



# Factors associated with repeat emergency department visits for mental health care in adolescents: A scoping review

Rebecca Wilson, PhD <sup>a,b,\*</sup>, Alice Jennings, MSc <sup>c</sup>, Maria Theresa Redaniel, PhD <sup>a,b</sup>, Kithsiri Samarakoon, MD <sup>a,b</sup>, Sarah Dawson, MSc <sup>a,b</sup>, Mark D. Lyttle, MBChB <sup>c,d</sup>, Jelena Savović, PhD <sup>a,b,1</sup>, Behnaz Schofield, PhD <sup>c,1</sup>

<sup>a</sup> NIHR Applied Research Collaboration West (ARC West) at University Hospitals Bristol and Weston NHS Foundation Trust, Bristol, UK

<sup>b</sup> University of Bristol, Bristol, UK

<sup>c</sup> University of the West of England, Bristol, UK

<sup>d</sup> Bristol Royal Hospital for Children, Bristol, UK

## ARTICLE INFO

### Article history:

Received 24 November 2023

Received in revised form 6 March 2024

Accepted 8 April 2024

### Keywords:

Emergency department

High impact ED use

Repeat ED visits

Adolescent

Mental health

## ABSTRACT

**Objectives:** The aim of this review was to identify factors associated with multiple visits to emergency department (ED) services for mental health care in adolescents.

**Methods:** Electronic databases (MEDLINE, PsycINFO, Embase, CINAHL, Web of Science and ProQuest Dissertations & Thesis Global) were searched for evidence that presented an association between risk factors or correlates of multiple visits to the emergency departmental for mental health care by 10–24 year olds. High impact use was defined as at least one return ED visit for mental health care. Primary studies of any quantitative design were included, with no exclusions based on language or country and all possible risk factors were considered. Data were extracted and synthesised using quantitative methods; frequencies of positive, negative and null associations were summarised for categories of potential risk factors.

**Results:** Sixty-five studies were included in the review. Most studies were from North America and reported a wide range of measures of high impact ED use, the most common being a binary indicator of multiple ED visits. Sex/gender and age were the most frequently reported risk factors. Measure of previous or concurrent access to mental health care was consistently positively associated with high impact use. Having private health insurance, compared with public or no insurance, was generally negatively associated with high impact use. Proxy measures of socioeconomic position (SEP) showed associations between lower SEP and more high impact use in a small number of studies. No other factors were consistently or uniformly associated with high impact use.

**Conclusions:** The review identified a substantial evidence base but due to the variability in study design and measurement of both risk factors and outcomes, no consistent risk factors emerged. More research is needed, particularly outside North America, using robust methods and high quality routinely collected data.

© 2024 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

Mental health disorders contribute significantly to emergency department (ED) visits [1,2], yet many EDs are not well equipped to manage complex mental health presentations. Mental health issues often emerge and escalate during adolescence [3,4] and the frequency of ED visits for adolescent mental health care is rising. Data from the National

Hospital Ambulatory Medical Care Survey showed that ED visits for psychiatric or substance use disorders in 6–24 year olds in the USA increased from 4.8 million visits (7.7% of all paediatric ED visits) to 7.5 million visits (13.1% of all paediatric ED visits) between 2011 and 2020 [5]. A similar trend is seen in EDs in England; ED visits with a psychiatric primary diagnosis more than trebled from 22,417 visits in 2009/10 to 76,959 visits in 2019/20 in under 25 year olds [6]. In Canada, mental health-related ED visits accounted for 5% of all paediatric ED visits in the years 2016–19, and this grew to 6.5% in 2020 and 8.6% in 2021 [7]. Outpatient mental health visits have not risen in line with ED visit rates, suggesting a propensity for ED as the ‘first port of call’ [10].

Patients with repeat visits to ED are referred to as ‘high impact users’, though the definition of high impact use varies. This sometimes reflects the number of visits within a time period (e.g., 20 or more visits per year [12]) and sometimes the time between index and subsequent visit(s)

\* Corresponding author.

E-mail addresses: [rebecca.wilson@bristol.ac.uk](mailto:rebecca.wilson@bristol.ac.uk) (R. Wilson), [alice.jennings@uwe.ac.uk](mailto:alice.jennings@uwe.ac.uk) (A. Jennings), [theresa.redaniel@bristol.ac.uk](mailto:theresa.redaniel@bristol.ac.uk) (M.T. Redaniel), [xr22401@bristol.ac.uk](mailto:xr22401@bristol.ac.uk) (K. Samarakoon), [sarah.dawson@bristol.ac.uk](mailto:sarah.dawson@bristol.ac.uk) (S. Dawson), [mark.lyttle@uwe.ac.uk](mailto:mark.lyttle@uwe.ac.uk) (M.D. Lyttle), [jelena.savovic@bristol.ac.uk](mailto:jelena.savovic@bristol.ac.uk) (J. Savović), [behnaz.schofield@uwe.ac.uk](mailto:behnaz.schofield@uwe.ac.uk) (B. Schofield).

<sup>1</sup> Joint senior author.

(e.g., return visit within a two-year study period [13]). People with serious mental illness are more likely to be high impact users of EDs [14] repeat ED visits are more likely for adolescent mental health care [15,16]. This may reflect unmet needs, suggesting patients are not receiving appropriate or timely mental health care.

A systematic review [17] investigating factors associated with repeat paediatric ED visits for mental health care identified only a small number of records, suggesting the search strategy may not have been sufficiently sensitive. This review examined the evidence up to January 2016. Health care usage patterns have since changed, due to the continued rise in mental health attendances combined with the effect of the COVID-19 pandemic, thus an updated review is warranted.

The aim of this review was to identify and summarise factors which have been assessed in this context, and to describe their associations with high impact ED use for mental health care in adolescence.

## 2. Methods

This review was developed and written following guidelines for conducting scoping reviews [18]. A protocol for the review was written and approved by the study team a priori and is uploaded as Supplementary Material. The review was registered with PROSPERO (ID: CRD42023398019).

### 2.1. Eligibility criteria

Studies were included if participants were predominantly between the ages of 10–24 years, as per Sawyer et al.'s definition of adolescence [19]. Studies must also have measured repeat visits to the ED for mental health care. Criteria for the number of visits or time period (referred to as high impact use henceforth) were not imposed, and any risk factors or features associated with high impact use were reported. There were no exclusion criteria based on publication year, country, or language. Studies were excluded if ED visits were for non-mental health care in a population with mental health disorders (e.g., adolescents with anxiety attending ED for asthma).

### 2.2. Information sources

The literature search was conducted by our information specialist (SD) in July 2022. Ovid platform was used to search MEDLINE, PsycINFO and Embase, and searches were also performed in CINAHL, Web of Science and ProQuest Dissertations & Thesis Global. The full search strategy can be found in the Supplementary Material.

### 2.3. Selection of sources of evidence

All identified citations were uploaded to the Rayyan web platform for the purpose of study screening (<https://www.rayyan.ai/>), and titles and abstracts were screened independently, in duplicate by two researchers (RW/AJ). Discrepancies in inclusion/eligibility decisions were discussed and consensus reached for each citation. Both researchers then independently assessed full text articles of included records against inclusion criteria, and the same resolution process was followed for discrepant decisions.

As a scoping review, study quality or risk of bias were not assessed [18].

### 2.4. Charting the data

Data from included studies were extracted using the pilot version of MetaReviewer v1.0 (<https://www.metareviewer.org>) by one of two reviewers (AJ/KS) and checked by the lead reviewer (RW). An example

data extraction form (exported into Excel) is in the Supplementary material.

When a study reported both unadjusted and adjusted associations, adjusted associations were extracted. If a study presented results for more than one measure of high impact use (e.g. multiple ED visits AND a time-to-event measure, as in Newton (2010) [20]), only associations for the measure presented as the primary outcome by the study were extracted. Only associations for one measure of high impact use (outcome measure) per study were included in the synthesis, but any differences between results were noted.

Extracted data were imported to Stata 17 statistical package [21] for descriptive analysis.

### 2.5. Categorisation of risk factors

Risk factors reported in included studies were categorised into the following groups: sex/gender, age, mental health/behavioural health disorder, mental health care, self-harm/suicidality, personal/family factors, insurance, race/ethnicity, socioeconomic position, substance abuse, features of index visit, disposition of index visit, other health/healthcare factors, urban/rural living, triage/acuity of index visit, geographical factors, population size. These categories were not predetermined but were developed iteratively after identifying all available risk factors from the literature.

### 2.6. Summarising the results

For each study, all associations between individual risk factors (including each level of any categorical measures) and high impact use, were coded as positive [1], negative (−1) or no association (0). As some studies reported multiple associations between a risk factor category and high impact use (for example, if a categorical measure was used, or different variables that were within the same theme of risk factor category), it was possible for a study to be both 'positively associated' with high impact use for one risk factor category and 'negatively associated' for another. Therefore, groups of 'positively associated' and 'negatively associated' studies were not mutually exclusive. Age and sex/gender risk factor categories were also sub-divided into older/younger age and male/female sex/gender to correctly indicate the direction of the association.

The number of unique studies assessing each risk factor category was tabulated, as was the number of studies reporting a positive or a negative association with each risk factor category. Further analysis assessed results by risk factor category, enabling richer investigation of what was represented by the associations, including what the risk factor actually measured, what the reference category or comparator was, and whether the association was adjusted for confounders.

## 3. Results

The search found 4464 records. After removing 943 duplicates, 3521 title and abstracts were screened, and 311 full texts assessed for eligibility (See Fig. 1). Sixty-five studies were included (Supplementary Table S1), of which seven [22–28] were abstracts from conference proceedings, six were theses [29–34] and the rest were full-texts from peer-reviewed journals.

Most studies (86.2%) were from the USA [22,24,25,27,29,32,34–56] and Canada [20,23,26,30,31,33,57–77] ( $N = 29$  and  $N = 27$ , respectively), four were Australian [78–81] (6.2%) and the remaining five were from France [82], Korea [83], Spain [28], Turkey [84] and the UK [85]. The oldest study was from 1985 [39] however most studies (86.2%) were published in or after 2010. Most were retrospective observational studies, though there was one quasi-experimental study [41] and three prospective studies [52,61,74].

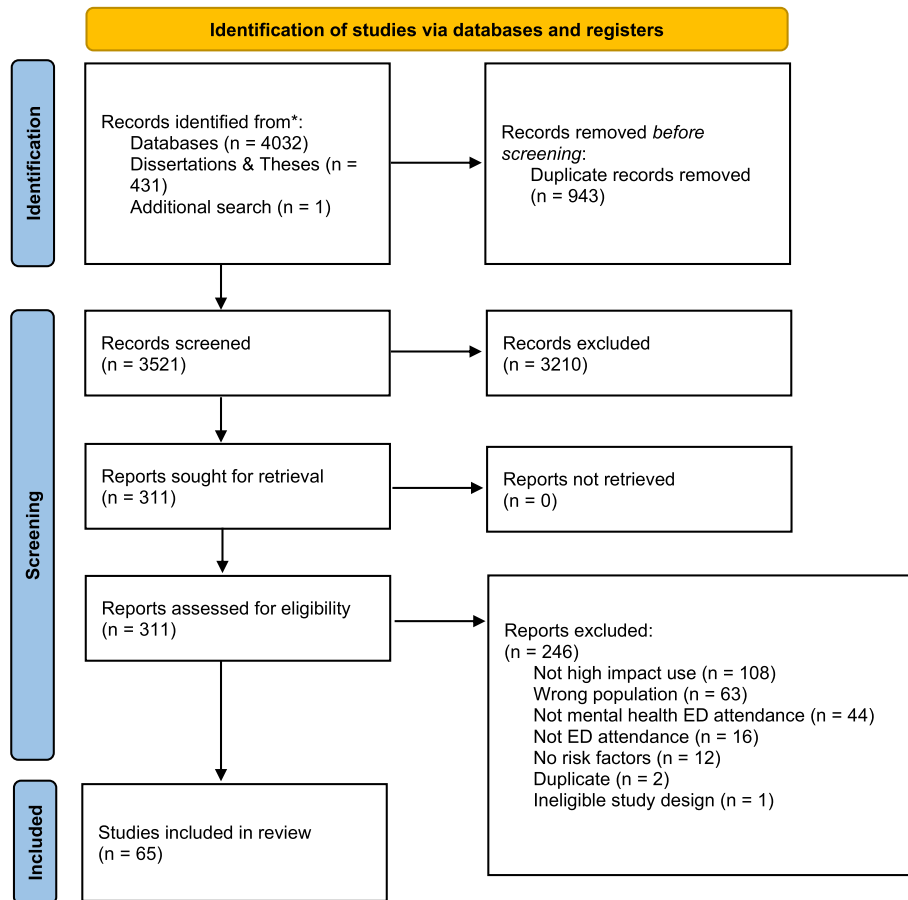


Fig. 1. PRISMA flow diagram of study selection.

### 3.1. Outcome measures

Studies measured high impact use in various ways (Supplementary Table S1). Definitions included categorical measures of single/infrequent/frequent visits, counts of number of visits and rates of return visits. The most common measure was a binary indicator of multiple ED visits (though this could be at least one repeat visit or, for example, four or more visits), within various timeframes. Studies varied in the follow-up period from the index ED visit, with the window for repeat ED visits ranging from 72 h to nine years six months.

Although most studies were clear that all ED visits were for mental health care, some assessed mental health ED visits following a non-mental health index ED visit [24,40] (or vice versa [36,56]). One study [70] also included non-mental health ED visits in its overall count of visits in the year before suicide, though a large proportion of these were for, or had a discharge diagnosis of, self-harm or mental health. These studies were few and were included as they had a mental health focus and were still thought to add value to the results of this review.

### 3.2. Risk factors

Sixty-two studies presented an association between a ‘risk factor’ and a measure of high impact use, although not all tested for statistical significance. One study [42] did not investigate any risk factors for high impact use but did present features (current outpatient mental health provision) of subsequent ED visits compared with index ED visits, thus still offering insight into factors which may be associated with high impact use. Another study [31] presented the number of ED visits (as a proportion visiting three or more times, twice, once, or not at all) for

four different types of primary care models (care provided by: paediatrician, Family Medicine Group, family physicians working independently of a Family Medicine Group, or no primary care), without any significance testing. Whilst not presented as an association between primary care model and high impact use, the data allow for a conclusion to be made about the likelihood of high impact use between primary care models. One study [32], where all participants were high impact users (visiting the ED at least three times), reported that a higher proportion of children making a fourth, fifth and sixth visit to ED for mental health had an outpatient mental health provider than those making a first, second or third visit. Although not presenting a risk factor of high impact use, this study reported a relationship between health care access and the most high impact use.

Risk factors were grouped using the categories shown in Fig. 2. Sex/gender, followed by age, was the most frequently assessed risk factor. Fig. 3 shows the number of studies with a positive, negative, or no association with high impact use. Mental or behavioural health disorders were the most frequently reported risk factor associated with more high impact use, followed by measures of mental health care. Personal/family factors (often representing adverse circumstances) and measures of health insurance were also often associated with more high impact use.

Mental or behavioural health disorders were also the most frequently reported risk factor associated with less high impact use. This is probably because mental/behavioural health disorders were often measured using categorical variables, producing many associations within a study. Fewer studies reported negative associations with high impact use (compared with studies reporting at least one positive association), possibly demonstrating the presence of reporting bias.



**Fig. 2.** Relative frequencies of studies assessing each risk factor category (the area of the square/rectangle is proportional to the number of studies assessing the stated risk factor).

The ten most frequently assessed risk factor categories are presented here in more depth.

### 3.3. Demographic factors

#### 3.3.1. Sex/gender

Sex/gender was the most frequently assessed risk factor ( $N = 35$  studies) [20,26,29,30,33–35,37,39,40,43,46,48,49,52,53,56–59,62,65,66,69–71,73,74,77,79,80,82–85]. Overall, results are inconsistent, though most studies reported no association. Many associations were unadjusted, leaving room for confounding. Results were often presented without an estimate of the association and its confidence interval or a test of statistical significance, as a difference in the proportions of single/multiple ED attenders or as the mean number of ED visits for males and females.

Twelve studies [20,26,30,39,57,59,65,66,69–71,77] reported associations indicating that females had more high impact use than males. Conversely, four studies [29,34,40,71] reported positive associations between being male and high impact use. In one study [71], this association was observed only following stratification by age (in 10-year-olds, rather than 15-year-olds). Twenty-one studies

[33,35,37,39,43,46,48,49,52,53,56,58,62,73,74,79,80,82–85] reported results indicating no association between sex/gender and high impact use.

#### 3.3.2. Age

Age was included by 33 studies [20,24,25,29,30,33–36,40,43,46–49,52,53,56–58,62,63,65,66,69,73,75,77,79,80,82–84], using a variety of continuous, binary and categorical measures. The parameters of this measure varied widely, with some studies including categorical groups of ages as young as ages 0–5 [20] (though the numbers in these young age groups were very small), whereas other studies included older participants (e.g., up to 24 [63]).

Age was the second most commonly assessed risk factor, yet evidence is generally inconclusive. Roughly equal numbers of studies reported adjusted ( $N = 17$ ) and unadjusted ( $N = 16$ ) results. Most studies ( $N = 17$ ) [25,33,43,48,52,53,56,57,62,63,75,77,79,80,82–84] reported no association between age and high impact use. Nine [20,24,35,40,47,65,66,69,73] reported positive associations between older age and high impact use and seven [29,30,36,46,49,58,69] reported negative associations. Two studies [34,77] reported mixed/non-linear associations between categorical measures of age and high impact use.

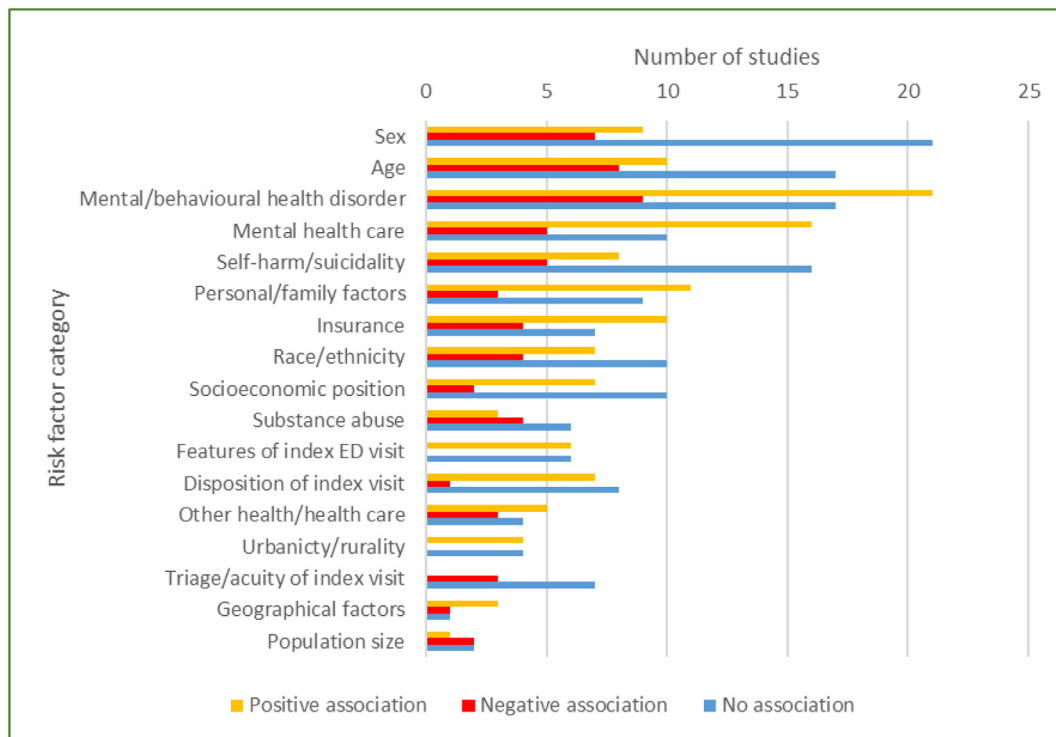


Fig. 3. Number of studies reporting positive, negative and no associations with each risk factor category.

### 3.3.3. Race/ethnicity

Fourteen studies [29,34–37,40,43,46–49,52,53,56] reported associations between race/ethnicity and high impact use. Measures of race/ethnicity were usually categorical, often resulting in several associations per study. Associations were also varied, depending on the measure and reference category, making it difficult to draw conclusions across studies.

Among nine studies [29,34–36,40,43,46,47,53] reporting at least one positive or negative association between race/ethnicity, there were no consistent findings between any racial/ethnic groups and high impact use; associations varied widely without any observable patterns. All but one [34] presented adjusted associations or used weighted samples. Five studies [37,48,49,52,56] found no associations between race/ethnicity and high impact use, presenting a mix of adjusted and unadjusted results.

### 3.4. Socioeconomic position (SEP)

Thirteen studies [20,30,33,46,62,65–67,69,71,72,74,79] reported associations between measures of SEP and high impact use. Measures of SEP were disparate, with some studies using indicators of health care payment status as a proxy for SEP and others using a more direct measure such as income. For measures of area level deprivation, income or educational attainment, no associations or consistent evidence were found, whereas studies using proxy measures for SEP generally showed consistent evidence for positive association between lower SEP and high impact use. However, these studies were all Canadian and from the same authorship group.

#### 3.4.1. Area-level deprivation

Five studies included area-level measures of deprivation [30,46,69,74,79]. One found a positive association between the most deprived category (compared with the least deprived) and high impact use [74], whereas another study reported a negative association between the most deprived category (compared with the least deprived)

and high impact use [46]. A weak, adjusted negative association between greater deprivation and high impact use was reported by another study [69] and the remaining two reported no association [30,79].

#### 3.4.2. Income/educational attainment

Two studies reported no association between family income or caregiver education and high impact use [33,62].

#### 3.4.3. SEP proxy measures

The remaining six studies [20,65–67,71,72] used self-described proxy measures of SEP. These proxy measures were often composite measures of ethnicity and insurance/medical fee-paying status. For example, one categorical measure included 'First Nation Status', 'Human Services Program Recipient' and 'Government Sponsored Program Recipient' categories [66]. These studies all reported that indicators of lower SEP were associated with high impact use. Studies that stratified by age found this association in older adolescents [66,71], and when stratified for sex, this association was observed in females but not males [72].

### 3.5. Mental health related factors

#### 3.5.1. Mental health/behavioural health disorder

The mental/behavioural health disorder category included a diagnosis or reason for visit at either the index or subsequent ED visit(s), or evidence of a previous diagnosis. (See Table 1 for detailed lists of measures of mental/behavioural health disorders). All measures were instances of having/experiencing a disorder, but reference categories varied (including both alternative disorders and no disorders), see Table 1.

Twenty-nine [20,25,26,28,33,34,36,43,47,50–53,55,57,58,62,64–66,68,69,73,74,77,79,82–84] studies included a measure of mental/behavioural health disorder. The results are mixed, although most suggest either positive or no association between having a mental/behavioural health disorder (compared with not) and high impact use. However, as the range of disorders is so wide, it was not possible to identify any

**Table 1**

Measures of mental/behavioural health disorders and associations with high impact use.

Measures of mental/behavioural health disorders associated with more high impact use		Measures of mental/behavioural health disorders associated with less high impact use		Measures of mental/behavioural health disorders not associated with high impact use	
Risk factor and measurement	Reference category	Risk factor and measurement	Reference category	Risk factor and measurement	Reference category
Diagnosis: Bipolar disorder, Psychotic disorder, Anxiety disorder, Behavioural disorder, Co-occurring disorders	Substance use disorder	Mental health need (CANS-MH 3.0): Crime/delinquency, Involvement in treatment Diagnosis: Adjustment disorder	Not actionable	Diagnosis: Depressive disorder, Developmental disorder	Substance use disorder
Psychiatric diagnosis: Disorders resulting from substance abuse, Schizophrenia/schizotypal/delusional disorder, Personality disorders, Disorders onset in childhood, Dual diagnosis, Absence of psychiatric diagnosis Familial psychiatric history		BH diagnosis: ADHD, Episodic mood disorders, Comorbid behavioural health diagnoses	Other BH diagnoses	Psychiatric diagnosis: Mood disorders, Neurotic/stress-related/somatoform disorders, Behavioural syndromes associated with physical factors, Mental retardation, Disorders of psychological development Mental health need (CANS-MH 3.0): Psychosis, Anxiety, Attention deficit/impulse control, Oppositional behaviour, Conduct disorder, Emotional control, Attachment, Adjustment to trauma, Eating disorder, Self-injuring behaviour, Danger to others, Elopement, Sexual aggression, Social behaviour Disruptive behaviour	Not actionable  Not reported
Mental health need (CANS-MH 3.0): Mood	Not actionable	Main diagnosis at first ED visit: Mental/behavioural disorder due to substance abuse Main diagnosis: Mental/behavioural disorder due to substance abuse Main ambulatory diagnosis: Anxiety/stress-related disorder Anxiety diagnosis	Anxiety/stress-related disorder	Mood-related diagnosis at index visit: Mood-related ICD code	
Diagnosis: Conduct/oppositional disorder				Behaviour-related diagnosis at index visit: Behaviour-related ICD code	
Presenting complaint: Threats of harming others			All other diagnoses		
Severity indicator (>2 diagnoses)				Psychosis-related diagnosis at index visit: Psychosis-related ICD code Perceived severity: Strengths and difficulties questionnaire (SDQ) BH diagnosis: Anxiety, dissociative & somatoform disorders, Pervasive developmental disorders Main diagnosis at first ED visit: Behavioural or emotional disorder/syndrome Main diagnosis: Behavioural or emotional disorder/syndrome Main diagnosis: Anxiety/stress-related disorder Reasons for visits: Aggression/violence, Psychotic symptoms, Mood symptoms, Anxiety, Forensic issues	
Severity (HEADS-ED)		MH diagnosis: Eating disorder alone Psychiatric diagnosis: Absence of psychiatric diagnosis	Mood disorder alone		
Main diagnosis at first ED visit: Mood disorder, Schizophrenia or other psychosis-related illness Main diagnosis: Mood disorder, Schizophrenia or other psychotic illness	Anxiety/stress-related disorder				Other BH diagnoses
Main ambulatory diagnosis: Unspecified	All other diagnoses				Anxiety/stress-related disorder
Psychiatric comorbidity indicated at ED visit	No				
Psychiatric diagnoses: Conduct disorder/oppositional defiant disorder, Autism spectrum disorder/intellectual disability, Psychotic disorders, Bipolar disorders, Dissociative disorders	None				Other
Reason for ED visit: Eating disorders	All cause/mental health			Psychiatric diagnoses: ADHD, Depression, Anxiety disorders, Conversion disorder, Disruptive mood dysregulation disorder, OCD, Stress related disorders, Tic disorders, Comorbidity Depression diagnosis	None
Mental disorder: Depressive, Adjustment, Conduct or oppositional defiant, Schizophrenia or psychotic, Other mental disorder, Possible mental disorder Depression diagnosis Mood symptoms History of depression ADHD	Unknown			Prior psychiatric diagnosis Behavioural symptoms History of anxiety Psychiatric diagnosis: Bipolar disorder, Depression, Anxiety, Conduct disorder, Impulse control	

Table 1 (continued)

Measures of mental/behavioural health disorders associated with more high impact use		Measures of mental/behavioural health disorders associated with less high impact use		Measures of mental/behavioural health disorders not associated with high impact use	
Risk factor and measurement	Reference category	Risk factor and measurement	Reference category	Risk factor and measurement	Reference category
Mood disorders				disorder, Oppositional defiant disorder, ADHD	
Number of diagnoses				MH diagnosis: Schizophrenia alone, Schizophrenia and mood disorder, Eating disorder and mood disorder	Mood disorder alone
MH diagnosis (Having ≥1 anxiety/depressive disorder)	No disorder			Having an existing behavioural health concern at the time of the assault	
Discharge diagnosis of depression				ED diagnosis (at first visit): Conduct disorder/mixed disorder of conduct and emotions/hyperkinetic disorder	
Discharge diagnosis of behavioural problem					
Number of psychiatric diagnoses (Multiple diagnoses)	Single diagnosis				

discernible patterns in mental/behavioural health states and high impact use. Studies were roughly split in whether they presented adjusted or unadjusted results.

3.5.2. Substance abuse/misuse

Twelve studies [20,25,27,30,47,57,64,69,73,79,83,84] reported associations between measures of substance (including alcohol) misuse and abuse, and high impact use. These included historical substance use and relevant diagnoses attached to the present ED visit, and reference categories included alternative diagnoses or absence of substance misuse/abuse. Half of these studies presented either a positive or negative association between substance abuse/misuse and high impact use (either compared with no evidence of substance abuse/misuse or with any other behavioural/mental health disorder) [20,47,64,73,79,83]; half reported no association [25,27,30,57,69,84]. Although results are mixed, the evidence leaned towards indicating no association between substance abuse/misuse and high impact use.

3.5.3. Self-harm/suicidality

A total of 21 studies [20,26,30,37,38,43–46,52,56–58,62,64,69,73,79,80,83,84] reported 42 associations between self-harm/suicidality and high impact use. Measures were diverse and included suicide risk, attempts and ideation, and reference categories included both no evidence of self-harm/suicidality and other mental/behavioural health issues.

Eleven studies [26,30,37,44–46,52,58,69,73,83] reported at least one positive or negative association between self-harm/suicidality and high impact use. There were no discernible patterns in the measures associated with high impact use, and most of these were not adjusted for confounders. Sixteen [20,37,38,43,44,46,56,57,62,64,69,73,79,80,83,84] reported no associations between self-harm/suicidality and high impact use, thus there were more null associations than positive and negative combined.

3.5.4. Mental health care

Twenty-five studies [28–30,41,43,44,46,47,51–54,56–58,60–62,66,72–74,79,83,84] assessed 67 associations between mental health care and high impact use. Most reported associations between accessing care, in various forms, and high impact use. This was a varied category of risk factor and included historical access to mental health care (including admissions, ED, and outpatient care), interventions associated with the present high impact use, use of psychological treatment and mental health follow-ups to the index visit. Descriptions of the measures of

mental health care are provided, with reference categories, in Table 2. There was more evidence to suggest that increased access to mental health care, of varying descriptions, was associated with high impact use, as sixteen studies [29,30,43,44,46,47,52,53,57,62,66,72–74,83,84] reported positive associations between accessing (or receiving) mental health care and high impact use.

Five studies [41,47,58,61,66] reported negative associations between accessing mental health care and high impact use. Two of these [41,61] were evaluating a mental health care intervention. Ten studies [30,46,51–54,56,60,66,79] reported no association between mental health care and high impact use. Two of these were evaluating a mental health care service or interventions [53,54].

3.6. Personal/family factors

Sixteen [25,27,28,37,43,46,49,52,57,58,62,69,73,78,79,83] studies assessed associations between personal/family factors and high impact use. This category included factors such as history of abuse, care involvement, immigration factors, and legal issues, but were generally adverse circumstances. Twelve [25,27,28,37,57,58,62,69,73,78,79,83] reported positive or negative associations between personal/family factors and high impact use; most of these associations being positive ( $N = 16$ ) rather than negative ( $N = 3$ ).

Results were fairly consistent for history of abuse, as four studies [25,27,73,83] reported positive associations with high impact use, though none were adjusted. Two studies [25,27] reported negative associations between having two biological parents at home and high impact use. Otherwise, results were mixed. Conflicting evidence was observed across some studies. For example, having been in some form of foster care or children's services was associated with high impact use in five studies [37,57,58,69,73] while three studies reported no association [37,43,62].

3.7. Medical insurance

Fourteen [22,24,29,34–37,40,43,46,48,52,53,56] studies reported 29 associations between a measure of medical/health insurance (including having health insurance and alternative forms of provision, such as self-payment or state-funded) and high impact use. Terms describing different insurance statuses varied, such as 'government' and 'public' insurance, and included references to specific schemes or providers, such as Medicaid and the Affordable Care Act. Some studies combined groups (e.g., "public/no insurance") that other studies analysed separately, making it difficult to draw conclusions.

**Table 2**

Measures of mental health care and associations with high impact use

Measures of mental health care associated with more high impact use		Measures of mental health care associated with less high impact use		Measures of mental health care not associated with high impact use	
Risk factor and measurement	Reference category	Risk factor and measurement	Reference category	Risk factor and measurement	Reference category
History of psychiatric treatment		Receiving outpatient treatment		Past psychiatric treatment	
History of psychiatric admission		Compliant with outpatient follow-up		Mental health ED visits before index visit: Any mental health visit, Any attention/conduct disorder visit, Any substance use visit, Any assault injury visit, Any unintentional injury visit, Any somatic complaint visit	
Previous psychiatric hospitalisation		Mobile crisis service attendance		Outpatient psychiatric service: ERFUT (emergency room follow-up team) service introduction	
Currently taking psychotropic medications		HEARTSMAP intervention		Physician type at follow-up visit: Paediatrician	General practitioner
Past psychiatric emergency visit		Prescription patterns: Other prescription pattern	No treatment with psychotropic medication	Facility type of physician practice: Mental health services facility	Practitioner's office
Mental health ED visits before index visit: Any anxiety disorder visit, Any mood disorder visit, Any psychotic disorder visit		Facility type of physician practice: Other	Practitioner's office	Prior mental health provider	
In current mental health treatment				Had difficulty obtaining/attending appointment	
History of psychiatric hospitalisation				Aggressive behaviour team called	
Post-index visit MH service utilisation				Enrolment in care management entity	Usual care
Prior psychiatric hospitalisation				Any concomitant use of antipsychotics	
Prescription patterns:	No treatment with psychotropic medication			ED intervention: New ED model of care for patients featuring dedicated MH team based in ED (the team performs MH evaluations, coordinates care, helps implement behavioural interventions, and provides brief psychoeducation to patients and families)	Pre-intervention
Previous/singular/stable prescription				Referral to mental health service by the sexual assault response team at the time of the assault	
Recent history of ED mental health care (6 months prior)				Inpatient psychiatry: Yes/No	Not admitted (not applicable)
Physician follow-up visit for mental health care					
Physician type at follow-up visit: Psychiatrist, Other	General practitioner				
Facility type of physician practice: Hospital-based outpatient clinic	Practitioner's office				
History of mental health contact					
Prior psychiatric admission					
Facility type where follow-up visit occurred: Hospital-based outpatient care	No visit/community mental health facility/practitioner's office/other				
History mental health professional					
Number of prior visits or hospitalisations					
Mental health admissions age 12–16/17–18: 1, 2, 3	0				
Mental health visits by speciality age 17–18: Psychiatrist (any), Family physician and/or paediatrician	No mental health visits				
History of ED visits: Any ED visit, Anxiety, Mood disorder, Psychotic disorder, Alcohol use, Substance use					
Ambulatory mental health service use: Includes psychiatrist, Other speciality only					
In hospital mental health service use: Includes inpatient admission(s), Emergency department presentation (s) only					

Ten studies [22,24,29,34,35,37,40,46,48,56] reported at least one positive association between an insurance measure and high impact use. Most associations (11/12) used private/commercial health insurance as the reference group, indicating that using public insurance or a governmental provider or having no insurance, compared with having private insurance, was associated with high impact use. Most studies ( $N = 6$ ) reported adjusted analyses.

There was some mixed evidence; two studies [35,46] reported (adjusted) negative associations between having no insurance, compared with private insurance, and high impact use. Seven studies [22,29,37,43,46,52,53] reported no association between various measures of insurance and high impact use, but the categories and reference categories did not indicate as clear a pattern as the positive associations.

### 3.8. Factors related to ED usage

#### 3.8.1. Features of the index ED visit

Eleven studies [20,23,26,56–58,62,64,77,79,81] reported associations between features of the index ED visit and high impact use. Factors varied and were all either positively or not associated with high impact use. Consistent, though scant, evidence was reported for overnight ED presentations, but otherwise no patterns emerged. Most studies ( $N = 7$ ) presented unadjusted associations only.

Factors positively associated with high impact use include: overnight ED presentations [26,58], visits in the year 2020 (compared with 2019) [81], visiting a general rather than paediatric ED [20], having a risk assessment by psychiatry [77], and involuntary rather than voluntary ED presentations [23]. Attending ED as a walk-in patient or with police (compared with by ambulance), accessing care from more than one mental health professional or having a consultation with a psychiatrist at the index visit [57], lengths of stay  $>5.5$  h or greater satisfaction with care during the index visit [62], visiting a paediatric or general ED [64], weekend or overnight presentations [77] and presentations in the year 2018 (compared with 2017) were all reported not to be associated with high impact use.

#### 3.8.2. Disposition of ED visit

A total of 10 studies [26,29,36,43,46,56,58,77,79,83] reported associations between disposition from ED and high impact use. Disposition from ED describes exit routes from ED, such as transfer to another department/service, or discharge/self-discharge, hence it is a diverse risk factor. Many measures were categorical meaning one study may have presented associations for several ED dispositions. Apart from fairly consistent findings that hospital admission (following the index ED visit) was positively associated with high impact use, there were no evident patterns across studies, possibly due to the range of measures and reference categories assessed. Half [29,36,43,46,77] presented adjusted analyses.

**3.8.2.1. Admitted to hospital/another health care setting.** Reports of associations between transfer to different health care setting (from ED) and high impact use were generally conflicting. Two studies [36,77] reported transfer to psychiatric care was positively associated (and transfer to non-psychiatric care was not associated) with high impact use; however, another study [83] found no association between transfer to psychiatric care and high impact use, and a negative association between transfer to non-psychiatric care and high impact use. One study [77] reported that admission to inpatient psychiatry was positively associated with high impact use whilst transfer to a mental health assessment or other inpatient unit was not associated with high impact use.

Five other studies [26,29,43,46,58] presented associations between hospital admission and high impact use, four of which reported positive associations [26,29,46,58] and the remaining one [43] finding no association.

**3.8.2.2. Discharged home/left against medical advice.** One study [83] reported a positive association between patient discharge with a follow-up outpatient visit and high impact use and a negative association with discharge without a follow-up outpatient visit. Another study [29] reported a positive association between leaving the ED against medical advice and high impact use; a further three studies [36,56,79] found no association with discharge home/self-discharge.

## 4. Discussion

### 4.1. Summary of findings

In this scoping review of risk factors for high impact use in adolescents with mental health crises, we identified 65 studies meeting

eligibility criteria, which were intentionally broad. The resulting evidence base is diverse, including a wide range of risk factor measurements and measures of high impact use, making it difficult to draw firm conclusions on which features, if any, most strongly influence or are associated with high impact use.

Sex/gender and age were the most frequently assessed risk factors, but there was no consistent evidence of a relationship between sex/gender and high impact use. Measures of mental/behavioural health disorders were disparate, including a wide range of disorders and measures. Given that all studies examined ED visits for mental health, it is assumed that all participants experienced at least symptoms (if not a diagnosis) of mental/behavioural health disorder. However, there were no common themes or patterns in the reported associations, and it was difficult to make a broad conclusion across this category of risk factor.

Measures of previously or concurrently accessing mental health care were associated with high impact use. However, as this included a wide range of facets of care it is not possible to make an overarching conclusion. The remaining evidence base was mixed; although many common factors were identified in the literature, none were uniformly predictive of high impact use.

In comparison to a previous systematic review of factors associated with repeat ED use for mental health in adolescents published in 2017 [17], this review adds to the evidence as it was more inclusive, thus including more studies and a wider body of evidence. The Leon et al. review excluded studies where ED disposition was psychiatric hospital, where there was a repeat suicide attempt, or the reason for the ED visit was drug or alcohol abuse. Our decision to include substance use disorders was made after initial scoping work demonstrated that many studies investigating mental health ED use included visits for substance use, and reported substance use as the most common reason for visiting the ED [86]. The Leon et al. review concluded that older age, female sex, lower SEP, ethnic minority status, and past or current mental health service use were associated with more repeat visits. These findings have not been replicated in the present review. However, the Leon et al. review included only 11 studies, a smaller and more homogeneous body of evidence to draw conclusions from, whereas this scoping review included a heterogeneous group of 65 studies, perhaps trading-off succinct summary of results.

This review highlights previously assessed factors, and those for which there is a paucity of evidence. There were relatively few socioeconomic measures identified, and where reported it was most often a measure of insurance status. There was a lack of educational measures, possibly because of study design, most of which used routinely collected data from health care records.

It is difficult and probably inappropriate to make generalisations about health care pathways across the globe. Some populations, including those where mental health disorders are more prevalent (e.g., immigrants, homeless, individuals with less social capital and with a history of adverse childhood experiences [87–89]) may be less able to navigate local health care systems and access the most appropriate timely care [86]. There may be an inevitability in ED visits for mental health crises, even high impact use.

Though we did not assess study quality or risk of bias, we observed varied analytical methods. The rigour of analytical methods varied across studies. Information was extracted on how data were analysed, including whether associations were adjusted or not. Extracted and synthesised results ranged from fully adjusted associations, with efforts made to control for the many confounding variables, to a crude presentation of the mean number of ED visits, or proportion of high impact users, between demographic or clinical groups. Study quality or risk of bias was not assessed as this is not commonly done in scoping reviews [18]. Whether the reported associations were adjusted for confounders was recorded and adjusted results were selected when they were available.

Studies using robust methods to assess factors predictive of high impact use in adolescents are missing from the evidence base. For instance,

no studies using a predictive modelling approach were found. One study used these methods to predict repeat ED attendance for mental health care in adults [90], but this was a gap in the evidence for adolescents and should be addressed in future research.

#### 4.2. Limitations

A potential limitation was inclusion of 31 studies [20,25,27,31,32,34,37,38,41–43,47–49,53,56,57,62,64–67,71,73,76,79–82,84,91] which had a proportion of participants aged under 10 years. However, either the mean age or majority of participants were aged between 10 and 25 years, and their exclusion would have limited the evidence. The purpose of scoping reviews is to describe the breadth of the evidence hence, on balance, these studies were included.

The diversity of included studies limits results synthesis and ability to draw conclusions, particularly where the evidence is so mixed. Although we acknowledge difficulties in summarising the evidence as a limitation, this was, at least in part, a result of not excluding studies based on country or ED setting. Emergency services, including those accessed for mental health care, vary in organisation and provision across and within countries [92].

Not assessing study quality is a general limitation of scoping reviews. Studies of lower quality, or with a risk of bias, were not excluded from the review, which could also have contributed to the wide and disparate evidence base we found and attempted to synthesise in our review.

It was also a challenge to define high impact use; our definition of high impact use (at least one repeat visit) is not in line with other definitions of high impact use (which may be as frequent as up to five times per year [93]). However, as this is a broad scoping review, we did not want to exclude studies that had a lower threshold, as these will still have included participants with much more frequent ED attendance, and because the studied risk factors may be relevant for both the lower and higher frequency ED attenders among the population of interest.

#### 4.3. Conclusion

Despite identifying a large evidence base, no key factors that were uniformly predictive of high impact ED use for mental health in adolescents were identified. However, this review may be used to inform future research in this field, as it describes measures previously assessed as risk factors, and whether and how these were associated with high impact use. Using the most often studied risk factors identified by this scoping review, a systematic review and meta-analysis may quantitatively evaluate the strength of associations.

Using high quality routinely collected data, more robust studies are needed to identify reliable factors associated with high impact use. More research outside of North America is needed, as these studies dominated this review. Country-specific research would be beneficial, given heterogeneity of health care systems globally. It was clear from studies included in this review that high impact use of EDs is widespread; in an age when EDs are under increasing pressure it is essential to find ways to alleviate this strain. However, this must be achieved without adversely impacting this vulnerable patient group, and further research to identify those most in need and evaluate potential interventions is required to guide primary prevention of high impact ED use.

#### Financial support

This study was funded by the NIHR Applied Research Collaboration West (ARC West) at University Hospitals Bristol and Weston NHS Foundation Trust. The views expressed in this article are those of the authors and do not necessarily represent those of the NHS, the NIHR, or the Department of Health and Social Care.

#### CRediT authorship contribution statement

**Rebecca Wilson:** Writing – review & editing, Writing – original draft, Project administration, Formal analysis, Data curation. **Alice Jennings:** Writing – review & editing, Formal analysis, Data curation. **Maria Theresa Redaniel:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization. **Kithsiri Samarakoon:** Writing – review & editing, Data curation. **Sarah Dawson:** Data curation, Resources, Writing – review & editing. **Mark D. Lyttle:** Conceptualization, Writing – review & editing. **Jelena Savović:** Conceptualization, Formal analysis, Funding acquisition, Methodology, Supervision, Writing – review & editing. **Behnaz Schofield:** Conceptualization, Formal analysis, Project administration, Supervision, Writing – review & editing.

#### Declaration of competing interest

RW, AJ, MTR, KS, SD, MDL, JS, BS report no conflicts of interest.

#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ajem.2024.04.018>.

#### References

- [1] Baracaia S, McNulty D, Baldwin S, Mytton J, Evison F, Raine R, et al. Mental health in hospital emergency departments: cross-sectional analysis of attendances in England 2013/2014. *Emergency Medicine Journal BMJ Publishing Group Ltd and the British Association for Accident & Emergency Medicine*. 2020;37:744–51.
- [2] Say DF, Carison A, Hill A, Hiscock H, Bahl FE, O'Donnell SM. Mental health presentations to the paediatric emergency department: a retrospective study. *J Paediatr Child Health*. 2021;57(5):684–95.
- [3] De Girolamo G, Dagani J, Purcell R, Cocchi A, McGorry PD. Age of onset of mental disorders and use of mental health services: needs, opportunities and obstacles. *Epidemiol Psychiatr Sci [Internet]*. 2012;21(1):47–57. [cited 2023 Jun 22]. Available from: <https://www.cambridge.org/core/journals/epidemiology-and-psychiatric-sciences/article/age-of-onset-of-mental-disorders-and-use-of-mental-health-services-needs-opportunities-and-obstacles/FF4B10C48A243F0D354161FE36029E1B>.
- [4] Jones PB. Adult mental health disorders and their age at onset. *Br J Psychiatry*. 2013; 202.
- [5] Bommersbach TJ, McKean AJ, Olsson M, Rhee TG. National Trends in mental health-related emergency department visits among youth, 2011–2020. *JAMA*. 2023;329(17):1469–77. May 2.
- [6] NHS England. A&E attendances for mental health concerns [Internet]. [cited 2024 Feb 22]. Available from: <https://digital.nhs.uk/supplementary-information/2021/ae-attendances-for-mental-health-concerns>; 2021.
- [7] Beaudry G, Drouin O, Gravel J, Smyrnova A, Bender A, Orri M, et al. A comparative analysis of pediatric mental health-related emergency department utilization in Montréal, Canada, before and during the COVID-19 pandemic. *Ann Gen Psychiatry [Internet]*. 2022;21(1):1–10. Dec 1 [cited 2024 Feb 22]. Available from: <https://annals-general-psychiatry.biomedcentral.com/articles/10.1186/s12991-022-00398-y>.
- [8] Gandhi S, Chiu M, Lam K, Cairney JC, Guttman A, Kurdyak P. Mental Health Service Use Among Children and Youth in Ontario: Population-Based Trends Over Time Utilisation des services de santé mentale par les enfants et les adolescents de l'Ontario : tendances dans la population au fil du temps. *The Canadian Journal of Psychiatry / La Revue Canadienne de Psychiatrie*. 2016;61(2):119–24.
- [9] LaCalle EJ, Rabin EJ, Genes NG. High-frequency users of emergency department care. *J Emergency Med [Internet]*. 2013;44:1167–73. Available from: <https://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emed14&AN=52476421https://libkey.io/libraries/1108/openurl?genre=article&aulast=LaCalle&issn=0736-4679&title=Journal+of+Emergency+Medicine&title=High-frequency+users+of+emergency+department+care&volume=44&issue=6&epage=1167&epage=1173&date=2013&doi=10.1016%2Fj.jemermed.2012.11.042&pmid=23473816&sid=OVID:embase>.
- [10] Gay A, Peyrard M, Pineau P, Pellet J, Trombert-Pavot B, Massoubre C. Risk factors for return visits and rehospitalizations to the child emergency psychiatric unit: a retrospective study over 2 years at saint-Etienne university hospital. *Encephale*. 2019;45(6):468–73.
- [11] Azar KMJ, Petersen JP, Shen Z, Nasrallah C, Pesa J, LaMori J, et al. Serious mental illness and health-related factors associated with regional emergency department utilization. *Popul Health Manag [Internet]*. 2020;23(6):430–7. Available from: <https://search.ebscohost.com/login.aspx?direct=true&db=cin20&AN=147345944&site=ehost-live>.
- [12] Ahn E, Kim J, Rahman K, Baldacchino T, Baird C. Development of a risk predictive scoring system to identify patients at risk of representation to emergency department: a retrospective population-based analysis in Australia. *BMJ Open*. 2018;8(9):e021323.

- [16] Bobashev G, Warren L, Wu LT. Predictive model of multiple emergency department visits among adults: analysis of the data from the National Survey of drug use and health (NSDUH). *BMC Health Serv Res*. 2021;21(1):1–10. Dec 1.
- [17] Leon SL, Cloutier P, Polihronis C, Zemek R, Newton AS, Gray C, et al. Child and adolescent mental health repeat visits to the emergency department: a systematic review. *Hosp Pediatr*. 2017;7(3):177–86.
- [18] Peters MDJ, Godfrey CM, Khalil H, McInerney P, Parker D, Soares CB. Guidance for conducting systematic scoping reviews. *Int J Evid Based Healthc*. 2015;13(3):141–6.
- [19] Sawyer SM, Azzopardi PS, Wickremaratne D, Patton GC. The age of adolescence. *Lancet Child Adolesc Health*. 2018;2(3):223–8. Mar 1.
- [20] Newton AS, Ali S, Johnson DW, Haines C, Rosychuk RJ, Keaschuk RA, et al. Who comes back? Characteristics and predictors of return to emergency department services for pediatric mental health care. *Acad Emerg Med*. 2010;17(2):177–86. Feb.
- [21] StataCorp. Stata statistical software: Release 17. College Station, TX: StataCorp LLC; 2021.
- [22] Burns C. Decreased emergency department utilization by young adult frequent users under health care reform. *Acad Emerg Med*. 2014;21(5):S223.
- [23] Gray C, Cloutier P, Thomson B, Chan E, Reid S, Beaudry E. Involuntary patients in the pediatric emergency department: a retrospective chart review. *J Am Acad Child Adolesc Psychiatry* [Internet]. 2018;57(10) [cited 2023 Apr 18]. S223–S223. Available from: <https://www.jaacap.org/pb/assets/raw/Health%20Advance/journals/jaac/suppl2018-1651244627370.pdf>.
- [24] Hersh M, Fang A, Saynina O, Wang N. Could we have predicted this? Association of youth low-acuity emergency department visits with mental health. *Acad Emerg Med*. 2020;27:S24.
- [25] Pasha S, Yogendran LV, Hany M, Chaucer B, Kaur S, Janusz C. Protective and risk factors associated with psychiatric emergency department visits and admissions among the child and adolescent population. *Journal of the American Academy of Child & Adolescent Psychiatry*. Elsevier BV; 2016.
- [26] Rosic T, Duncan L, Ma J, Eltoriki M, Bennett K, Brotherston L, et al. Time to repeat ED visit for pediatric mental health concerns. *J Can Acad Child Adolesc Psychiatry*. 2020;29(4):261.
- [27] Yogendran L, Hany M, Chaucer B, Pasha S, Kaur S, Janusz C. The effects of abuse and substance use on emergency department visits and hospital admissions among child and adolescent patients. *Pediatrics*. 2018;310.
- [28] Sague Vilavella M, Anmella G, Madero S, Pinzon J, Gimenez A, Pons M, et al. Adult and pediatric frequent attenders in the psychiatric emergency department: impact and characteristics in a tertiary referral hospital. *Eur Psychiatry*. 2019;56:S391.
- [29] Allen K. Behavioural Health in a Rural Setting: Understanding Access, Availability and Acceptability of Care and Services; 2018.
- [30] Bethell JM. Child and Adolescent Emergency Department Presentations For Self-Harm: Population-Based Data From Ontario, Canada; 2012.
- [31] Cartman G. The Impact of Primary Care on First Mental Health Contact For Children and Adolescents: A Population-Based Cross-Sectional Cohort Study in Québec, Canada; 2019.
- [32] Hale A. Trends in Pediatric Psychiatric Emergency Room Visits For Mental Health Related Symptoms; 2009.
- [33] Liu S. Patient and Treatment Characteristics of Children And Youth Who Visit The Emergency Department For a Behavioural Disorder; 2013.
- [34] Oblath R. Utilization of Mental Health Services Among Urban Youth With Emotional and Behavioral Disorders: Racial/Ethnic Differences in Emergency Department And Outpatient Visits; 2020.
- [35] Abrams AH, Badolato GM, Boyle MD, McCarter R, Goyal MK. Racial and ethnic disparities in pediatric mental health-related emergency department visits. *Pediatr Emerg Care* [Internet]. 2022;38(1) e214–8. Available from: <http://links.lww.com/PEC/A601>.
- [36] Aratani Y, Addy S. Disparities in repeat visits to emergency departments among transition-age youths with mental health needs. *Psychiatr Serv*. 2014;65:685–8.
- [37] Ballard ED, Horowitz LM, Jobs DA, Wagner BM, Pao M, Teach SJ. Association of positive responses to suicide screening questions with hospital admission and repeated emergency department visits in children and adolescents. *Pediatr Emerg Care*. 2013;29(10):1070–4. Oct.
- [38] Ballard ED, Cwik M, Van Eck K, Goldstein M, Alfes C, Wilson ME, et al. Identification of at-risk youth by suicide screening in a pediatric emergency department. *Prev Sci*. 2017;18(2):174–82. Feb 1.
- [39] Deykin EY, Perlow R, McNamara J. Non-fatal suicidal and life-threatening behavior among 13- to 17-year old adolescents seeking emergency medical care. *Am J Public Health*. 1985;75(1):90–2.
- [40] Fang A, Hersh M, Birgisson N, Saynina O, Wang NE. “Could we have predicted this?” the association of a future mental health need in young people with a non-specific complaint and frequent emergency department visits. *J Am Coll Emerg Physicians Open*. 2021;2(5) Oct.
- [41] Fendrich M, Ives M, Kurz B, Becker J, Vanderploeg J, Bory C, et al. Impact of mobile crisis services on emergency department use among youths with behavioral health service needs. *Psychiatr Serv*. 2019;70(10):881–7.
- [42] Frosch E, dosReis S, Maloney K. Connections to outpatient mental health care of youths with repeat emergency department visits for psychiatric crises. *Psychiatr Serv*. 2011;62(6):646–9.
- [43] Goldstein A, Frosch E, Davarya S, Leaf P. Factors associated with a six-month return to emergency services among child and adolescent psychiatric patients. *Psychiatr Serv*. 2007;58(11):1489–92.
- [44] Gipson PY, Agarwala P, Opperman KJ, Horwitz A, King CA. Columbia-suicide severity rating scale: predictive validity with adolescent psychiatric emergency patients. *Pediatr Emerg Care*. 2015;31(2):88–94. Feb 13.
- [45] Goldman-Mellor S, Phillips D, Brown P, Gruenewald P, Cerdá M, Wiebe D. Emergency department use and inpatient admissions and costs among adolescents with deliberate self-harm: a five-year follow-up study. *Psychiatr Serv*. 2020;71(2):136–43. Feb 1.
- [46] Goldman-Mellor S, Kwan K, Boyajian J, Gruenewald P, Brown P, Wiebe D, et al. Predictors of self-harm emergency department visits in adolescents: a statewide longitudinal study. *Gen Hosp Psychiatry*. 2019;1(56):28–35. Jan.
- [47] Lynch S, Pines J, Mutter R, Teich JL, Hendry P. Characterizing behavioral health-related emergency department utilization among children with Medicaid: comparing high and low frequency utilizers. *Soc Work Health Care*. 2019;58(8):807–24.
- [48] Pickner WJ, Puumala SE, Chaudhary KR, Burgess KM, Payne NR, Kharbada AB. Emergency department utilization for mental health in American Indian children. *J Pediatr*. 2016;1(174):226–231.e3. Jul.
- [49] Portley R, North CS. Are there differences in pediatric psychiatric emergency department patients related to utilization frequency? *Pediatr Emerg Care*. 2021;37(12) Jan 1. e1295–8.
- [50] Richardson LP, Russo JE, Lozano P, McCauley E, Katon W. The effect of comorbid anxiety and depressive disorders on health care utilization and costs among adolescents with asthma. *Gen Hosp Psychiatry*. 2008;30(5):398–406. Sep.
- [51] Robinson E, Ketterer T, Molnar J, DiGirolamo S, Rockey A, Brennan B, et al. Emergency department visits for behavioral health concerns after sexual assault: a retrospective mixed methods study. *Pediatr Emerg Care* [Internet]. 2021;37:c1251–4. Available from: [www.pec-online.com](http://www.pec-online.com).
- [52] Sobolewski B, Richey L, Kowatch RA, Grupp-Phelan J. Mental health follow-up among adolescents with suicidal behaviors after emergency department discharge. *Arch Suicide Res*. 2013 Oct;17(4):323–34.
- [53] Tai MH, Lee B, Onukwugha E, Zito JM, Reeves GM, Dos Reis S. Impact of a care management entity on use of psychiatric services among youths with severe mental or behavioral disorders. *Psychiatr Serv*. 2018;69(11):1167–74. Nov 1.
- [54] Uspal NG, Rutman LE, Kodish I, Moore A, Migita RT. Use of a dedicated, non-physician-led mental health team to reduce pediatric emergency department lengths of stay. *Acad Emerg Med*. 2016;23(4):440–7. Apr 1.
- [55] Burns C, Wang NE, Goldstein BA, Hernandez-Boussard T. Characterization of young adult emergency department users: evidence to guide policy. *J Adolesc Health*. 2016;59(6):654–61. Dec 1.
- [56] Caffy K, Jones TL, Gilmore BG. A collaborative behavioral model for psychiatric visits in a pediatric emergency department. *Pediatr Emerg Care* [Internet]. 2019;35(7):461–7. Available from: [www.pec-online.com](http://www.pec-online.com).
- [57] Cloutier P, Thibedeau N, Barrowman N, Gray C, Kennedy A, Leon SL, et al. Predictors of repeated visits to a pediatric emergency department crisis intervention program. *Can J Emerg Med*. 2017;19(2):122–30. Mar 1.
- [58] Cole W, Turgay A, Moulden G. Repeated use of psychiatric emergency services by children. *Can J Psychiatry*. 1991;36(10):739–42.
- [59] Gontijo Guerra S, Vasiliadis HM. Gender differences in youth suicide and healthcare service use. *Crisis*. 2016;37(4):290–8.
- [60] Greenfield B, Hechtman L, Tremblay C. Short-term efficacy of interventions by a youth crisis team. *Can J Psychiatry*. 1995;40(6):320–4.
- [61] Ishikawa T, Chin B, Meckler G, Hay C, Doan Q. Reducing length of stay and return visits for emergency department pediatric mental health presentations. *Can J Emerg Med*. 2021;23(1):103–10. Jan 1.
- [62] Leon SL, Polihronis C, Cloutier P, Zemek R, Newton AS, Gray C, et al. Family factors and repeat pediatric emergency department visits for mental health: a retrospective cohort study. *J Can Acad Child Adolesc Psychiatry*. 2019;28(1):9–20.
- [63] Mazhar MN, Lau F, Van Wassen C, Bajaj N, Hassan T, Munshi T, et al. A retrospective hospital database analysis on substance use-related emergency department visits in an Ontario university-affiliated hospital setting. *Canadian J Addic*. 2016;7:22–7.
- [64] Newton AS, Ali S, Johnson DW, Haines C, Rosychuk RJ, Keaschuk RA, et al. A 4-year review of pediatric mental health emergencies in Alberta. *Can J Emerg Med*. 2009;11(5):447–54.
- [65] Newton AS, Rosychuk RJ, Dong K, Curran J, Slomp M, McGrath PJ. Emergency health care use and follow-up among sociodemographic groups of children who visit emergency departments for mental health crises. *Can Med Assoc J*. 2012;184(12):E665–74. Sep 4.
- [66] Newton AS, Rosychuk RJ, Niu X, Radomski AD, McGrath PJ. Predicting time to emergency department return for anxiety disorders and acute stress reactions in children and adolescents: a cohort study. *Soc Psychiatry Psychiatr Epidemiol*. 2015;50(8):1199–206. Aug 31.
- [67] Newton AS, Rosychuk RJ, Niu X, Radomski AD, McGrath PJ. Emergency department use and Postvisit Care for Anxiety and Stress Disorders among Children: a population-based cohort study in Alberta, Canada. *Pediatr Emerg Care* [Internet]. 2016;32(10):658–63. Available from: [www.pec-online.com](http://www.pec-online.com).
- [68] Redekopp C, Dimitropoulos G, Patten S, Kassam A. Considering a risk profile based on emergency department utilization in young people with eating disorders: implications for early detection. *Int J Eat Disord*. 2022;55(9):1219–28. Sep 1.
- [69] Rhodes AE, Boyle MH, Bethell J, Wekerle C, Tonmyr L, Goodman D, et al. Child maltreatment and repeat presentations to the emergency department for suicide-related behaviors. *Child Abuse Negl*. 2013;37(2–3):139–49. Feb.
- [70] Rhodes AE, Khan S, Michael, Boyle H, Tonmyr L, Wekerle C, et al. Sex differences in suicides among children and youth: the potential impact of help-seeking behaviour. *Canadian J Psych* [Internet]. 2013;58(5):274–82. Available from: [www.TheCJP.ca](http://www.TheCJP.ca).
- [71] Rosychuk RJ, Newton AS, Hu XJ. Age affects the impact of important predictors on mental health emergency department visits. *J Behav Health Serv Res*. 2019;46(4):625–35. Oct 1.
- [72] Soleimani A, Rosychuk RJ, Newton AS. Predicting time to emergency department revisits and inpatient hospitalization among adolescents who visited an emergency department for psychotic symptoms: a retrospective cohort study. *BMC Psychiatry*. 2016;16(1) Nov 9.

- [73] Stewart SE, Manion IG, Davidson S, Cloutier P. Suicidal children and adolescents with first emergency room presentations: predictors of six-month outcome. *J Am Acad Child Adolesc Psychiatry*. 2001;40(5):580–7.
- [74] Toulany A, Stukel TA, Kurdyak P, Fu L, Guttman A. Association of Primary Care Continuity with outcomes following transition to adult Care for Adolescents with severe mental illness. *JAMA Netw Open*. 2019;2(8) Aug 2.
- [75] Penzenstadler L, Gentil L, Huynh C, Grenier G, Fleury MJ. Variables associated with low, moderate and high emergency department use among patients with substance-related disorders. *Drug Alcohol Depend*. 2020;1:207. Feb.
- [76] Yu AY, Rosychuk RJ, Newton AS. Clinical acuity of repeat pediatric mental health presentations to the emergency department. *J Canadian Acad Child and Adol Psych [Internet]*. 2011;20(3):208–13. Available from: [www.who.int/classification/icd/en/](http://www.who.int/classification/icd/en/).
- [77] Rosic T, Duncan L, Wang L, Eltorik M, Boyle M, Sassi R, et al. Trends and predictors of repeat mental health visits to a pediatric emergency Department in Hamilton, Ontario. *J Can Acad Child Adolesc Psychiatry*. 2019;28(2):82–90.
- [78] Russell M, Soong W, Nicholls C, Griffiths J, Curtis K, Follett D, et al. Homelessness youth and mental health service utilization: a long-term follow-up study. *Early Interv Psychiatry*. 2021;15(3):563–8. Jun 1.
- [79] Summers P, O'Loughlin R, O'Donnell S, Borschmann R, Carlin J, Hiscok H. Repeated presentation of children and adolescents to the emergency department following self-harm: a retrospective audit of hospital data. *Emerg Med Australas*. 2020;32(2):320–6. Apr 1.
- [80] Woolfenden S, Dossetor D, Nunn K, Williams K. The presentation of aggressive children and adolescents to emergency departments in Western Sydney. *Child Health*. 2003;39:651–3.
- [81] Carison A, Babl FE, O'Donnell SM. Increased paediatric emergency mental health and suicidality presentations during COVID-19 stay at home restrictions. *Emerg Med Australas*. 2022;34(1):85–91. Feb 1.
- [82] Boyer L, Henry JM, Samuelian JC, Belzeaux R, Auquier P, Lancon C, et al. Mental disorders among children and adolescents admitted to a French psychiatric emergency service. *Emerg Med Int*. 2013;2013:1–7.
- [83] Cheon J, Oh D, Lee J, Ahn J, Song DH, Cheon KA. Increasing trend and characteristics of Korean adolescents presenting to emergency department for self-harm: a 5-year experience, 2015 to 2019. *Yonsei Med J*. 2020;61(7):614–22. Jul 1.
- [84] Poyraz Findik OT, Fadiloğlu E, Ay P, Fiş NP. Emergency mental health care for children and adolescents outside of regular working hours: 7 years outcomes from a tertiary hospital. *Asian J Psychiatr*. 2022;1:72. Jun.
- [85] Herbert A, Gilbert R, González-Izquierdo A, Li L. Violence, self-harm and drug or alcohol misuse in adolescents admitted to hospitals in England for injury: a retrospective cohort study. *BMJ Open*. 2015;5(2).
- [86] Gill PJ, Saunders N, Gandhi S, Gonzalez A, Kurdyak P, Vigod S, et al. Emergency department as a first contact for mental health problems in children and youth. *J Am Acad Child Adolesc Psychiatry [Internet]*. 2017;56 475–482.e4. Available from: <https://www.jaacap.comhttps://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emed18&AN=615441811https://libkey.io/libraries/1108/openurl?genre=article&aulast=Gill&issn=0890-8567&title=Journal+of+the+American+Academy+of+Child+and+Adolescent+Psychiatry&title=Emergency+Department+as+a+First+Contact+for+Mental+Health+Problems+in+Children+and+Youth&volume=56&issue=6&spage=475&epage=&date=2017&doi=10.1016%2Fj.jaac.2017.03.012&pmid=28545752&sid=OVID:embase.>
- [87] Gewirtz O'Brien JR, Edinburgh LD, Barnes AJ, McRee AL. Mental health outcomes among homeless, runaway, and stably housed youth. *Pediatr Int*. 2020;145(4) Apr 1 [cited 2023 Jun 30]. Available from: [/pediatrics/article/145/4/e20192674/36969/Mental-Health-Outcomes-Among-Homeless-Runaway-and](https://pediatrics/article/145/4/e20192674/36969/Mental-Health-Outcomes-Among-Homeless-Runaway-and).
- [88] Liu M, Mejia-Lancheros C, Lachaud J, Nisenbaum R, Stergiopoulos V, Hwang SW. Resilience and Adverse Childhood Experiences: Associations With Poor Mental Health Among Homeless Adults. *Am J Prev Med [Internet]*. 2020;58(6). <https://doi.org/10.1016/j.amepre.2019.12.017>. 807–16. Available from: [cited 2023 Jun 30].
- [89] Delaruelle K, Walsh SD, Dierckens M, Deforche Benedicte, Kern MR, Currie C, et al. Mental Health in Adolescents with a Migration Background in 29 European Countries: The Buffering Role of Social Capital. *J Youth Adolesc [Internet]*. 2021;50: 855–71. [cited 2023 Jun 30]. Available from: <https://doi.org/10.1007/s10964-021-01423-1>.
- [90] Kaltsidis G, Bamvita JM, Grenier G, Fleury MJ. Predictors of frequent emergency department utilization for mental health reasons. *J Behav Health Serv Res [Internet]*. 2021;48:259–73. Available from: <https://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emexa&AN=631284637https://libkey.io/libraries/1108/openurl?genre=article&aulast=Kaltsidis&issn=1556-3308&title=The+journal+of+behavioral+health+services+%26+research&title=Predictors+of+Frequent+Emergency+Department+Utilization+for+Mental+Health+Reasons&volume=48&issue=2&spage=259&epage=273&date=2021&doi=10.1007%2Fs11414-020-09695-4&pmid=32185614&sid=OVID:embase.>
- [91] Abrams AH, Badolato GM, Boyle MD, McCarter R, Goyal MK. Racial and ethnic disparities in pediatric mental health-related emergency department visits. *Pediatr Emerg Care [Internet]*. 2022;38(1) e214–8. Available from: <http://links.lww.com/PEC/A601>.
- [92] Janssens A, Hayen S, Walraven V, Leys M, Deboutte D. Emergency psychiatric care for children and adolescents: A literature review [Internet]. *Pediatr Emerg Care*. 2013; Vol. 29:1041–50. [cited 2022 Feb 9]. Available from: [https://journals.lww.com/pec-online/Fulltext/2013/09000/Emergency\\_Psychiatric\\_Care\\_for\\_Children\\_and.20.aspx](https://journals.lww.com/pec-online/Fulltext/2013/09000/Emergency_Psychiatric_Care_for_Children_and.20.aspx).
- [93] Sillero-Rejon C, Kirbyshire M, Thorpe R, Myring G, Evans C, Lloyd-Rees J, et al. Improving care for high impact users of hospital emergency departments: a mixed-method evaluation of a regional quality improvement programme 'Supporting High impact users in the Emergency Department' (SHarED). *medRxiv [Internet]*. 2023. Apr 18 [cited 2023 Jun 8]. Available from: <https://www.medrxiv.org/content/10.1101/2023.04.17.23287910v2>.