


# The impact of COVID-19 on benzodiazepine usage in psychiatric inpatient units

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**Nancy Zaki**  Department of Pharmacy, Cumberland Hospital, Westmead, NSW, Australia.

**Vlasios Brakoulias** Office of the Mental Health Executive, Western Sydney Local Health District; School of Medicine and Translational Health Research Institute, Western Sydney University; Faculty of Medicine and Health, the University of Sydney, NSW, Australia.

## Abstract

**Objective:** This study aims to investigate whether COVID-19 has led to increased usage of benzodiazepines in acute psychiatric settings.

**Method:** We evaluated the rates of benzodiazepine usage in two acute psychiatric inpatient units over a period of two years, 2019 and 2020 (the year of the pandemic). Rates of oral atorvastatin usage over the same period were used as a comparator.

**Results:** We saw a significant increase in the usage of benzodiazepines in the period between April and December 2020 compared to the same period in 2019 despite a decline in the total number of admissions in 2020. Usage peaked further at the time of eased pandemic restrictions which coincided with higher rates of emergency department mental health (MH) presentations and acute MH hospital admissions. We also noticed higher rates of substance use disorder recorded on admission. Hospital leave restrictions due to COVID-19 also led to further restrictions on smoking.

**Conclusion:** Benzodiazepine usage increased in the context of the COVID-19 pandemic. The study encourages more research to better understand the impact of the pandemic on acute psychiatric settings.

**Keywords:** COVID-19, benzodiazepines, psychiatric, anxiety, distress

On 11 March 2020, COVID-19 was declared a pandemic by the World Health Organization.<sup>1</sup> The magnitude of the psychological impact of the pandemic has been particularly high in vulnerable people with pre-existing MH disorders.<sup>2–5</sup>

Higher levels of distress in people with serious mental illness compared to the general population could be due to higher vulnerability to stress, reduced access to resources for ongoing MH treatment and services, greater job or food insecurity, or social isolation and loneliness.<sup>3–5</sup>

In addition, different studies have shown increased rates of substance abuse during the pandemic, a situation that could induce or worsen existing MH conditions.<sup>5–7</sup>

According to the NSW Health record, the period from mid-March to mid-May 2020 saw a substantial drop in healthcare activity in NSW, including MH services, reaching its lowest point in mid-April (the period with the tightest restrictions on movement and interactions). In June, although many activities remained subdued, there were increases in new emergency department (ED) MH presentations and hospital admissions, returning to levels similar to 2019 throughout

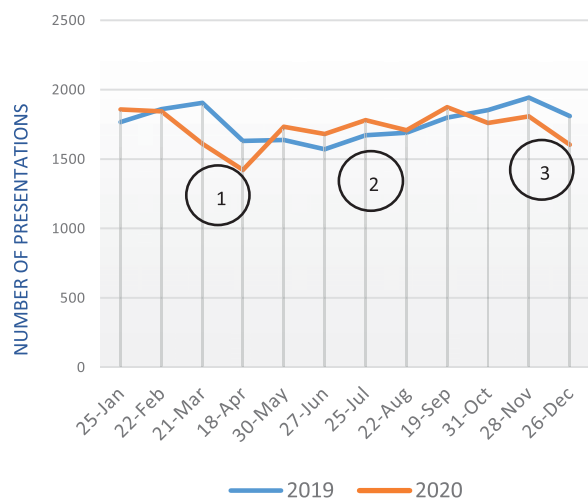
June to mid-December 2020 (Figure 1).<sup>8</sup> Our Western Sydney Local Health District (WSLHD) followed the same pattern, in that the lowest ED MH presentations in 2020 occurred in April, and presentations increased thereafter. However, monthly rates of ED MH presentations remained high throughout the whole of 2020 compared to 2019 (Figure 2).

*Benzodiazepines* are pharmacological agents commonly used within psychiatric units.<sup>9</sup> Diazepam, lorazepam and midazolam are three benzodiazepines often used on an ‘as needed’ basis for acute episodes of anxiety and agitation. Diazepam is also used to manage withdrawal symptoms associated with substance use disorder.

In this study, we aimed to compare the usage rates of these three benzodiazepines in an acute psychiatric setting during the year 2020 (the year of pandemic) with the usage rates in 2019. We hypothesised that higher levels of

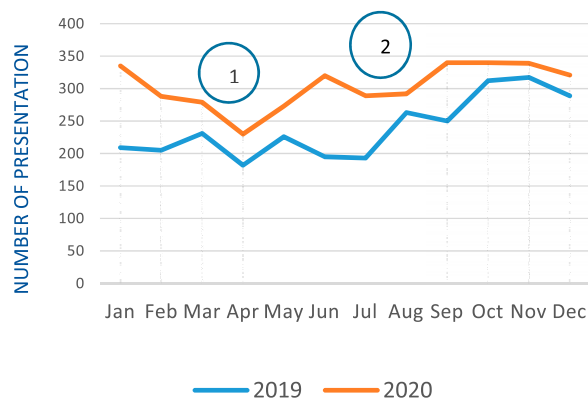
## Corresponding author:

Nancy Zaki, Department of Pharmacy, Cumberland Hospital, 1-11 Hainsworth Street, Westmead, NSW 2145, Australia.  
Email: [nancy.zaki@health.nsw.gov.au](mailto:nancy.zaki@health.nsw.gov.au)



**Figure 1. Emergency Presentation, Mental Health, NSW, Jan to Dec 2020 and 2019.** (1) Presentations decreased from mid-March to mid-April (tight COVID-19 restrictions). (2) Presentations returned to levels similar to 2019 throughout June to October (eased restrictions). (3) Presentations decreased again in November and December (tight restrictions in December).

Graph adapted from *Emergency presentations, mental health, NSW, January to December 2020 and 2019* (Figure 12). Bureau of Health Information. *Healthcare in Focus – New South Wales and the COVID-19 pandemic in 2020*. Sydney (NSW); BHI; 2021.



**Figure 2. Emergency Presentation, Mental Health, Western Sydney Local Health District (WSLHD), Jan to Dec 2020 and 2019.** (1) New cases of COVID-19 peaked in mid-March and then decreased, with locally acquired cases remaining below 10 per day from 18 April to 1 July.<sup>8</sup> (2) New cases increased during July and August before decreasing again from September to November.<sup>8</sup>

anxiety and agitation in the context of the pandemic would lead to increased use of benzodiazepines.

## Method

The study reviewed the usage rates of oral diazepam and lorazepam, and intramuscular midazolam during the period January 2019 to December 2020. Data was collected from two

33-bed acute adult psychiatric units in a major psychiatric hospital in Sydney, Australia. The two units studied are regarded as identical in staffing profile, design, and the demographic and clinical characteristics of the patients admitted to them. Rates of benzodiazepine usage, as extracted from the hospital's electronic medical record system (Cerner Millennium®), were collated in an Excel spreadsheet on a monthly basis for the period from January 2019 to December 2020. Both 'as needed' and regular benzodiazepine units used were included, while doses were not recorded. For comparison, the usage rates of a drug that was unlikely to be influenced by increased levels of distress were also evaluated for the same time frame. Atorvastatin was chosen for this purpose as it is commonly used as a lipid-lowering agent in patients with severe mental illness due to their high rates of metabolic syndrome.<sup>10</sup> Descriptive statistics and graphical representations of trends were used to assess changes in usage rates over the two-year period.

The demographic and clinical characteristics of patients admitted to the two psychiatric units during this period and rates of local MH presentations were extracted from the health service database (Table 1).

Data regarding NSW ED MH presentations and dates of COVID-19 restrictions in the community were extracted from the NSW Bureau of Health Information Report 2021.<sup>8</sup>

Nursing feedback on patients' mental states during the pandemic were sought on a regular basis.

This study received ethics approval from the WSLHD Human Research Ethics Committee (Study Number: 2009 -13).

## Results

As summarised in Table 1, there were 2122 admissions to the 66 beds of the two acute psychiatric units in 2020 compared to 2269 admissions in 2019. The average length of stay in 2020 was 11 days compared to 10.7 days in 2019. The majority of patients admitted to both units during the two-year period had a diagnosis of schizophrenia (44.3% in 2020 and 43.6% in 2019). However, there were more diagnoses of substance use disorder in 2020 compared to 2019 (an increase from 16% in 2019 to 19.2% in 2020 ( $p = 0.006$ )).

An increase in the usage of benzodiazepines was observed in the period between April and December 2020 with a peak in June 2020 where the usage almost doubled compared to June 2019 (Figure 3). The total number of benzodiazepine units administered in the year of the pandemic (2020) was 20,120 units compared to 14,547 units in 2019: an increase of 38% despite the decline in total admissions in 2020. In contrast, atorvastatin usage decreased in 2020 (1252 tablets) compared to 2019 (1344 tablets).

It is important to note that the peak of benzodiazepine usage in June 2020 coincided with a rise in the inpatient admissions in these two units (compared to the months March to May) and an increase in the ED MH presentations both on the state and WSLHD levels (Figures 1 and 2). All of these aligned with the easing of COVID-19 restrictions in the community. Nevertheless, even in the months of lower

**Table 1. Demographic characteristics of the acute psychiatric units during the study period (2019–2020)**

Categorical variable	Value taken	Year of admission		p-value
		2019 (n = 2269)	2020 (n = 2122)	
Sex	Male	63.4%	64.3%	
	Female	36.6%	35.6%	
	Indeterminate	0.0%	0.1%	
Month of admission	Jan	7.6%	9.3%	0.020*
	Feb	8.8%	9.2%	
	Mar	7.5%	8.7%	
	Apr	6.8%	7.5%	
	May	7.7%	7.7%	
	Jun	8.3%	10.1%	
	Jul	9.1%	8.5%	
	Aug	9.1%	8.4%	
	Sep	8.9%	8.3%	
	Oct	8.4%	8.3%	
	Nov	9.2%	6.9%	
	Dec	8.5%	6.9%	
Primary diagnosis on admission	Schizophrenia and related disorders	43.6%	44.3%	0.004*
	Bipolar disorder	8.8%	9.4%	
	Major depression and depressive disorder	5.1%	4.1%	
	Substance use disorder	16.0%	19.2%	
	Personality disorder	7.7%	6.4%	
	Adjustment disorder	9.5%	7.6%	
	Posttraumatic or acute stress disorder	3.9%	2.9%	
—	Other disorder <sup>#</sup>	5.4%	6.2%	
Continuous variables				
Age in years	Mean (SD)	38.3 (11.5)	37.4 (11.9)	0.005
Length of stay (days)	Mean (SD) median (LQ, UQ)	10.7 (16.4)	11 (17.3)	0.074
		4.4 (0.9, 12.8)	4.8 (1.1, 13.7)	

\*p-value is statistically significant at  $p < 0.05$ .

<sup>#</sup>Other disorder included diagnoses such as obsessive-compulsive disorder, developmental disorder, eating disorder and conduct disorder.

admission rates (July to December 2020, Table 1), monthly benzodiazepine usage was still higher than in 2019.

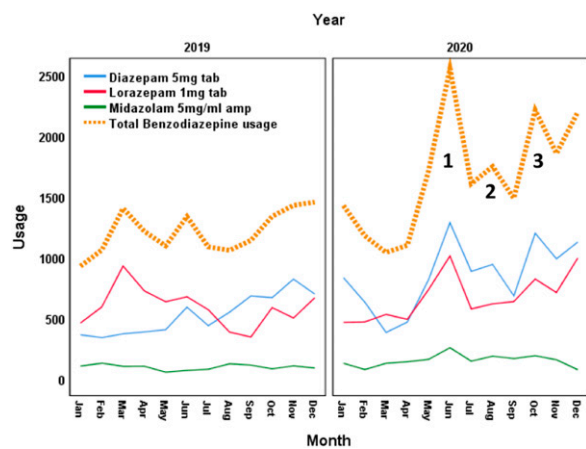
## Discussion

This small audit reveals that usage rates of diazepam, lorazepam and midazolam increased in two acute psychiatric units based in metropolitan Sydney during the pandemic in 2020. Used as anxiolytics and sedatives, these three benzodiazepines may be considered as surrogate markers of distress and anxiety. This finding supports the published reports that during the pandemic, patients with severe mental illness are experiencing greater levels of distress than the general population.<sup>2–5</sup> The need to use pharmacological intervention may also indicate the severity of patients' distress.

Other reasons for increased use of benzodiazepines could be a greater acuity of mental illness, more substance abuse and occasional increases in admissions (as in June 2020). Another potential explanation could be the restrictions placed on patient leave that could lead to further agitation especially for people who are craving cigarettes and not able to leave to smoke. The unavailability of effective nicotine replacement therapy (NRT) could be another reason for inadequate management of nicotine dependency during restrictions. However, discussion of this topic is outside the scope of this paper.

Although not systematically sought, the views of nursing staff supported all these potential explanations.

To our knowledge, there have not been any other reports of increased benzodiazepine use within a psychiatric population during the pandemic.



**Figure 3. Details of type of benzodiazepine usage.** (1) Mid-May to June 2020: eased COVID restrictions, increased ED presentations and admissions. (2) July August: tight restrictions due to community transmissions and face mask wearing. (3) September November: eased COVID-19 restrictions.

This finding should prompt clinicians to ask questions that enable a better understanding of the impact of the pandemic on the individual and to adopt a solution-focussed approach or a cognitive approach rather than resorting to benzodiazepines. It is well known that benzodiazepines are associated with significant adverse effects including increased confusion, risk of falls, respiratory depression, and dependency, especially when combined with other psychotropic medications.<sup>9,11</sup>

This study has a number of strengths in that it evaluated benzodiazepine use in a clinical sample and also used a non-psychotropic medication (i.e. atorvastatin) as a control. We assessed two large psychiatric units that are representatives of acute psychiatric units within Australia. We were also able to note changes in benzodiazepine usage in a chronological sequence while also noting changes in the ED MH presentations and in the Australian community relating to the pandemic (Figures 1 and 2). The short and sharp increase in the number of infected cases in NSW in 2020 confers a relatively unique advantage to studies attempting to determine the impact of the pandemic.

Limitations of the study include the large number of confounding variables that may have influenced prescribing rates and the inability of this study to attempt to control for these. Ideally, the study could have looked at a larger population of patients in psychiatric units and reported a larger number of variables such as markers of severity of illness, rates of patient leave and the extent of benzodiazepine usage in patients with substance use disorder. Another limitation was the absence of direct patient interviews by the audit team, as COVID-19 restrictions limited direct patient contact.

Future studies may consider further investigation of the impact of the pandemic on inpatient psychiatric settings. A better understanding will lead to more effective interventions. These may include inpatient-tailored programmes

to reduce distress, adequate NRT to manage nicotine dependency, timely telehealth consultations and assessments in the community, and evidence-based interventions to reduce substance abuse.<sup>12</sup>

## Conclusion

Benzodiazepine usage increased in two psychiatric inpatient units during the pandemic in 2020. This finding emphasises the need to better understand the impact of the COVID-19 pandemic on acute psychiatric inpatient settings and to develop more effective interventions to reduce and manage distress when it arises.

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## Declaration of conflicting interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: The authors did not report conflict of interest, but acknowledge that author VB is the Executive Director of the Mental Health Service and author NZ is a pharmacist working on the psychiatric units that were studied.

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## ORCID iD

Nancy Zaki  <https://orcid.org/0000-0002-3007-4575>

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