Tidsskriftet
DEN NORSKE LEGEFORENING

Acute poisoning among children and adolescents in southern Norway

ORIGINALARTIKKEL

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BACKGROUND

Self-inflicted poisoning is common in adolescents and is a risk factor for suicide. The aim of this study was to survey the circumstances surrounding hospitalisations due to acute poisoning in patients aged up to 18 years.

MATERIAL AND METHOD

All hospitalisations in the Departments of Paediatric and Adolescent Medicine, Sørlandet Hospital Trust (Arendal and Kristiansand) due to acute poisoning in the period 1 August 2014–31 July 2015 were prospectively recorded with the aid of a form completed during the admission.

RESULTS

There were 88 hospitalisations distributed among 68 adolescents (mean age 15.5 years, SD 1.5) and 13 children (mean age 2.8 years, SD 2.8). The poisoning was categorised as self-harm behaviour in 32 (47 %) of the adolescents, and as substance misuse-related in 35 (52 %). In total, 37 (54 %) of the adolescents had been or were under treatment at the Department of Child and Adolescent Psychiatry. Fifteen (22 %) of the adolescents were deemed to be suicidal. Thirty (94 %) of the adolescents who reported self-harm as the intention behind their poisoning were offered further follow-up at the Department of Child and Adolescent Psychiatry, along with 7 (20 %) of the group with substance misuse-related poisoning.

INTERPRETATION

Adolescents who reported self-harm as their intention were usually offered further follow-up, whereas adolescents with substance misuse-related poisoning were rarely offered follow-up.

Self-inflicted and accidental acute poisonings are a common reason for hospitalisation in departments of paediatric and adolescent medicine (1–3). Studies show that adolescents who self-harm have a far greater risk of suicide than the general population (1). Among adolescents who have been hospitalised once due to acute poisoning, 15–19 % will be readmitted with another incidence of poisoning (1, 3). Appropriate follow-up after the first hospitalisation is therefore important to prevent further risk behaviour and, at worst, suicide.

In Norway, few studies have specifically examined the number of children and adolescents hospitalised in paediatric departments due to acute poisoning (3). Most paediatric and adolescent departments have now increased their upper age limit from 16 to 18 years. As the incidence of self-inflicted poisonings increases throughout adolescence and into young adulthood (2–4), this increased age limit is likely to result in more hospitalisations due to self-inflicted poisoning. There is therefore a need for greater understanding of this patient group in paediatric and adolescent departments.

The aim of this study was to survey patients aged up to 18 years who were admitted over the course of a year to the Departments of Paediatric and Adolescent Medicine, Sørlandet Hospital Trust, in Kristiansand and Arendal, due to acute poisoning. In addition to demographic factors, we wished to obtain an overview of the types of medications and/or intoxicants that were ingested and the intention behind each case. We also wished to investigate whether a suicide risk assessment was conducted and what follow-up the adolescents were offered after discharge.

Material and method

In the period 1 August 2014–31 July 2015, all poisoning-related admissions to the Departments of Paediatric and Adolescent Medicine, Sørlandet Hospital Trust, Kristiansand and Arendal were prospectively recorded. The departments cover a paediatric population of approximately 65 000, and in 2015 there were a total of 3 980 hospitalisations of patients aged up to 19 years (not including admissions to neonatal intensive care). For each admission, the paediatrician completed a form containing questions on various factors (appendix). With the exception of the completion of this form, the patients in the study received standard care. Prior to and during the study period, all doctors in the departments received information about which patients should be included and how the form should be completed.

All forms were reviewed retrospectively. In several cases, information was missing and this was then retrieved from the patient's admission record. A note was made if the information could not be found in either the form or the hospital medical record. To ensure that all

hospitalisations were captured in the dataset, diagnostic code searches were performed on multiple occasions during and after the study period (diagnostic codes T4n–T50, F10–F19 and X6n). In those cases where patients who met the inclusion criteria were detected through diagnostic code searches, but where the form had not been completed on admission, the necessary information was retrieved from the patient's hospital medical record. If a patient was hospitalised several times during the study period, only the first admission was included.

The form included questions on age and sex. We recorded the living arrangements of the child/adolescent under the following categories: nuclear family (living with both parents), separated family (parents divorced or living with a single parent), foster home, institution or living alone.

The substances consumed were recorded on the form under the categories: alcohol, narcotics, paracetamol and other. However, as medications other than paracetamol were taken in many cases, while processing the data we changed the categories to the following: medications (prescription and over-the-counter drugs), illicit drugs, alcohol, multiple drug intoxication (medications or illicit drugs combined with alcohol) and other/unknown (where the substance was difficult to categorise). In most cases, the doctor completing the form had recorded the substance ingested under 'other'. When not specified in the form, this information was retrieved from the medical records.

The form did not survey how the adolescents had obtained access to the medications they took. We considered this to be of interest. Using the medical records, we therefore recorded whether the medications were for the adolescent's own therapeutic use or whether they had been found in the home. If this was not recorded in the medical records, we searched the medication module to determine whether the medication had been prescribed to the adolescent. If this could not be established with certainty, it was recorded as unknown.

The form had three checkboxes for the intention behind the poisoning: 'accidental' in which the substance was ingested in error, for example, where young children found medicines in the bathroom; 'self-harm' where the poisoning was part of self-injurious behaviour, and 'other', which was intended to cover substance misuse-related poisonings and other hard-to-define situations. However, many of the patients with substance misuse-related poisonings were incorrectly placed in the 'accidental' group by the doctor completing the form, and the patients' medical records were therefore reviewed retrospectively to ensure that patients had been placed in the correct groups. In the following, the categories 'accidental', 'self-harm', 'substance misuse-related poisoning' and 'other' are used.

The form recorded whether the adolescent had other signs of self-harm, such as scars as a result of cutting, and whether he or she had previously been subjected to physical violence or other forms of abuse. We also recorded whether assessment by a member of the Department of Child and Adolescent Psychiatry was requested during the admission and, if so, whether he or she considered the adolescent to be at increased risk of suicide. Information on which adolescents had been or were under treatment at the Department of Child and Adolescent Psychiatry was retrieved from the 'previous illnesses' section of the admission notes after the study period. Any follow-up after discharge was also recorded.

All data were collected and processed in SPSS version 23.

The project was endorsed by the management of the Division of Medicine and the Department of Child and Adolescent Psychiatry at Sørlandet Hospital Trust and was approved as a quality assurance project by the Norwegian Centre for Research Data. The project was approved without the requirement to obtain consent.

Results

Over a one-year period, we recorded 88 hospitalisations of 81 patients. The patients

comprised two groups: 13 children (16 %) aged 0–8 years (mean 2.8 years, SD 2.8) and 68 adolescents (84 %) aged 13–18 years (mean 15.5 years, SD 1.5). Some adolescents were hospitalised several times over the course of the period. Only the first hospitalisation is included. The children's group consisted solely of accidental poisonings with various substances, and no further data are presented for this group.

Key characteristics of the adolescent group are shown in Table 1. Girls were over-represented with 48 admissions (71 %). Medication positioning was the most frequent reason for admission (29 cases, 43 %), followed by alcohol poisoning (26 cases, 38 %). Alcohol was the most common substance among the boys (10 cases, 50 %).

Table 1

Adolescents admitted due to poisoning to the paediatric and adolescent departments of Sørlandet Hospital Trust in the period 1 August 2014–31 July 2015. DCAP = Department of Child and Adolescent Psychiatry

Variable	**No. of hospitalisations** (%)
Sex	
Girl	48 (71)
Boy	20 (29)
Living arrangements	
In nuclear family	26 (38)
In separated family	22 (32)
In foster home	5 (7)
In institution	5 (7)
Alone	7 (10)
Not recorded in medical records	3 (4)
Ingested substance	
Medications	29 (43)
Alcohol	26 (38)
Illicit drugs	< 5
Multiple drug intoxication	8 (12)
Other/unknown	< 5
Access to medications	
Medications for own therapeutic use	14 (21)
Found at home	16 (24)
Unknown/not recorded in medical records	2 (3)
Not applicable	36 (53)
Intention	
Deliberate self-harm	32 (47)
Substance misuse-related poisoning	35 (52)
Other	< 5
Previous/other self-harm	
Yes	24 (35)
No	44 (65)
Previous poisoning	
Yes	13 (19)
No	55 (81)
Former/current patient in DCAP	
Yes	37 (54)
No	31 (46)
Assessed by DCAP	
Yes	37 (54)
No	31 (46)
Considered suicidal by DCAP	

Variable	No. of hospitalisations (%)
Yes	15 (22)
No	22 (32)
Not assessed	31 (46)
Planned follow-up	
Hospitalisation in DCAP	8 (12)
Outpatient in DCAP	29 (43)
None	31 (46)

Medications were involved in 32 (47 %) poisonings, exclusively in 29 cases and as part of multiple drug intoxication in 3 cases. Paracetamol was ingested in 16 (24 %) cases. Girls accounted for 24 out of 29 poisonings involving medications alone. Where medications were ingested, they were for the individual's own therapeutic use in 14 (44 %) cases, while in 16 (50 %) cases the medications were found in the home.

Self-harm was reported as the intention behind the poisoning in 32 (47 %) cases. Substance misuse- related poisonings were responsible for 35 (52 %) hospitalisations.

Previous/other self-harm was recorded in 24 (35 %) cases, almost all of them girls. Previous poisonings were recorded in 13 adolescents (19 %).

In total, 37 (54 %) of the adolescents had completed or were currently receiving treatment at the Department of Child and Adolescent Psychiatry. This was the case for 28 (88 %) of the adolescents who reported self-harm as the intention behind their poisoning, and for eight (23 %) of those with substance misuse-related poisoning. Assistance in assessing suicide risk was requested in 37 (54 %) of the cases and always when the intention behind the poisoning was given as self-harm or a suicide attempt. A request was made in 28 (97 %) cases of medication poisoning and in three (12 %) cases of alcohol poisoning. In total, 15 (22 %) of the adolescents were considered to have an increased suicide risk, 11 (23 %) girls and four (20 %) boys.

Information on whether the adolescents had been subjected to physical violence or other forms of abuse was not recorded in 60 cases (88 %), either in the form or in the medical records.

A total of 37 adolescents (54 %) were followed up in the Department of Child and Adolescent Psychiatry following discharge from the Department of Paediatric and Adolescent Medicine, with 9 (12 %) patients acutely hospitalised. None of the discharge summaries mentioned follow-up by the patient's general practitioner or other sectors of the primary healthcare service.

Discussion

Over the course of a year, 81 children and adolescents were hospitalised with poisoning. Poisonings in children were exclusively accidental in nature. In adolescents, ingestion of medications was more common in girls, whereas alcohol was the predominant cause of poisoning in boys. However, 33 % of the girls had also consumed alcohol. In common with several European studies, we found that paracetamol was the most commonly taken medication (4). Besides paracetamol, the adolescents mainly took medications that had been prescribed for their own therapeutic use. Eliminating access to means is important for preventing repeated self-harm, and suicide (2). Providing parents with guidance on the storage and administration of medications can be an important preventive measure.

Dysfunctional family relationships are a risk factor for self-harm behaviour (5). It is worth noting that 25 % of the adolescents lived outside the parental home, either alone or in an institution or foster home.

Almost half of all poisonings in the adolescent group were linked to self-harm, while around half of the hospitalisations involved substance misuse. Underlying mental illness is a known risk factor for self-harm behaviour in adolescents (5, 6). This is consistent with our

dataset, in which 54 % of the adolescents had previously been or were currently under treatment at the Department of Child and Adolescent Psychiatry. In cases where self-harm was stated as the intention behind the poisoning, the Department of Child and Adolescent Psychiatry always provided assistance upon request. However, this was requested for only seven out of 37 (19 %) poisonings involving substance misuse. It may appear that consumption of alcohol and illicit drugs is not regarded as risk behaviour, but rather as normal behaviour in adolescents. This is despite the fact that, in 2009, Hodgins et al. showed that Swedish adolescents who sought help for substance misuse were at significantly increased risk of death, mental illness and further substance misuse (7). The group with substance misuse-related poisonings make up a large proportion of our dataset, and we believe that hospitalisations with acute poisoning provide a good opportunity to survey the drinking and substance use habits of adolescents, either while in hospital or at their general practice.

In our dataset, as many as 15 (22 %) of the adolescents were considered to have an elevated risk of suicide. Self-inflicted poisoning is not a common method of suicide among adolescents (2, 8, 9). However, in 2012, Tørmoen et al. studied a Norwegian adolescent population and found that one-third of adolescents who had self-harmed also reported previous suicide attempts (10). A study from Finland on suicide in children and adolescents found that 17 % of women who committed suicide had previously been hospitalised with self-inflicted poisoning (9). This underlines the importance of viewing self-inflicted poisoning as a risk factor for suicide.

Given that a history of abuse is a known trigger for risk behaviour in adolescence (11) and has been found to explain up to one-third of self-harm in women (12), we specifically wished to survey whether the adolescents had suffered physical or sexual abuse. Interestingly, in 88 % of cases, neither the medical records nor the form contained any information about this. It appears that this subject is not broached with adolescents, which is notable in light of a report by the Committee on Child Physical Abuse [*Barnevoldsutvalget*] of May 2017 (13), emphasising that all areas of the support services are doing too little to uncover abuse and neglect in children and adolescents. It could be argued that this topic falls within the remit of the Department of Child and Adolescent Psychiatry and thus does not belong in non-psychiatric medical records. However, studies have shown that too little information on this topic is gathered, even after long-term follow-up by the child and adolescent psychiatry services (14). That is not to say that paediatricians should explore these issues in all children and adolescents hospitalised with acute poisoning whatever the cause. But, in adolescents with serious risk behaviour, it may be worth considering whether this topic should be explored more routinely. If so, the most appropriate person or agency to ask these questions should be determined to ensure that already vulnerable young people do not fall between two stools.

Major review articles have highlighted a lack of knowledge regarding the type of follow-up that is most beneficial for this patient group (2). In our dataset, 47 % were discharged without any form of follow-up. In particular, 80 % of the group with substance misuse-related poisonings received no offer of follow-up. It is especially notable that the discharge summaries never mention general practitioners with respect to follow-up, despite the fact that general practitioners should be well-placed to play a key role in the further assessment and follow up of adolescents with risk behaviour.

LIMITATIONS

The dataset is small, but we have no reason to believe that adolescents in the Agder counties differ markedly from other adolescents in Norway. Data were not obtained for patients assessed in Accident and Emergency or by their general practitioner.

Since we do not routinely test for drugs other than alcohol unless there are implications for further treatment, the proportion of poisonings with illicit drugs or mixed intoxicants may be underestimated.

Analysis of the data raised several interesting points that should have been addressed in the questionnaire, but for which we instead had to obtain information from the patients' medical records. This in turn revealed what we consider to be the biggest limitation of the study: that many pieces of information are inadequately recorded in the medical records, with the result that not all data could be analysed as precisely as we might have wished. In light of the fact that the study is defined as a quality improvement project, inadequate record keeping can be seen as an interesting finding in itself.

MAIN FINDINGS

A survey of hospitalisations due to acute poisoning among children and adolescents in the Agder counties of Norway showed that medications were the most frequently ingested substance, followed by alcohol

About half of poisonings in adolescents were a form of self-harm, the other half were related to substance misuse

In all, 54 % of the adolescents were or had been under treatment in the Department of Child and Adolescent Psychiatry, and 22 % were considered suicidal upon admission

Adolescents with substance misuse-related poisoning were offered little follow-up

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Published: 25 September 2019. Tidsskr Nor Legeforen. DOI: 10.4045/tidsskr.17.1116
Received 21.12.2017, first revision submitted 14.5.2018, accepted 20.6.2019.