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Psychotropic medication use for paediatric mental health patients in an Emergency Department.

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Abbreviations
ABD acute behavioural disturbance
ED emergency department
EMR Electronic Medical Record
ICD International Statistical Classification of Diseases and Related Health Problems
IM intramuscular
MH mental health
PO per oral
SI suicidal ideation.

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Table of contents summary

Paediatric mental health presentations to emergency departments are increasing yet there is a paucity of evidence to inform choice of psychotropic medication regimens in this population.

What is already known

- Mental health presentations to the emergency department are increasing in children and adolescents.
- **There is a paucity of research into what medications are used; and for which children and adolescents.**
- Chemical restraint in children in the ED is currently not evidence based.

What this study adds

- Relatively few children and adolescents with mental health presentations receive psychotropic medications in ED.
- **Medicated children with mental health presentations in the ED are more likely to be male, have a more acute triage category (ATS 1 or 2), have an ED LOS greater than 12 hours and present after hours.**
- Most children who received psychotropic medication in the ED had a diagnosis of acute behavioural disturbance or suicidal ideation.

Contributor's statement page

SOD and AC conceived the study, extracted and analysed the data, wrote the first draft of the paper and revised all drafts. AH and DS assisted with data entry, review of data and revision of the drafts of the paper.

FEB and HH assisted with the design of the study protocol, obtained ethics approval and revised the drafts of the paper.

All authors approved the final draft for submission.

ABSTRACT

Objectives:

There is paucity of evidence for psychotropic medication use in children and adolescents presenting with mental health (MH) problems to the emergency department (ED). We set out to describe paediatric psychotropic medication use in the ED.

Methods:

We conducted a retrospective electronic medical record review of ED patients with MH discharge codes at a tertiary paediatric ED in 2018. We assessed the epidemiology and management of patients who received a psychotropic medication. We calculated the odds ratios (ORs with 95% confidence intervals (CI)) of key demographic factors of medicated vs non-medicated MH patients.

Results:

During 2018 there were 1695 MH-related presentations to the ED. Of these, 280 presentations resulted in the patient receiving a psychotropic medication (16.5%). Medicated children with MH illness were more likely to be male (OR 1.50, CI 1.16 – 1.96), have a more acute triage category (OR 3.37, CI 2.28 – 4.98), have an ED LOS greater than 12 hours (OR 3.96, CI 2.56 – 6.13) and present after hours (OR 1.51 CI 1.16 – 1.96). Most had a diagnosis of acute behavioural disturbance or suicidal ideation. A variety of treatment regimens were used but children primarily received a single oral agent (diazepam or olanzapine). Parenteral medications were given in 8.6%. No adverse events **were** recorded.

Conclusion:

A minority of children with MH presentations to the ED were medicated. It will require multicentre research to determine the most effective and safe acute psychotropic agents for oral and parenteral use in children in the ED.

Key words:

Paediatrics

Emergency department

Mental health

Psychotropic medication

Acute behavioural disturbance

INTRODUCTION

The paediatric emergency department (ED) plays an important role in the assessment and management of children and adolescents in MH crises. In recent years Australian ED paediatric mental health (MH) presentations have increased significantly[1] compared to paediatric presentations[2] and adult MH presentations[1,3]. MH emergencies are becoming an increasing part of Australian paediatric ED practice with patients more likely to arrive out of business hours, be triaged as urgent, have prolonged stays and require an acute admission[1,2,4]. Similar findings have been reported in the USA[5,6].

International consensus supports patient advocacy, increasing community services, improving staff education and training[7], minimising the use of restrictive intervention and improving de-escalation[8,9] in MH emergencies. However, when these strategies fail, medication use in ED may be necessary to ensure a child or healthcare worker's safety or to expedite the patient's medical evaluation. Multiple high quality studies comparing different agents for the management and treatment of aggression and violence in adults in the ED setting have been published[10,11]. We know that children and adolescents are receiving psychotropic medications in EDs in Australia[12,13] however, there is little information in the literature about the use of chemical restraint in this population and guidance remains unclear as multiple different drugs, doses and administrative methods have

been used in various studies[14,15,16,17]. The National Institute for Care and Excellence (NICE)[9] and the American Psychiatric Association (APA)[18] provide guidance on psychotropic medication use in children but the background evidence and support for this guidance is very limited. **The most recent consensus statement from the American Association for Emergency Physicians[19] favours a multimodal approach to managing aggression and agitation in the paediatric ED. It provides guidance on treatment regimens for use in different clinical situations, although limited evidence exists for first-line agents.** It is therefore not surprising that there is marked variation **internationally** in the prescribing practice of anxiolytics, stimulants, antidepressants and antipsychotics for children and adolescents in the ED[20].

Baker et al[21] concluded that there was no evidenced based medication regimen available to effectively treat agitated children with MH disorders. One small double-blind placebo-controlled study studied 21 boys and showed no difference between medication (diphenhydramine) and placebo in the management of acute behavioural disturbance (ABD)[22].

The safety profile of psychotropic medications when used in the acute management of ABD and agitation in the ED paediatric population has not been well described or studied. Kendrick et al reported adverse events in <5% of their paediatric cohort who received antipsychotics in the ED for treatment of

aggression or agitation[23]. Droperidol use has been reported to be safe and effective in both the pre-hospital and ED settings for ABD in adolescents[24,25]. It is difficult to ascertain true adverse event profiles in the literature for psychotropic medications as sedation/somnolence, often considered to be an adverse event, is usually the desired effect for their use in the ED population.

Before embarking on interventional medication trials in children it is important to understand what psychotropic medications are used in children in the ED and what MH presentations require their use. **We aimed to describe MH patients who** received a psychotropic medication in a paediatric ED and how they differ from other MH patients.

METHODS

Design and Setting

We conducted a retrospective electronic medical record (EMR) review of all psychotropic medication use in ED patients with MH discharge codes who presented to the Royal Children's Hospital (RCH) in Melbourne, Australia between January 1st and December 31st 2018. RCH is a tertiary children's hospital with an annual ED census of 85,347 children in 2018. It is a designated mental health facility under Victorian Mental Health Act regulation[26]. The MH services consist of the ED with an

in-house and on call MH team, a 16-bed adolescent inpatient unit and outpatient services. Although the hospital MH team is available for consult, they are usually not involved in the choice of acute medication for ED patients. The Human Research and Ethics Committee (HREC) at RCH approved the study (HREC QA/51710/RCHM-2019).

Study procedure

Sixty-six MH related International Classification of Diseases, Revision 10, Australian Modification (ICD-10-AM) diagnostic codes were used to identify all MH presentations to the RCH ED (see *Appendix 1*). This list included all MH diagnoses available for treating staff to use and other diagnoses not specifically MH related but often associated with MH presentations, such as ingested foreign body, hallucinations and forearm laceration. EMRs of all identified MH presentations were manually assessed to confirm MH related presentations, exclude non-MH presentations, and assess the ED and MH clinician diagnoses and any underlying MH diagnoses reported in the medical record.

Inclusion criteria:

- All presentations aged 7 **to <18 years of age presenting** to ED, who had a MH diagnosis assigned by the ED and / or MH clinician.

Exclusion criteria:

- Children under 7 and **≥18 years of age**
- Presentations with a diagnosis of ingested foreign body or forearm laceration, where there was no MH issue.

Definitions:

To be sectioned under Section 351 of the Victorian Mental Health Act is the apprehension of a person by police if the person appears to have a mental illness and needs to be apprehended to prevent harm to the person or another person, and subsequent transport to a medical or MH practitioner for examination[26].

ED triage urgency was defined using the national Australian triage scale (ATS)[27].

For identified patients, we extracted relevant demographic, diagnostic, management and follow up data, using an a priori developed coding dictionary. Data extractors were trained and intermittently audited[28].

Analysis

Data were entered into an Excel database (Excel, Microsoft, Seattle, WA, USA) and analysed using Stata 14 (Stata Corp, College Station, Tx, USA). We reported demographic data for all MH presentations using frequencies and percentages with 95% confidence intervals (CIs), and additional presentation related variables for the subset of presentations that received medications. Our primary analysis was focused

on identifying the differences between patients who received medications and those who did not using odds ratios (ORs) and 95% confidence intervals (CI) of key demographic factors.

RESULTS

In 2018 there were 85,347 presentations to RCH ED and 25,095 presentations in children aged 7–17 years. Of these 25,095 presentations, 1695 had a MH diagnosis representing 6.8% of all ED presentations in the 7–17 years age group. In 280 (16.5%) of these presentations, patients received treatment with a psychotropic medication. Three hundred and eighty-eight **medication administrations** were given across 280 patient presentations and no adverse effects were documented. Patients who received psychotropic medications in the ED differed from MH patients who did not receive medications. *Table 1* details the demographic information of the total MH cohort and the subset of patients who did and did not receive psychotropic medication management. Those who received medications were more likely to be male (OR 1.50, CI 1.16 – 1.96), **have a more urgent triage category (ATS 1 or 2)** (OR 3.37, CI 2.28 – 4.98), have an ED LOS greater than 12 hours (OR 3.96, CI 2.56 – 6.13) and present **after hours between 17.00pm and 07.59am** (OR 1.51 CI 1.16 – 1.96). There were no significant differences in age, day of presentation or admission rates between the medicated and non-medicated cohorts. *Table 2* displays other important demographic variables. **Over half of these patients arrived by ambulance**

or police escort (52.5%, OR 1.97, CI 1.52-2.56) and 21.1% were sectioned on arrival (OR 1.93, CI 1.39-2.68). Children who received medications were also more likely to be under DHHS guardianship (OR 1.87, CI 1.28 – 2.73). The majority (85.7%) had prior engagement with psychiatry or community care services and 90.7% had a past psychiatric diagnosis. **There was no statistically significant association between admission and requiring any medication (OR 1.16, CI 0.87-1.55) compared to presentations with no medication and no statistically significant association between admission in patients receiving IM medication (OR 2.10, CI 0.89-4.95) compared to PO only.**

Most patients (76.1%, 213/280) received only one medication during their ED presentation. Forty patients (14.3%) received two medications, 15 patients (5.4%) received three medications and 12 patients (4.3%) received four or more medications (see *Table 3).* There was a range of 1-8 medication administrations per presentation. In 256 patient presentations (91.4%), only an oral medication was given (n = 348, 89.7% of total meds administered). IM medications were given in 24 patient presentations (8.6%), (n = 40, 10.3% of total meds administered). An oral medication was given first line in 262 cases (93.6%) and IM was given first line in 18 cases (6.4%). The most common orally administered medication was diazepam followed by olanzapine and lorazepam. The most frequently given IM medication was droperidol followed by olanzapine and midazolam. *Table 4* describes the type of

medication administered, order of administration and median dose used. When oral medication was given as a first-line agent, 53 of these patients went on to need a second medication. Only 4 of these 53 (7.5%) patients were escalated to an IM medication as a second medication. **The requirement for an IM medication increased with next dose (1st dose IM 6.4%, 2nd dose IM 17.2% and 3rd dose IM 17.4%).**

Table 5 lists the most likely diagnoses given to the medicated cohort by ED and MH practitioners. ABD and suicidal ideation (SI) were the most commonly attributed diagnoses, accounting for 40.7% and 29.4% of all medications administered, respectively. For both groups most patients required a single orally administered medication while in the ED (*Table 3).* **More IM medications were prescribed for the ABD patient cohort than the SI cohort (23 vs. 5 medications, respectively, OR 2.96, CI 2.22-3.94).**

Code grey response.

A Code Grey is a coordinated staff response to an agitated or aggressive patient. **Encounters requiring medications were 9.2 times more likely to be associated with a Code Grey than non-medicated encounters. (95% CI 6.38 – 13.25).** A total of 53 Code Grey responses resulted in the administration of psychotropic medications. Just over 17% of total medications given were during a Code Grey event. Oral

medication was dispensed in 31 presentations and IM medication in 22 presentations. A total of 79 individual medication doses were dispensed and 30% of patients required a 2nd medication during their Code Grey event. This 2nd medication was more likely to be administered via the IM route (62.5% versus 37.5%). The most frequently oral and IM administered medications during a Code Grey event were olanzapine PO and IM droperidol respectively.

DISCUSSION

We have described an important population of paediatric patients presenting to the ED at a tertiary centre who were administered psychotropic medications. A minority of children with MH diagnoses receive psychotropic treatment during their ED visit (16.5% of all MH patients presenting). This is higher than other reports[17]. Medicated children in our ED are more likely to present after hours, have a higher triage category (**ATS 1 or 2)** and **have a LOS >12 hours. If a child presented with a diagnosis of ABD they were more likely to receive a psychotropic medication during their stay than if they had other presenting diagnoses.**

A child is more likely to receive an oral medication in the first instance. There is a low oral to IM medication conversion rate (2.3%). We found that if IM medications are required, they were primarily given as a first (45%) or second (27.5%) medication although some changed to IM medication administration after further oral

medication doses had failed. Two thirds of presentations requiring IM medications were diagnosed with ABD.

Children who received medications were not admitted more. However admission was associated with multiple medication (>=2) administrations (OR 2.54, CI 1.41-4.54) compared to single administration only. Due to the broad range of medications used, reasons for medication use and broad range of diagnoses, no association is seen between admission and medication use alone. However, when multiple medications are administered, patients are 2.5 times more likely to be admitted.

A wide range of medication regimens was used to chemically restrain children and adolescents with ABD, violence or aggression however, there was very little variation in our prescriptions as shown in *Supplemental Table 1*. The most commonly administered medications do not differ greatly from a report of aggressive children in another Australian paediatric centre[13]. Olanzapine, which was commonly administered in our ED, has been shown to be efficacious in an adult randomised controlled trial (RCT)[11]. Khan et al retrospectively examined IM olanzapine and IM ziprasidone in the management of acute agitation and aggression in children and adolescents[14]. They found no difference in efficacy or safety profile. To date, there is no high level evidence studying the best psychotropic management of ABD and violence in the paediatric ED environment[8]. An adequately powered multicentre RCT, comparing such medications, is required specifically for this population where

outcomes of success of sedation, adverse events etc. are assessed to provide evidence for their optimal use and guidance for clinicians.

Though limited by the retrospective methodology of our study, we did not identify any adverse effects of medication administration (including respiratory depression, extrapyramidal reactions, neuroleptic malignant syndrome or paradoxical reactions). This is in keeping with a mixture of single agent studies for the treatment of agitation and aggression in children where they seem to be well tolerated and safe[14,23,24,25]. The APA remains concerned about risk–benefit trade-off of the use of antipsychotic agents in children outside of FDA-approved indications[18]. It is pertinent when administering such medications to children that a stepwise approach to treatment is used and appropriate post sedation monitoring is commenced in an appropriately staffed area of the ED.

The consensus based clinical practice guideline (CPG) at RCH advises weight specific doses of oral olanzapine, lorazepam, quetiapine, diazepam or risperidone if the patient accepts oral sedation[29]. The CPG does not recommend which drug may be most suitable or effective, simply that they may be used for all causes of agitation including recreational drug ingestion. For parenteral treatment the guideline advises IM droperidol or olanzapine. Third line agents include IM/IV ketamine or midazolam if the patient has not settled after two doses of other IM medications. The range of

medications used to treat our patient cohort was consistent with the broad CPG recommendations. No drug was used outside of this guideline.

The 2015 NICE Guideline on short-term management of violence and aggression advises the use of IM lorazepam for rapid tranquilisation of a child or young person and to adjust the dose according to their age and weight[9]. The NICE Guideline on the management of children with conduct disorders and antisocial behaviour advises not to offer pharmacological interventions for the routine management of their behavioural problems[30]. It encourages, in severe cases, to consider giving risperidone. On examining the references from these NICE guidelines they express caution with prescription as, at the time of publication, the advised medications did not have authorisation for use in children and youths with the specific MH diagnoses.

Limitations

This was a retrospective study from a single institution. We tried to mitigate the retrospective limitations by the use of a detailed protocol and data dictionary and trained abstractors with intermittent audits of work[28].

Only medications administered within the ED were examined in this study. We were unable to record any pre-hospital medications administered due to the inconsistent uploading of paramedic data. The order and timing of medication given within the ED was recorded accurately on the EMR. However, neither the EMR nor the chart

review could be used to reliably determine if the medication was administered for acute de-escalation, tranquilisation, and sedation or per scheduled routine. As previously documented in the literature[31], a further issue encountered with the electronic data quality was that the codes available to clinicians were often vague, inappropriate and inaccurate. This prompted us to manually check the notes of all included patients for accurate diagnostic data.

CONCLUSION

Few children with MH disease were medicated in ED but of those that were, a variety of medications and routes were used. Most frequent diagnoses associated with medication use were ABD and SI. Considering the variation in use of psychotropic medications and the paucity of high-level evidence in children and adolescents, further research is needed in acute psychotropic agents for oral and parenteral use in the emergency setting.

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TABLES

Table 1: Comparison of demographics and ED variables of total mental health presentations and medicated versus non-medicated subsets

Demographics	Total MH † presentations n = 1695	Medicated n = 280	Non-Medicated n = 1415	Comparison
Sex	**n (%)**	**n (%)**	**n (%)**	**OR (95% CI) ‡**
Female	1132 (66.8)	165 (58.9)	967 (68.3)	Male: Female
Male	563 (33.2)	115 (41.1)	448 (31.7)	1.50 (1.16 – 1.96)
Age (years)				
7-10	182 (10.7)	37 (13.2)	145 (10.2)	≥14 years: <14 years
11-14	675 (39.8)	96 (34.3)	579 (40.9)	0.94 (0.72 – 1.23)
15-17	838 (49.4)	147 (52.5)	691 (48.8)	
Triage category				
1	24 (1.4)	12 (4.3)	12 (0.9)	
2	100 (5.9)	34 (12.1)	66 (4.7)	Category 1-2:
3	1120 (66.1)	194 (69.3)	926 (65.4)	Category 3-5
4	423 (25.0)	38 (13.6)	385 (27.2)	3.37 (2.28 – 4.98)
5	28 (1.7)	2 (0.7)	26 (1.8)	
Length of stay				
< 4 hrs	706 (41.7)	93 (33.2)	613 (43.3)	
≥ 4 – < 8 hrs	792 (46.7)	120 (42.9)	672 (47.5)	≥12 hours: <12 hours
≥ 8 – < 12 hrs	105 (6.2)	29 (10.4)	76 (5.4)	3.96 (2.56 – 6.13)
≥ 12 hrs	92 (5.4)	38 (13.6)	54 (3.8)	
Arrival day				
Weekday	1314 (77.5)	213 (76.1)	1101 (77.8)	Weekend: Weekday
Weekend	381 (22.5)	67 (23.9)	314 (22.2)	1.10 (0.82 – 1.49)
Arrival time				
0000-0759	160 (9.4)	33 (11.8)	127 (9.0)	
0800-1559	647 (38.2)	87 (31.1)	560 (39.6)	After hours: In hours
1600-2359	888 (52.4)	160 (57.1)	728 (51.4)	1.51 (1.16 – 1.96)
After hours (1700-0759)	931 (54.9)	177 (63.2)	754 (53.3)	
In hours (0800-1659)	764 (45.1)	103 (36.8)	661 (46.7)	

† MH: Mental health

‡ Odd Ratios (OR) and 95% confidence intervals (CI) calculating the likelihood of presentation variables in medicated cohort, compared to non-medicated cohort.

Table 2. Comparison of presentation variables of medicated subset of mental health presentations versus non-medicated subset

Presentation variable	Medicated n = 280	Non-Medicated n = 1415	Comparison
Means of arrival	**n (%)**	**n (%)**	**OR (95% CI)** †
Private car / self / public transport	133 (47.5)	904 (63.9)	Police/Ambulance: Private/other transport 1.97 (1.52 – 2.56)
Police	76 (27.1)	216 (15.3)	
Ambulance	71 (25.4)	292 (20.6)	
Unknown	0	3 (0.2)	
Sectioned			
No	219 (78.2)	1241 (87.7)	Sectioned: Not 1.93 (1.39 – 2.68)
Yes	59 (21.1)	171 (12.2)	
Unknown	2 (0.7)	2 (0.1)	
Guardianship			
Parent	229 (81.8)	1246 (88.1)	DHHS/Police: Parent/other 1.87 (1.28 – 2.73)
DHHS ‡	42 (15.0)	118 (8.3)	
Other family	6 (2.1)	39 (2.8)	
Unknown	3 (1.1)	8 (0.6)	
Police custody	0	4 (0.3)	
Attended with			
Parent	203 (72.5)	1132 (80.0)	DHHS/social worker: Parent/other 2.64 (1.77 – 3.94)
DHHS ‡/residential care/social worker	40 (14.3)	84 (5.9)	
Alone	22 (7.9)	85 (6.0)	
Other family	10 (3.6)	61 (4.3)	
Unknown	3 (1.1)	19 (1.3)	
Community psychiatric liaison	1 (0.4)	0	
Friend	1 (0.4)	26 (1.8)	
Teacher	0	8 (0.6)	
Prior psychiatric / community care			
Yes	240 (85.7)	1092 (77.2)	Prior psychiatric care: None/unknown 1.77 (1.24 – 2.54)
No	39 (13.9)	311 (22.0)	
Unknown	1 (0.4)	12 (0.8)	
Past psychiatric diagnosis			
Yes	254 (90.7)	1004 (71.0)	Past diagnosis: None/unknown 4.0 (2.63 – 6.08)
No	26 (9.3)	386 (27.3)	
Unknown	0	25 (1.8)	
Disposition from Emergency Department			
Home	186 (66.4)	948 (67.0)	Admitted: Discharged 1.16 (0.87 – 1.55)
Admitted to Royal Children's Hospital	51 (18.2)	279 (19.7)	
Admitted to another facility	24 (8.6)	60 (4.2)	
Residential care	14 (5.0)	60 (4.2)	
DHHS ‡	3 (1.1)	26 (1.8)	
Relative	1 (0.4)	18 (1.3)	

Absconded	1 (0.4)	14 (1.0)	
Police custody	0	10 (0.7)	
Total discharged (any location)	205 (73.2)	1076 (76.0)	
Total admitted (any location)	75 (26.8)	339 (24.0)	
Discharged with			
Parent	208 (74.3)	1160 (82.0)	
DHHS ‡/residential care/social worker	46 (16.4)	117 (8.3)	
Other	15 (5.4)	57 (4.0)	DHHS/police:
Unknown	6 (2.1)	21 (1.5)	Parent/other
Police	3 (1.1)	12 (0.8)	2.11 (1.48 – 3.02)
Alone	1 (0.4)	22 (1.6)	
Friend	1 (0.4)	26 (1.8)	
Follow up arrangements			
Community psychiatric services	187 (66.8)	872 (61.6)	
Private psychiatrist / counsellor	23 (8.2)	165 (11.7)	
Outpatient psychiatry	21 (7.5)	49 (3.5)	
Transfer to another unit	19 (6.8)	46 (3.3)	
Paediatrician	16 (5.7)	103 (7.3)	N/A
Unknown	7 (2.5)	27 (1.9)	
General Practitioner	2 (0.7)	91 (6.4)	
None	4 (1.4)	38 (2.7)	
Return to Emergency Department	1 (0.4)	24 (1.7)	

† Odd Ratios (OR) and 95% confidence intervals (CI) calculating the likelihood of presentation variables in medicated cohort, compared to non-medicated cohort.

‡ DHHS: Department of Health and Human Services

Table 3. Major diagnostic groups† and medications received

	All presentations receiving medications n = 280	Acute behavioural disturbance n = 96	Suicidal ideation n = 94	Other diagnoses† n = 90
	n (%)	n (%)	n (%)	n (%)
Total number of presentations	280	96	94	90
Medication Route				
Oral only	256 (91.4)	80 (83.3)	90 (95.7)	86 (95.6)
Intramuscular (at least once)	24 (8.6)	16 (16.7)	4 (4.3)	4 (4.4)
Number of medication administrations				
1	213 (76.1)	68 (70.8)	76 (80.9)	69 (76.7)
2	40 (14.3)	12 (12.5)	16 (17.0)	12 (13.3)
3	15 (5.4)	8 (8.3)	2 (2.1)	5 (5.6)
≥4	12 (4.3)	8 (8.3)	0	4 (4.4)
Most commonly prescribed intramuscular (IM) medications				
Total IM‡ administrations	40	23	5	12
Droperidol IM 5mg	13 (32.5)	9 (39.1)	4 (80.0)	0
Olanzapine IM 10mg	9 (22.5)	6 (26.1)	0	3 (25.0)
Most commonly prescribed oral (PO) medications				
Total PO§ administrations	348	135	109	104
Diazepam PO 5mg	102 (29.3)	17 (12.6)	50 (45.9)	35 (33.7)
Olanzapine PO 5mg	75 (21.6)	32 (23.7)	22 (20.2)	21 (20.2)
Lorazepam PO 1mg	37 (10.6)	18 (13.3)	10 (9.2)	9 (8.7)

† Diagnostic groups based on Emergency Doctor diagnosis outlined in Table 5.
‡ IM: Intramuscular
§ PO: Per oral route includes all orally ingested and sublingual routes

Table 4. Total medication administrations (n = 388)

Medication	Medication given anytime during visit n (%)	Medication given first line n (%)	Medication given second line n (%)	Medication given third line n (%)	Median Total Dose mg (range)
Total drug administrations n (% total) †	388 (100)	280 (72.2)	64 (16.5)	23 (5.9)	-
Diazepam	168 (43.3)	144 (51.4)	18 (28.1)	4 (17.4)	5 (1-20)
Droperidol	15 (3.9)	6 (2.1)	3 (4.7)	3 (13.0)	5 (0.5-10)
Lorazepam	59 (15.2)	40 (14.3)	11 (17.2)	5 (21.7)	1 (0.5-2)
Midazolam	12 (3.1)	2 (0.7)	6 (9.4)	2 (8.7)	5 (2-10)
Olanzapine	100 (25.8)	71 (25.4)	18 (28.1)	5 (21.7)	5 (2.5-10)
Risperidone	34 (8.8)	17 (6.1)	8 (12.5)	4 (17.4)	1 (0.3-4)

† Percentage of total 388 individual drug administrations (via any route) given anytime during visit

Table 5. Diagnoses in medicated cohort (n=280)

Diagnosis	Emergency Doctor Diagnosis n (%)	Mental Health Practitioner Diagnosis n (%)
Acute behavioural disturbance	96 (34.3)	81 (28.9)
Acute psychosis	12 (4.3)	14 (5.0)
Affective bipolar disorder	1 (0.4)	1 (0.4)
Anorexia nervosa or Eating Disorder	1 (0.4)	1 (0.4)
Anxiety	28 (10.0)	17 (6.1)
Anxiety and depression	0	5 (1.8)
Depression	4 (1.4)	4 (1.4)
Drug induced psychosis	2 (0.7)	2 (0.7)
Drug overdose	14 (5.0)	7 (2.5)
Drug withdrawal	1 (0.4)	1 (0.4)
Emotional dysregulation	3 (1.1)	8 (2.9)
Hallucinations	7 (2.5)	6 (2.1)
No recorded diagnosis †	0	23 (8.2)
Self-harm	13 (4.6)	15 (5.4)
Somatoform disorder	1 (0.4)	2 (0.7)
Suicidal and homicidal ideation	1 (0.4)	2 (0.7)
Suicidal ideation	94 (33.6)	87 (31.1)
Suicide attempt	2 (0.7)	3 (1.1)
Tourette's syndrome	0	1 (0.4)

† All patients had an Emergency Doctor diagnosis recorded. 23 patients were not seen by a Mental Health Practitioner and hence did not have a Mental Health Practitioner diagnosis recorded.

Supplemental Table 1. Total medication administrations (n = 388)

Medication	Medication given anytime during visit n (%)	Doses via intramuscular route n (%)	Median Total Dose mg (range)
Diazepam	168 (43.3)	1 (0.6)	5 (1-20)
Droperidol	15 (3.9)	15 (100)	5 (0.5-10)
Lorazepam	59 (15.2)	0	1 (0.5-2)
Midazolam	12 (3.1)	9 (75)	5 (2-10)
Olanzapine	100 (25.8)	15 (15)	5 (2.5-10)
Risperidone	34 (8.8)	0	1 (0.3-4)

Appendix 1: List of 66 International Classification of Diseases, Revision 10, Australian Modification (ICD-10-AM) Diagnostic Codes used for patient inclusion.

ICD-10-AM Mental Health Diagnostic Codes for patient inclusion
Accidental drug overdose
Accidental paracetamol overdose
Acute anxiety
Acute depression
Acute drug overdose
Acute post-traumatic stress disorder
Acute stress disorder
Affective bipolar disorder
Anorexia
Anorexia nervosa
Anxiety disorder
Behaviour disorder
Behavioural disorder
Borderline personality disorder
Chronic depression
Depression with suicidal ideation
Destructive behaviour
Drug addiction
Drug dependence
Drug ingestion
Drug overdose, multiple drugs
Drug withdrawal
Drug-induced mental disorder
Emotional crisis
Emotional disorder
Emotionally unstable borderline personality disorder
Hallucination
History of self-harm
Hysteria
Intentional drug overdose
Intentional paracetamol overdose
Manic depression
Manic disorder
Mental and behavioural disorders due to use of alcohol, acute intoxication
Mental disorder
Mental health disorder
Multiple drug overdose
Non-accidental drug overdose
Overdose of medication
Overdose of psychotropic
Overdose of sedative or hypnotic

Overdose of tricyclic
Paracetamol overdose
Paracetamol overdose of undetermined intent
Persistent mood disorder
Post-traumatic stress disorder
Psychiatric disorder
Psychosomatic disease
Psychosomatic disorder
Reactive psychosis
Schizophrenia
Social problem
Somatoform disorder
Stress and adjustment reaction
Suicidal ideation
Suicidal risk
Suicidal thoughts
Suicide by hanging
Suicide ideation
Additional ICD-10-AM Diagnostic Codes for patient inclusion
Laceration of upper arm
Laceration of wrist
Forearm laceration
Wrist laceration
Ingestion of foreign body
Swallowed foreign body