions	68	(17.7)	40	**(44.0)**	28	(9.6)	**< 0.001**
No previous contacts indicated	138	**(35.9)**	14	(15.4)	124	**(42.3)**	**< 0.001**
Currently in contact with outpatient CAMHS							
Yes	163	(42.5)	53	**(58.2)**	110	(37.5)	< 0.001
Previously established psychiatric diagnosis							
No prior diagnosis	164	(42.7)	17	(18.7)	147	(50.2)	**< 0.001**

Table 3 shows that the children of OHC were significantly more likely to have diagnosis of psychosis (11.0% vs. 1.7%, $p < 0.001$) and attachment disorder (18.7% vs. 1.0%, $p < 0.001$) compared to those in IHC. Additionally, 50.6% of patients in OHC were receiving psychiatric medication at the time of the PED visit, compared to 29.7% of the children in IHC ($p < 0.001$). Among the children in OHC the most commonly prescribed psychotropic medications were melatonin (34.1%), antipsychotic drugs (27.5%) and selective serotonin reuptake inhibitors (SSRIs) (16.5%).

For children in OHC, the most frequently reported behavioural changes were self-harm (49.5%), disrupted sleep (41.8%), aggressive behaviour (24.3%) and affective reaction/episode (19.8%). The most common psychiatric symptoms included behavioural changes (37.4%) and psychotic symptoms (39.6%).

At the time of the PED visit, children in OHC exhibited significant differences in their current psychiatric condition compared to those in IHC. These differences were observed in behavioural changes, psychiatric symptoms, suicidal behaviour and risk, suggesting a more acute clinical presentation among children in OHC. Given that the clinical presentation was not directly assessed, specific variables were selected to estimate its acuity: a history of suicide attempts, current suicide attempts, suicide risk rated by the physician as “increased”, presence of psychotic symptoms, aggressive behaviour, substance abuse and visits resulting in admission to the psychiatric unit (Figure 2).

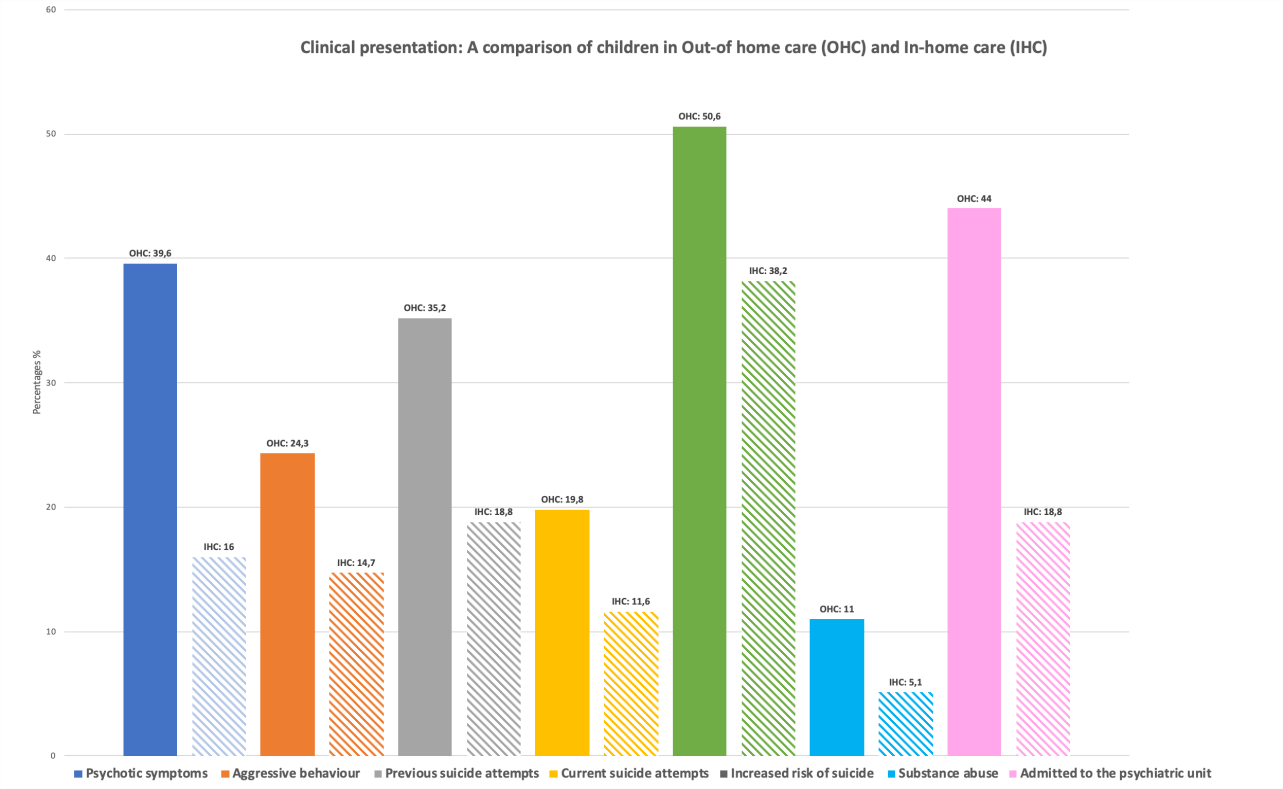
Table 3 illustrates these significant differences observed in the two groups. Psychotic symptoms were reported in 39.6% of children in OHC, compared to 16.0% of children in IHC ($p < 0.001$). Similarly, aggressive behaviour was more common among children in OHC (24.3% vs. 14.7%, $p=0.035$). Previous suicide attempts were also significantly more frequent in OHC (35.2% vs. 18.8%, $p = 0.001$), as were current suicide attempts (19.8% vs. 11.6%, $p= 0.046$).
Furthermore, 50.6% of children in OHC were assessed to have an increased risk of suicide compared to 38.2% of children in IHC ($p= 0.037$). Following the medical assessment in the PED, children in OHC were significantly more likely to be admitted to the psychiatric unit (44.0% vs 18.8%, $p < 0.001$).

Table 3: Psychiatric characteristics of the total sample, and comparison between children in out-of-home care (OHC) and in-home care (IHC). The table presents frequencies(n), percentages (%) and p-values.

	Total sample n= 384	%	Out-of-home care (OHC) n= 91	%	In-home care (IHC) n= 293	%	OHC vs. IHC P-value
Previously established diagnosis							
No prior diagnosis	164	(42.7)	17	(18.7)	147	(50.2)	< 0.001
Psychosis (DF20-25, DF28-29)	15	(3.9)	10	**(11.0)**	5	(1.7)	**< 0.001**
Affective disorders (DF30-34, DF38-39)	31	(8.1)	14	**(15.4)**	17	(5.8)	0.003
Reaction to severe stress, and adjustment disorders (DF43)	52	(13.5)	21	**(23.1)**	31	(10.6)	**0.002**
ASD (DF80-89)	62	(16.2)	13	(14.3)	49	(16.7)	0.581
ADHD/ADD (DF90-98)	87	(22.7)	21	**(23.1)**	66	(22.5)	0.913
Anxiety disorders (DF40-42)	29	(7.6)	2	(2.2)	27	(9.2)	0.027
Attachment disorder (DF94)	20	(5.2)	17	**(18.7)**	3	(1.0)	**< 0.001**
No information	24	(6.3)	10	(11.0)	14	(4.8)	0.033
Psychiatric medication treatment							
Yes, currently in treatment	133	(34.6)	46	(50.6)	87	(29.7)	**< 0.001**
No, never	147	(38.3)	14	(15.4)	133	(45.4)	< 0.001
Unknown	88	(22.9)	30	(33.0)	58	(19.8)	0.009
Type of psychiatric medication							
ADHD medications	50	(13.0)	7	(7.7)	43	(14.7)	0.084
SSRIs	41	(10.7)	15	(16.5)	26	(8.9)	**0.040**
Melatonin	75	(19.5)	31	(34.1)	44	(15.0)	**< 0.001**
Antipsychotics	42	(10.9)	25	(27.5)	17	(5.8)	**< 0.001**
Other	10	(2.6)	4	(4.4)	6	(2.1)	0.216
Behavioural changes							
Self-harm	179	(46.6)	45	**(49.5)**	134	(45.7)	0.535
Social isolation	65	(16.9)	7	(7.7)	58	(19.8)	0.007
Aggressive behaviour	65	(16.9)	22	**(24.3)**	43	(14.7)	**0.035**
Affective reaction/episode	62	(16.2)	18	(19.8)	44	(15.0)	0.281
Increased impulsivity	16	(4.2)	5	(5.5)	11	(3.8)	0.468
Disrupted sleep	178	(46.4)	38	**(41.8)**	140	(47.8)	0.314
Impaired eating	89	(23.2)	17	(18.7)	72	(24.6)	0.245
None of the above	63	(16.4)	20	(22.0)	43	(14.7)	0.100
Psychiatric symptoms							
Depression symptoms	144	(37.5)	25	(27.5)	119	(40.6)	**0.024**
Psychotic symptoms	83	(21.6)	36	**(39.6)**	47	(16.0)	**< 0.001**
Behavioural changes	124	(32.3)	34	(37.4)	90	(30.7)	0.236
Sleep disorders	110	(28.6)	27	(29.7)	83	(28.3)	0.805
Anxiety symptoms	38	(9.9)	5	(5.5)	33	(11.3)	0.107
Other symptoms	66	(17.2)	10	(11.0)	56	(19.1)	0.073
Suicidal behaviour							
Suicidal ideation	250	(65.1)	62	(68.1)	188	(64.2)	0.488
Suicidal planning	70	(18.2)	19	(20.9)	51	(17.4)	0.454
Previous suicide attempts	87	(22.7)	32	**(35.2)**	55	**(18.8)**	**0.001**
Current suicide attempt	53	(13.5)	18	(19.8)	34	(11.6)	**0.046**
No suicidal ideation	68	(17.7)	8	(8.8)	60	(20.3)	**0.011**
No information	35	(9.1)	12	(13.2)	23	(7.9)	0.122
Suicidal risk							
No increased risk	173	(46.0)	25	(27.5)	148	(50.5)	**< 0.001**
Increased risk	158	(41.2)	46	(50.6)	112	(38.2)	**0.037**
Acutely increased risk	13	(3.4)	6	(6.6)	7	(2.4)	0.053
Substance abuse							
Yes	25	(6.5)	10	(11.0)	15	(5.1)	**0.047**
No	148	38.54	24	(26.4)	124	(42.3)	**0.006**
Previous	18	(4.7)	8	(8.8)	10	(3.4)	**0.034**
No information	198	(51.6)	51	(56.0)	147	(50.2)	0.327

Treatment recommendations							
Admission	95	(24.9)	40	**(44.0)**	55	(18.8)	**< 0.001**
Outpatient follow up	148	(38.7)	31	(34.1)	117	(40.2)	0.315
No current need for psychiatric care	107	(28.0)	16	(17.6)	91	(31.3)	**0.012**

Figure 2: Comparison of clinical presentation indicators between children in Out-of-home care (OHC) and In-home care (IHC). The bar chart presents the percentage of children in each group across multiple variables. Shaded bars represent children in IHC.



Logistic regression analyses were made for all variables from Table 2 and 3 that showed significant differences between children in OHC and those in IHC. The logistic regression examined the association between each of these variables and being in OHC. The results of the significant associations found in this analysis are presented in Table 4.

For instance, children in OHC were found to be 22.21 times more likely to have an attachment disorder compared to children in home care (OR = 22.21, 95% CI: [6.34, 77.79]. Additionally, children in OHC were significantly more likely to exhibit psychotic symptoms (OR = 3.43, 95% CI = [2.03, 5.78] and had an increased overall suicidal risk (OR = 1.65, 95% CI: [1.03, 2.65]). In contrast, children in OHC were less likely to report no suicidal thoughts (OR = 0.37, 95% CI: [0.17, 0.82]).

Regarding treatment recommendations**,** children in OHC had higher odds of requiring admission (OR = 3.39, 95% CI: [2.04, 5.63] and lower odds of having no current treatment needs (OR = 0.47, 95% CI: [0.26, 0.86]).

Table 4: Logistic regression model: This table presents the results of logistic regression analyses conducted on the variables from Table 2 and 3 that showed significant differences between children in OHC and in IHC. The analysis examines the association between each variable and being in OHC. The odds ratios (OR) and 95% confidence intervals (CI) are presented for each variable. The dependent variables include psychotic symptoms, history of suicide attempts, and current suicide attempts. The independent variable is the presence of out-of-home care. All associations are statistically significant with p-values < 0.05.

	Out-of-home care (OHC)	
	OR	95% CI
Previous contact with hospital services for psychiatric assessment		
Outpatient CAMHS	**2.81**	[1.70, 4.67]
PED: Emergency department	**4.03**	[2.45, 6.64]
Inpatient admission	**7.42**	[4.20, 13.10]
Previously established diagnosis		
No previously established diagnosis	0.23	[0.13, 0.41]
Psychosis diagnosis	**7.11**	[2.36, 21.39]
Adjustment disorder	**2.54**	[1.38, 4.68]
Attachment disorder	**22.21**	[6.34, 77.79]
Functional impairment		
Social isolation	0.33	[0.15, 0.77]
Aggressive behaviour	**1.85**	[1.04, 3.31]
Psychiatric symptoms		
Depression symptoms	0.55	[0.33, 0.93]
Psychotic	**3.43**	[2.03, 5.78]
Suicidal behaviour		
Previous suicide attempts	**2.35**	[1.39, 3.95]
Current suicide attempt	**1.88**	[1.00, 3.52]
No suicidal thoughts	0.37	[0.17, 0.82]
Suicidal risk		
Increased risk	**1.65**	[1.03, 2.65]
Substance abuse		
Yes	**2.29**	[0.99, 5.29]
Treatment recommendations		
Admission	**3.39**	[2.04, 5.63]
No current need	0.47	[0.26, 0.86]

4. DISCUSSION

This cross-sectional study investigated the characteristics of psychiatric emergency department (PED) visits among children and adolescents, with a specific focus on identifying differences in clinical presentations between children in out-of-home care and those in in-home care. The discussion focuses on key findings: the primary characteristics of PED visits, the subgroup of patients without previous contact with hospital services for psychiatric assessment, and the differences in clinical presentations observed in children in OHC. These findings provide valuable insights into patterns of psychiatric crisis visits and healthcare utilization.

4.1 Characteristics of psychiatric emergency visits

A significant characteristic of the study sample was the uneven distribution of gender, with 78.7% of visitors being girls. This overrepresentation of girls in the PED is consistent with findings of several other studies (8, 13). One potential explanation for this overrepresentation in an emergency context may be highlighted in the Danish report "Well-being among children and adolescents in vulnerable positions 2023", which emphasize that girls have a higher vulnerability index, particular in relation to self-harm, suicide attempts, and experiences of sexual assault and cyberbullying (14). Notably, self-harm and suicidal behaviour were found to be the primary reason for referral to the PED in this study (Table 1).

The Danish report further reveals that these vulnerabilities are particularly severe among girls in out-of-home care, where two-thirds exhibit a high degree of vulnerability, compared to one-third of boys in similar situations. Moreover, girls expressed a greater need for support and help than they currently received (14).

These compounded vulnerabilities and unmet needs may contribute to girls' increased need for psychiatric crisis care.

In contrast, referrals to CAMHS, often show a more balanced gender distribution or even an overrepresentation of boys (12).

The age distribution in this study sample, with teenagers (median visiting age= 15 years) constituting the majority of the population, is comparable to findings reported in another Danish study investigating demographic characteristics in a PPED in Copenhagen (8). The literature indicates that suicide attempts and severe self-harming behaviour are among the most common reasons for acute psychiatric referrals of children and adolescents aged 14 to 19 (15). This pattern is comparable to findings from this study, where the primary reason for referral to the PED was suicide ideation or planning, accounting for 73.7% of cases, followed by self-harm at 14.6% (Table 1). These findings highlight the importance of suicide prevention initiatives, crisis care planning, and better communication regarding available support services and helplines should be prioritized in the PED.

This study supports the need for acute child and adolescents' psychiatric services outside business hours, as the majority of the visits were in the afternoon and the evening (14:00–23:00), a pattern that aligns with previous studies (13). Additionally, most medical assessments in the PED were

conducted by adult psychiatrists (57.3%, Table 1), indicating a potential gap in the availability of child and adolescent specialists during evening hours.

4.2 Children with no previous contact to hospital services for psychiatric assessment

In this study, 35.9% of children presenting to the PED had no previous contact with hospital services for psychiatric assessment (Table 1), making the PED their first point of contact for mental health service. This raises questions about why these children are seeking help in an emergency setting rather than through earlier intervention pathways.

Findings from Hansen et al. (2021) provide insight for understanding the barriers faced by parents of children with mental health problems (16). In their study, parents highlighted several barriers to accessing CAMHS, including a lack of knowledge about available services, stigmatization, and challenges with multiagency collaboration. These barriers can result in delayed help-seeking, as evidenced by their reported median duration of 5.6 years between the onset of mental health problems and CAMHS referral (16).

In this study, children without previous contact with hospital services for psychiatric assessment were significantly more likely to have experienced psychiatric symptoms lasting more than six months compared to those with previous contact (34.8% vs. 15.9%, $p < 0.001$) (data not shown). While these findings suggest a potential delay in accessing appropriate mental health services, it remains unclear whether this delay is due to specific barriers. However, this suggest a potential delay in seeking care, highlighting the need to address barriers through early identification, increased service awareness, and improving the accessibility of CAMHS, in order to reduce the duration of untreated psychiatric symptoms and decrease the number of children presenting to the PED as their first point of contact with mental health services.

4.3 Children in out of home care

Children and adolescents in out-of-home care (OHC) were overrepresented in this study, constituting 23.7% of PED visits (Table 1), compared to just 1% in the general background population in Denmark (17). These children were also significantly more likely to have previous visits to PEDs compared to children in-home care (IHC) (Table 3,4). Previous findings have reported a generally high use of mental health services for children and adolescents in OHC, compared to the general youth-population (10).

However, relative to these children's high rate of mental disorders, the service utilization by children in OHC seems low, and previous findings indicate that a considerable part of this population does not receive services according to need. This study found that only 58.2% of children in OHC were in contact with CAMHS at the time of the PED visit (Table 2). Similar findings by Larsen et al. (2018) revealed large unmet needs for youth in foster care, with 57% of foster youth with carer-reported mental health problems not having contact with CAMHS (10). This pattern is further reflected in the report "Well-being among children and adolescents in vulnerable positions 2023" which found that nearly half (46%) of children in OHC in Denmark receive no additional interventions beyond their placement (14).

Previous studies have also reported that children in OHC may face more struggles in accessing appropriate support through CAMHS. Hansen et al. (2021) found that referrals for children in care are significantly more likely to be rejected by CAMHS compared to referrals for children living at home (12). Another study investigated another factor that may further limit access to specialized support for children in OHC. McGuire et al. (2022) investigated whether being in care might influence clinical diagnosis and treatment decision-making (18). Their study found that mental health professionals were less likely to diagnose a child in OHC with PTSD compared to a child in IHC, even when given identical case information, suggesting potential diagnosis and treatment decision bias towards children in care (18). Together, these studies highlight different factors that may create barriers to receiving appropriate care for children in OHC.

Some children in OHC may receive support from primary health care services. Larsen et al. (2018) found that 78.2% of youth with mental health problems accessed such services (10). Many of these children may have their needs adequately addressed within primary care services. However, to secure stepped care, there should be focus on identifying the children who are in need for more specialized services. Effective collaboration between service providers is essential, as these children frequently interact with multiple systems.

Children and adolescents in OHC represent a vulnerable group. Previous studies indicate that one in two foster children suffers from mental disorders (10) and have an increased risk of metal health problems, suicidal behaviour and higher mortality compared to the general population (11). This study aligns with these findings, showing significant differences in the clinical presentations of children in OHC compared to children in IHC when presenting to the PED (Figure 2).

Specifically, children in OHC demonstrated higher prevalence of psychiatric diagnoses, including psychosis, attachment disorders, and reaction to severe stress and adjustment disorders (Table 3). Further, children in OHC had significantly higher rates of psychotic symptoms, aggressive behaviour, and previous suicide attempts and increased suicide risk. These findings, suggest that children in OHC face more psychiatric challenges, as reflected by their greater likelihood of admission to the psychiatric unit. Furthermore, the logistic regression analysis, detailed in Table 4, supports these observations, underscoring the disparity in both the frequency and severity of mental health problems between children in OHC and IHC. These findings suggest that children in OHC not only experience a higher prevalence of mental health problems but also experience greater severity in their symptoms.

Moreover, a previous study investigated the "complexity index" which highlights the increased complexity in the lives of children in OHC, who, on average exhibit 6.4 vulnerability factors compared to just 1.1 for children without social interventions (14). This combination of higher mental health problems and increased life complexity underscores the greater severity and multifaceted needs of children in OHC.

These findings collectively highlight the significant challenges and barriers to appropriate mental health services faced by children and adolescents in OHC. The combination of frequent emergency department visits, higher prevalence of psychiatric diagnoses, greater severity in symptoms, unmet service needs, potential diagnosis and treatment decision biases, and increased life complexity underscores the importance of greater attention on this vulnerable group and to identify the children who need more specialized services.

4.4 Strength and limitations

One of the main strengths of this study was that it investigated the full spectrum of children and adolescents presenting to a PED, making the findings applicable to typical visits in PEDs. Another strength was the systematic review of emergency notes, which provided more detailed insights and characterization of visits to the PED, encompassing a wide range of variables, compared to studies based solely on administrative data. To our knowledge, this is the first study to analyse a broad range of variables and detailed information about children presenting to the PED.
A limitation of this study was that emergency notes were collected from a single PED, which may not be representative of visits to other PEDs nationally or internationally, potentially limiting the

generalizability of the findings. However, the demographic characteristics of the emergency visits observed in this study are consistent with findings from another region in Denmark (8). Additionally, the study only included data from PED visits over a period of one year and one quarter, comprising a dataset of 384 emergency notes. While this sample size may be sufficient to provide insights into the patient population during that time frame, it is relatively small compared to studies with longer observation periods, which could also limit the generalizability of the results. Future studies with larger or extended datasets could help confirm and expand upon these findings.

This study was a cross-sectional observational study, and therefore does not allow for conclusions about causality of the findings, but only about associations between variables. Although cross-sectional studies are lower in the hierarchy of the evidence pyramid compared to other types of studies, they still play an important role in developing hypotheses for future research (19). This type of study can provide a snapshot of the characteristics within a population at a specific point in time, which aligns with the primary aim of this study. This cross-sectional study provides insights into PED visits by children and adolescents, which can contribute to the development of future interventions in the PED.

A limitation of the statistics in this study is that some patients had multiple visits to the PED during the observation period, resulting in non-independent observations. This lack of independence does not meet the assumption of the statistical methods used, such as the Chi-squared test and logistic regression, which assume that observations are independent of one another. As a result, the repeated measures from the same individuals may introduce bias or affect the precision of the statistical estimates. Future studies should consider methods that account for repeated measures to improve the reliability of the findings.

5. CONCLUSION

This study provides insights into the characteristics of psychiatric emergency department (PED) visits among children and adolescents. Girls were overrepresented in PED visits and the primary reason for referral to the PED were suicidal ideation and self-harm. This study supports the need for acute child and adolescents' psychiatric services outside business hours, as the majority of the visits were in the afternoon and in the evening. Furthermore, a proportion of children used the PED as their first point of contact with hospital mental health services, which may suggest delays in early identifications and interventions.

This study revealed that children in out-of-home care (OHC) accounted for nearly one-quarter of PED visits despite representing only a small fraction of the general population. These children had more frequently visits to the PED, exhibited a higher prevalence of psychiatric diagnoses, alongside greater symptom severity and were more often admitted to a psychiatric unit compared to children in in-home care (IHC). Logistic regression analysis further confirmed this association. However, due to the study design, it was not possible to determine the underlying reasons for these findings, but it would be relevant for future studies to investigate whether this trend is consistent across other PEDs and, if so, to further investigate the factors contributing to this finding.

The results of this study indicate that children in OHC represent a significant part of the children seen in the PED. Consequently, the PED could serve as an important place for identifying these children, who may be in need for greater support than they currently receive or require more specialised services. This highlights the potential role of the PED in detection, treatment and referral to a specialised unit.

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