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Investigating the management of alcohol-related presentations in an Australian teaching hospital

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Investigating the management of alcohol-related presentations in an Australian teaching hospital

Abstract

Introduction and Aims: Alcohol-related morbidity is estimated to range from 10-38% of the presentations to hospital emergency departments. This study aims to investigate the actual management process for alcohol-related presentations in a teaching hospital in Australia.

Design and Methods: Retrospective audit was conducted on the electronic medical records of 210 presentations with a primary or secondary diagnosis of 'alcohol use disorder' at discharge between November 2016 and February 2017. Six key management steps were investigated: identification of alcohol use disorder, documentation, thiamine, alcohol withdrawal assessment, benzodiazepine for alcohol withdrawal and referral to the drug and alcohol consultation liaison service.

Results: Of all the 210 presentations, 77.1% (162) were identified with alcohol use disorder in the initial assessments; 64.3% (135) were documented with alcohol use history, 49.5% (104) were prescribed with thiamine, 48.1% (101) were assessed with the alcohol withdrawal scale, 41% (86) were prescribed with benzodiazepine for alcohol withdrawal and only 38.6% (81) were referred to the drug and alcohol consultation liaison service. Only 8.6% (18) of the initial presentations were directly related to alcohol. These presentations had a higher completion rate in each of the six steps than those (91.4%, 192) not directly related to alcohol. Only 6.2% (13) were formally screened for alcohol use.

Discussion and Conclusions: The findings suggest a need to improve the alcohol management practice in the hospital. Routine use of an alcohol screening tool can enable early identification of the alcohol use disorder and to improve the management of this problem in the hospital.

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Title: Investigating the management of alcohol-related presentations in an Australian teaching hospital

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Conflict of interest

None to declare

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Of all the 210 presentations, 77.1% (162) were identified with alcohol use disorder in the initial assessments, 64.3% (135) were documented with alcohol use history, 49.5% (104) were prescribed with thiamine, 48.1% (101) were assessed with the alcohol withdrawal scale, 41% (86) were prescribed with benzodiazepine for alcohol withdrawal and only 38.6% (81) were referred to the drug and alcohol consultation liaison service. Only 8.6% (18) of the initial presentations were directly related to alcohol. These presentations had a higher completion rate in each of the six steps than those (91.4%, 192) not directly related to alcohol. Only 6.2% (13) were formally screened for alcohol use.

Discussion and Conclusions

The findings suggest a need to improve the alcohol management practice in the hospital. Routine use of an alcohol screening tool can enable early identification of the alcohol use disorder and to improve the management of this problem in the hospital.

Keywords: alcohol use disorder, screen, management process, emergency departments, hospitals

1 **Introduction**

2 Alcohol is one of the top five risk factors for disease and disability that caused 3.3 million
3 deaths annually [1, 2]. In Australia, alcohol caused more than 5,500 deaths and 150,000
4 hospitalisations in 2010 [3].

5 With Emergency Department (ED) as the first “port of call” for many hospitalised patients, it
6 is estimated that 10% to 38% of the ED presentations are alcohol-related [4-6]. An Australian
7 study reported that 27% of ED patients used alcohol in the 24 hours prior to presentation [7].
8 Sadly this type of presentation is often unidentified [8]. As alcohol withdrawal and its
9 complications such as seizures may occur 6 hours after the last drink [9], failure in
10 identification of alcohol use disorder (AUD) can lead to unexpected acute alcohol
11 withdrawal. This can further complicate emergency assessment and diagnosis, causing harm
12 to patients [10].

13 Early identification of AUD is essential for the medical staff to determine optimal clinical
14 management of the patients [11]. An effective way is to use an alcohol screening tool to
15 identify and assess whether alcohol is harming a person’s health or is likely to cause harm in
16 the future. Although there are validated, formal alcohol screening tools available such as
17 Alcohol Use Disorders Identification Test (AUDIT) [12], the Cut-down, Annoyed, Guilt,
18 Eye-opener (CAGE) [13] and the Paddington Alcohol Test (PAT) [14], the use of these tools
19 remains unsatisfactory in Australian hospitals [15]. This results in a significant proportion of
20 patients with AUD unscreened or undiagnosed, exposing them to the risk of developing
21 alcohol withdrawal symptoms or complications. A recent Australian study evaluated the
22 effectiveness of a routine screening and triage tool for alcohol withdrawal syndrome [16].
23 The study specifically measured the completion rate of identification of alcohol withdrawal
24 syndrome, documentation of alcohol use and appropriate withdrawal management before and
25 after the intervention. It found that after the use of the tool, there was a significant increase in
26 the rate of documentation of alcohol use from 35.4% pre-intervention to 55.2% post-
27 intervention. The rate of appropriate management also increased significantly from 31.8% to
28 80% [16].

29 When AUD is suspected, assessment and documentation of alcohol use history should be
30 conducted. This includes information such as duration, quantity, pattern of use, previous
31 attempts to cut down alcohol intake or psychosocial impact [17, 18]. Research on

documentation of alcohol use is sparse and is not specific to patients with AUD. One study of documentation pattern of alcohol use in electronic medical records (eMR) in primary care found that although 56% of the eMR had quantitative documentation of alcohol use, only 26% had qualitative descriptions of this use [19]. Another similar study in hospital records for cancer patients found that in 57% of the documentation of alcohol use history was poorly described as social, occasional or moderate drinkers [20]. Therefore, there is a need to assess the documentation of alcohol use history for patients with AUD.

Due to prolonged heavy alcohol consumption, patients with AUD suffer from thiamine deficiency [21]. Therefore, once identified, these patients should be provided with thiamine to prevent Wernicke's encephalopathy, an acute neurological syndrome caused by thiamine deficiency [21-23]. The earlier thiamine is started, the faster the patient will recover [24]. Route of thiamine administration can be oral or parenteral. A retrospective medical record audit study found that among 226 patients, 89% (201) were prescribed with oral thiamine [25]. However, for patients at risk of alcohol withdrawal, only 4.5 mg of thiamine can be absorbed orally from any dose over 30 mg [26]; therefore, parenteral thiamine is the standard of care [21, 27].

To assess severity of alcohol withdrawal and to guide therapy appropriately, several validated scales can be used [9]. The Alcohol Withdrawal Scale (AWS) requires less reliance on patients' response by assessing four physiological indicators (pulse, body temperature, sweating and tremor) and five mental or psychopathological symptoms (agitation, anxiety, tactile disturbances, disorientation and hallucination) common to alcohol withdrawal [28]. According to the Clinical Institute Withdrawal Assessment for Alcohol scale in its revised version (CIWA-Ar), the severity of alcohol withdrawal should be estimated by observation with patient participation [9]. In case of lacking patient cooperation, other tools can be used, such as the Richmond Agitation-Sedation Scale which is generally applicable to intensive care patients [9, 29].

To prevent progression to a more severe withdrawal, benzodiazepine is recommended to be used early in the management of alcohol withdrawal [17]. Despite the fact that within the first two days of withdrawal, benzodiazepine reduces the incidence of seizures by up to 84% and prevent the development of delirium tremens [9], a previous study found that only 37% of

1 patients with AUD were prescribed with benzodiazepine for alcohol withdrawal management
2 [30].

3 To provide effective advice on inpatient withdrawal management, assess patients' readiness
4 to change alcohol consumption behaviour and assist them to meet their goal, it is
5 recommended that clinicians refer every patient with AUD to the hospital-based Drug and
6 Alcohol Consultation Liaison (DA-CL) specialist service [17]. However, it is found that in
7 practice, only 51% of the patients with AUD were referred to the specialist treatment services
8 including Drug and Alcohol Service [30] and only 27% of ED staff provided these patients
9 with formal referral to the outpatient alcohol service [31].

10 With the above prior knowledge, this research aims to understand and identify gaps in the
11 actual management process of patients with AUD in a teaching hospital in Australia.
12 Specifically, six key steps in the management of patients with AUD in hospitals were
13 examined: identification of AUD, documentation of alcohol use history, thiamine use, alcohol
14 withdrawal assessment, benzodiazepine for treatment of alcohol withdrawal and referral to
15 the DA-CL service.

Methods

2.1 Study design

The study was conducted in a teaching hospital in New South Wales, Australia. To allow the inclusion of any alcohol-related presentations, the diagnosis-related group (DRG) “AUD” acquired on discharge was used to identify these presentations. This umbrella term includes both apparent alcohol induced symptoms e.g. intoxication, and complications e.g. alcoholic pancreatitis, of which initial disclosure are more difficult. Three hundred and sixty-seven consecutive patient presentations with a primary or secondary discharge diagnosis of AUD between 15 November 2016 and 15 February 2017 were identified retrospectively.

Among these consecutive presentations, 210 (57.2%) presentations incurred by 199 patients were randomly selected. These included patients who were triaged and assessed in the ED, those who were directly admitted to the hospital wards and inter-hospital transfers. The randomization was performed in the IBM SPSS Statistics. As no paper file was used in the study hospital, all the patient information was extracted from the eMR for this audit research.

Audit of one patient record requires 30-minute manual work by the advanced trainee who could only afford half a day per week for research. That totals up to 105 hours of work. Given this constraint, the sample size may seem small, however it accounts for 57.2% of the total population.

An investigation of hospital re-presentation, re-admission and attendance to the community-based Drug and Alcohol Service was also conducted 17 months after patient discharge.

The project was approved by the hospital authority as meeting the requirements for quality assurance/audit and therefore it did not require consideration by the Human Research Ethics Committees.

2.2 Development of the audit protocol for extraction of data variables from the medical records

A collaborative, consensus-based, multi-disciplinary approach was used to complete this research. In total, 17 project meetings were held among the authors. Of these meetings, three were focus group discussions to develop a data extraction scheme in order to ensure that the

1 extracted data can address our research aim. The first focus group discussion involved three
2 clinician authors to develop an initial list of 16 data variables for extraction. The second focus
3 group involved six clinicians and a researcher in epidemiology to review and expand the list
4 to 21 variables. The third focus group involved five clinicians to further scrutinise the data
5 variables and one more variable- “number of AWS observations in the first 24 hours after
6 presentation”- was added. A coding scheme, including the variables and their values, was
7 developed by data extractor 1, then validated by six clinicians. For example, three possible
8 values for the variable “thiamine administration” were parenteral thiamine, oral thiamine and
9 no drug prescribed.

10 The 21 data variables were grouped into seven categories:

- 11 • *Patient characteristics* include eight variables: gender, age, length of stay, admission
12 specialty, admission ward, triage code, presenting problem and postcode.
- 13 • *Identification of AUD* includes three variables: screening tool used to assess the
14 severity of AUD, whether AUD was identified at ED triage and who (job role)
15 identified and documented AUD.
- 16 • *Documentation of alcohol use history* includes one variable: who (job role)
17 documented detailed history of AUD (e.g. duration, quantity, pattern of use, previous
18 attempts to cut down alcohol intake and social impact).
- 19 • *Thiamine* includes one variable: thiamine administration. Thiamine assists with
20 nutritional deficiencies associated with AUD which, if untreated, may lead to
21 Wernicke’s encephalopathy [23].
- 22 • *AWS assessment* includes six variables: whether AWS was started prior to or after the
23 medical officer's assessment, where was AWS first started, time to start AWS from
24 presentation, number of AWS observations in the first 24 hours after presentation,
25 maximum AWS score and documented alcohol withdrawal complications.
- 26 • *Benzodiazepine for alcohol withdrawal* includes two variables: type of prescribed
27 benzodiazepine and benzodiazepine regime for alcohol withdrawal. These two
28 variables were used to examine the practice of prescribing benzodiazepine for
29 withdrawal.
- 30 • *Referral to the DA-CL service* includes one variable: whether the patient was referred
31 to the DA-CL service following the clinical guideline.

2.3 Inter-rater agreement

Data extraction was manually conducted by two medical officers with six years and 20 months of hospital work experience, respectively. They have sufficient experience of using and extracting information from the eMR. They independently extracted the same 160 data points. A comparison of their records showed a Cohen's Kappa score of 0.96; therefore, adequate agreement was achieved [32].

2.4 Data cleaning and analysis

To ensure data accuracy, nine data validation rules were developed as the criteria to be used to detect inconsistencies, outliers and missing values in a large dataset [33]. Applying validation rules is a well-recognised method for checking data accuracy. For example, if no AWS was performed, then there should be no record of an AWS score. These rules were then applied to validate the data. Of the 3,360 data points manually extracted, 24 errors (0.7%) were identified in 19 patients' records, and were corrected through mapping back to the original eMR. Descriptive statistical analysis was conducted using SPSS version 21 (IBM Corp, Armonk, NY, USA).

3 Results

3.1 Patient characteristics

The 210 presentations were made by 199 patients; 30.2% (60) female and 69.8% (139) male (see Table 1). Their age ranged from 14 to 90 years old (mean, 50.6, 95% confidence interval [CI], 48.11, 53.17). On average, a patient stayed in the hospital for 5.9 days (95% CI, 4.82, 6.97).

It is noteworthy that 91.4% (192) of the 210 presentations had an initial presenting problem not directly related to alcohol, e.g. abdominal pain, reflecting the difficulty of fully disclosing alcohol-related morbidity at the initial presentation. Among all the 210 presentations, 34.2% (72) were admitted by emergency medicine specialty in the short stay area. This is followed by general medicine (18.6%, 39), psychiatry (9%, 19), general surgery (8.1%, 17), gastroenterology (6.7%, 14) and others (23.3%, 49).

3.2 Identification and management of patients with alcohol use disorder

Overall, only 6.2% (13) of the 210 presentations were formally assessed by a Mental Health substance use form, as there was no formal alcohol screening tool in place. Figure 1 shows the percentage of patients with AUD in each of the six key management steps. Among all patient presentations, 77.1% (162) were identified with AUD in the initial contacts with medical staff such as ED medical officer, ED nurse or specialty medical officer. The percentage of patients in each key step decreased from 64.3% (135) with a documentation of alcohol use history, 49.5% (104) with thiamine prescribed, 48.1% (101) with AWS assessment to 41% (86) with a prescription of benzodiazepine for alcohol withdrawal.

Of the 210 presentations, 38.6% (81) were referred to the DA-CL service and 61.4% (129) were not. Compared with the non-referred group, the referred one had higher proportion of female (32.1% [26/81] vs. 29.5% [38/129]), lower average age (46.5 vs. 52.7) and lower proportion of non-alcohol related presenting problems (85% [69/81] vs. 95.3% [123/129]).

Of the 129 non-referred presentations, 83.7% (108/129) received no referral or advice. Although 4.7% (6/129) were advised to contact the Drug and Alcohol Service, no formal

referral was made. The rest 6.2% (8/129) of the patients declined referral or were abstinent, 3.9% (5/129) were deceased and 1.6% (2/129) were discharged against medical advice.

Of the 210 presentations, 8.6% (18) had presenting problems directly related to alcohol. These presentations had a higher completion rate of each of the six key steps than those with initial presenting problems not directly related to alcohol.

3.3 Management of patients who developed moderate or severe alcohol withdrawal symptoms or complications

The alcohol withdrawal scores showed that 27.6% (58) of all presentations developed moderate or severe withdrawal, and/or withdrawal complications (i.e. seizures, delirium and hallucinations). Table 2 shows that 15.5% of these 58 presentations did not have thiamine and 20.7% received oral thiamine. In the first 24 hours since presentation, 24.1% of these did not receive any AWS assessment and 44.8% received one to four assessments. Regarding benzodiazepine regimes, only 1.7% were on loading dose, 34.5% were on symptom-triggered sedation and 31% did not have any prescription of benzodiazepine for withdrawal.

3.4 Hospital re-presentation and re-admission

As five patients were deceased in the index presentation, 194 patients were examined for their re-presentation, re-admission and attendance to the community-based Drug and Alcohol Service 17 months after discharge. Only 14% (27/194) of these patients attended the community-based Drug and Alcohol Service. 57% (111/194) re-presented to the ED, with 31% (61/194) identified with AUD. 44% (86/194) were re-admitted (including direct ward admission) into the hospital, with 32% (63/194) identified with AUD. These patients occupied 1,939 hospital days and 63% (1,216/1,939) of these days were alcohol-related.

4 Discussion

This study investigated the practice of identification and management of patients with AUD in an Australian teaching hospital. Medical records of 210 patient presentations with a primary or secondary diagnosis of AUD were audited. The results showed that more than 90% of the presentations were not screened with a formal screening tool. Despite the well-established evidence that early identification can inform optimal clinical management of alcohol-related morbidity [11], our study showed that more than a fifth of the presentations were not identified with AUD in the initial assessment by the triage nurse, ED medical officer, specialty medical officer or ward nurse. Approximately a third of these presentations did not have documentation of alcohol use history. More than half of them did not have thiamine, AWS assessment and benzodiazepine for alcohol withdrawal. More than 60% were not referred to the DA-CL service.

Our audit found that alcohol screening was conducted for only 6% of the presentations, similar with what was found in a previous study that was also conducted in Australian hospitals [31]. It was also found that 23% of the presentations were not identified with AUD in the initial contact with medical staff, lower than the 30% found in a study conducted in an Australian trauma setting [15]. Identification of AUD and providing brief advice is a cost-effective method to reduce alcohol-related morbidity in EDs [34]. Therefore, almost two thirds of 147 EDs surveyed in UK routinely screen patients' alcohol consumption [35]. Because there is strong evidence of a positive impact of screening on the subsequent management of AUD [36], there is a need to formally include an alcohol screening tool in the routine assessment in the hospital.

According to the local clinical guideline, AWS needs to be conducted second hourly in the first 12 hours and four to six hourly for the following 48 hours (Figure S1), which indicates that at least eight AWS observations should be recorded. Even this number might be an underestimate, our study found a lower number- only one to four AWS observations were recorded for most patients who exhibited moderate or severe withdrawal or developed withdrawal complications.

Thiamine is commonly prescribed to treat patients with alcohol withdrawal. It assists with nutritional deficiencies associated with AUD, which, if left untreated, can lead to Wernicke's encephalopathy [23]. However, for the 58 patients who suffered from moderate or severe

1 withdrawal or developed withdrawal complications, 16% were not prescribed with thiamine
2 and 21% of them received oral thiamine even though parenteral thiamine is recommended as
3 the optimal delivery method [27].

4 Our study reveals that there are three benzodiazepine regimes used for treating alcohol
5 withdrawal: loading dose, fixed dose and symptom-triggered sedation. Loading dose regime
6 uses high doses of longer-acting benzodiazepine at the commencement of treatment with no
7 further tapering, to reduce withdrawal-related complications and symptomatology; whereas
8 with fixed dose regime, benzodiazepine is administered at regular intervals, and tapered down
9 over few days [17]. The symptom-triggered sedation regime can result in under-treatment by
10 inexperienced staff who may not perform close monitoring of patient response. Because of
11 this, our local guideline recommends using either the fixed or loading regimes (see Figure
12 S2). Contradictory to this guideline, our study found that among the patients who developed
13 moderate or severe alcohol withdrawal symptoms or complications, only 2% of them were on
14 a loading dose regime. More than one third of them were sub-optimally prescribed the
15 symptom-triggered benzodiazepine. Unexpectedly, more than 30% of the 210 patients did not
16 receive any benzodiazepine.

17 According to the local clinical guideline, all of the patients who were diagnosed with AUD
18 should be referred to the hospital DA-CL service. However, in reality, more than 60% of
19 these patients were not referred, missing the opportunity to optimise care and provide
20 relevant education to these patients [37].

5 **Limitation**

There is a potential under-reporting of AUD in the eMR because the study scope and resource limitation did not allow the assessment of the completeness of the eMR in the study hospital. However, the number of referrals to the DA-CL was validated by comparing the data extracted from the eMR and the referral list kept by the DA-CL. The comparison found that 22 referrals recorded by the DA-CL were not actually documented in the eMR. These 22 referrals were then added to the audit results.

The methodology of retrospective audit of eMR was also limited by the completeness and accuracy of the records at the data entry stage. The number of AWS recordings may be under-estimated if the action was taken but was not documented in the eMR by the clinicians.

The results may also be affected by the spectrum of alcohol-related morbidity that was manifested in the patient population and the clinical judgment used by the two medical officers who extracted data to determine if a specified management step was implemented or not.

Conclusion

This study identified gaps in the management of patients with AUD. It identified a need to routinely use an alcohol screening tool to screen patients at the initial presentation and to improve alcohol management of patients with AUD in the hospital. Future research is required to investigate why some patients with AUD were not referred to the DA-CL service and how to improve the management of these patients across the continuum of care.

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1 8 Tables

2 **Table 1. Characteristics of patient presentations.**

Data variable	Data value	N (%)
Gender (N=199)	Female	60 (30.2)
	Male	139 (69.8)
Age group (N=199)	<20	10 (5)
	20-29	23 (11.6)
	30-39	21 (10.6)
	40-49	35 (17.6)
	50-59	42 (21.1)
	60-69	41 (20.6)
	70-79	18 (9)
	80-90	9 (4.5)
Triage code (N=210)	1. Immediately life threatening condition (has to be seen immediately)	8 (3.8)
	2. Imminently life threatening condition (has to be seen in 10 minutes)	38 (18.1)
	3. Potentially life threatening condition (has to be seen in 30 minutes)	100 (47.6)
	4. Potentially serious (has to be seen in 60 minutes)	37 (17.6)
	The patient was directly admitted to ward and was not seen by ED triage	27 (12.9)
Presenting problem (N=210)	Non-alcohol related	192 (91.4)
	Alcohol-related	18 (8.6)

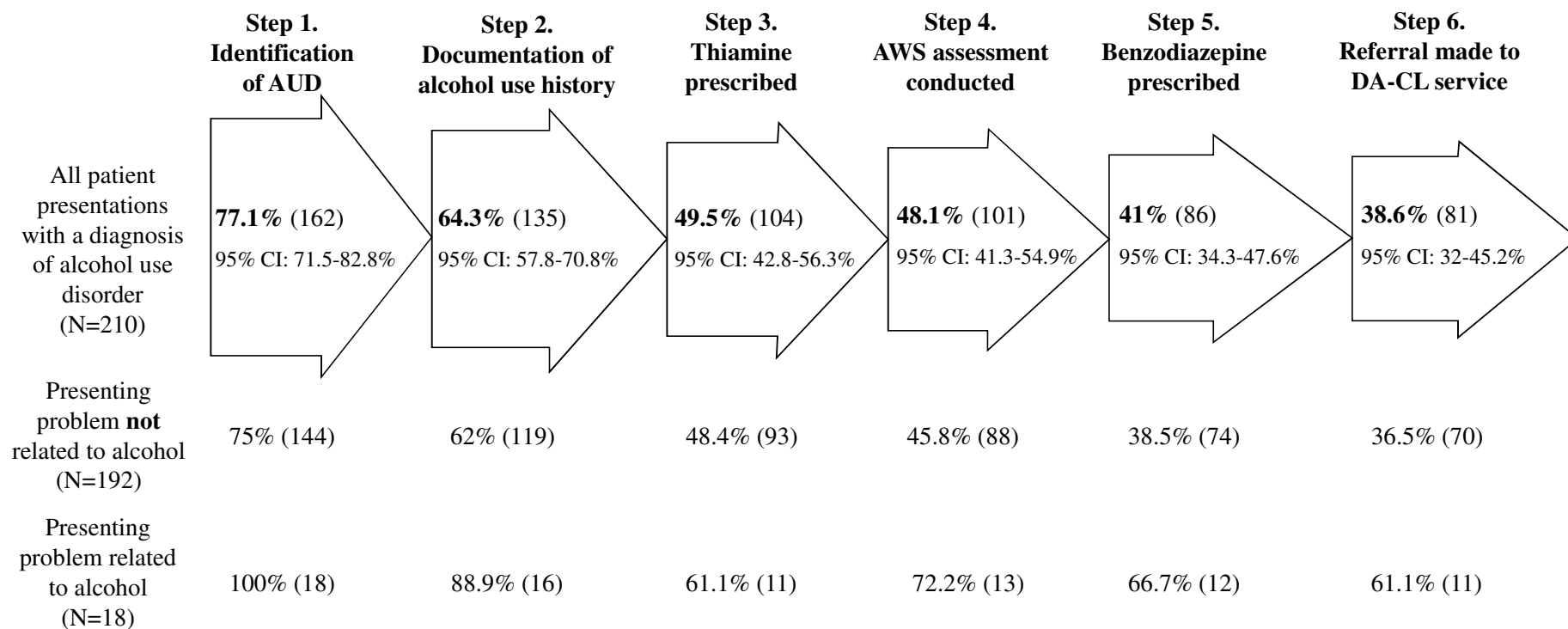
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1 **Table 2. Management of patients who exhibited moderate or severe withdrawal or**
2 **developed withdrawal complications.**

Data variable	Data value	Number of presentations	% (N=58)
Thiamine administration	Parenteral thiamine	37	63.8
	Oral thiamine	12	20.7
	No drug prescribed	9	15.5
Where was AWS first started	ED until discharge	25	43.1
	ED and continued on ward	1	1.7
	ED but discontinued on ward	5	8.6
	Ward (patients admitted through ED)	8	13.8
	Direct ward admission	5	8.6
Time to commence AWS since triage or ward admission	No AWS assessment was performed	14	24.1
	0 to 6 hours	22	37.9
	6 to 12 hours	12	20.7
	12 to 24 hours	5	8.6
	After 24 hours	5	8.6
Number of AWS observations in the first 24 hours after presentation	No AWS assessment was performed	14	24.1
	1 to 4 times	26	44.8
	5 to 7 times	9	15.5
	8 to 10 times	4	6.9
Type of prescribed benzodiazepine for alcohol withdrawal	None	19	32.8
	Diazepam	31	53.4
	Oxazepam	5	8.6
	Diazepam and oxazepam	4	6.9
Benzodiazepine regime for alcohol withdrawal	No drug prescribed	18	31
	Loading	1	1.7
	Fixed	15	25.9
	Symptom-triggered sedation	20	34.5
	Other	4	6.9
Referral to the DA-CL service	No drug prescribed	18	31
	Yes	26	44.8
	No referral or advice	23	39.7
	No referral but patient was advised to contact the DA-CL service	2	3.4
	No referral because of patient death	4	6.9
	No referral because the patient was discharged against medical advice	1	1.7
	Patient declined referral or patient abstinent	2	3.4

3 DA-CL: Drug and Alcohol Consultation Liaison



AUD: alcohol use disorder; AWS: Alcohol withdrawal scale; DA-CL: Drug and Alcohol Consultation Liaison

Figure 1. Percentage of patients with alcohol use disorder in each of the six key management steps.