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Original Research

A cross-sectional study of alcohol and drug-related medical hospital admissions among youth (15–24-years olds) in Ireland during the COVID-19 hard lockdowns

Sean Gunnigle[1], Bobby Smyth[2] and Anne O'Farrell[3]

[1]Child and Adolescent Mental Health Service, Cork Kerry Community Healthcare, Health Service Executive, Blackrock Hall Primary Care Centre, Cork, Ireland, [2]Consultant Child & Adolescent Psychiatrist, Adolescent Addiction Service, Cherry Orchard Hospital, Dublin, Ireland and [3]Research and Evidence, Strategic Planning and Transformation, Health Intelligence Unit, Dublin, Ireland

Abstract

Background: The COVID-19 pandemic and associated lockdowns raised concerns about their impact on substance use among young people.

Objectives/Aims: The aim of this study is to investigate the potential changes in alcohol and drug-related medical hospital admissions during the pandemic compared to pre and post pandemic years among individuals aged 15–24 in Ireland.

Methods: Data from the Hospital Inpatient Enquiry (HIPE) database, covering emergency hospital admissions from 2017 to 2022, were analysed. Lockdown and control periods were identified, and admission rates for drug-related hospital admissions (DRHA) were calculated per population and per 100 all-cause admissions. The study also examined changes in alcohol-related hospital admissions (ARHA) and explored the contribution of different drug categories to DRHA during lockdowns.

Results: We found that there was an increase in drug-related hospital admissions (DRHA) among individuals aged 15–24 years during the periods of hard lockdowns, comparing the three periods of hard lockdown from 2020 to 2021 with corresponding weeks in control years. The median rate of DRHA per million per week during the lockdowns was 23.8 (inter-quartile range [IQR] 19.0 – 29.9) while it was 18.2 (IQR 13.7–22.2) during the control weeks ($p<0.001$). DRHA accounted for a median 3.81% of admissions during lockdown weeks while they comprised 2.16% during the control weeks.

Conclusions: Our findings suggest that an adverse effect of pandemic restrictions appears to be increased acute drug-related problems requiring medical management among youth aged 15–24 years.

Keywords: Drug; COVID; youth; admissions; lockdown

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Introduction

The COVID-19 pandemic and the ensuing lockdowns (the imposition of stringent restrictions on travel, social interaction, and access to public spaces) imposed to kerb its spread have had implications for public health (Onyeaka *et al.* 2021). One such area of concern is the potential impact on substance use patterns and related hospital admissions, particularly among young adults (Perino *et al.* 2023). During the pandemic, public health measures influenced behaviours associated with alcohol and drug consumption, leading to mixed outcomes in substance-related hospital admissions (Zhai *et al.* 2023; McGrath *et al.* 2023). While some studies report increases in such admissions during the pandemic (Ng *et al.* 2022; Zhang *et al.* 2022), others suggest decreases (Akhoundzadeh *et al.* 2022; Perino *et al.* 2023), indicating a complex and multifaceted issue.

The COVID-19 pandemic impacted mental health among children and adolescents (Gómez-Ramiro *et al.* 2021; Loades *et al.* 2020; Jones *et al.* 2021). In Ireland, there was a noted increase in emergency department visits for psychiatric assessments of individuals under 18 during the pandemic (McLoughlin *et al.* 2023). A study conducted in 2022 revealed that over 40% of Irish adults met the criteria for a mental health disorder, with 10% reporting a history of suicide attempts (Hyland *et al.* 2022). These findings could suggest that the pandemic exacerbated mental health challenges within a population already bearing the fourth highest rate of youth suicide in Europe (UNICEF Office of Research, 2017). Amid these challenges, some individuals turned to substances as a coping mechanism (Xin *et al.* 2022). Information about the illicit drug trade remains difficult to obtain due to its clandestine nature (Eligh, 2020). Disruptions in supply chains may have led users to experiment with unfamiliar drugs or consume drugs with higher contaminant levels. An online survey conducted

Corresponding author: Bobby Smyth; Email: bobby.smyth@hse.ie

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in Ireland from April 11 to June 1, 2020, revealed that cannabis users were least likely to alter their usage patterns, although daily users reported increased consumption. In contrast, individuals who used cocaine and ecstasy prior to the pandemic often ceased use, with reduced opportunities cited as a reason for decreased use, while boredom and anxiety were linked to increased use (O'Connor *et al.* 2021).

Internationally, a systematic review indicates a nuanced picture of substance use during the pandemic, with a trend towards increased use of non-alcohol substances (Roberts *et al.* 2021). Research suggests that while opioid and alcohol consumption remained stable in the early pandemic phases, mortality rates among these groups increased, likely due to heightened use among high-risk populations (Marsden *et al.* 2022; Friedman & Akre, 2021; Ghose *et al.* 2022). Similarly, cannabis consumption rose among regular users during lockdowns (Marsden *et al.* 2022; Capuzzi *et al.* 2020), and in North America, drug overdose deaths increased after the onset of the pandemic (Marsden *et al.* 2022). In Ireland, 2020 saw a 17.1% rise in drug poisoning deaths compared to 2019 (Kelleher *et al.* 2024).

This study aims to explore the potential changes in alcohol and drug-related medical hospital admissions during the pandemic compared to pre- and post-pandemic years in Ireland. This investigation stems from varied international reports indicating inconsistent findings in such admissions during the pandemic (Zhai *et al.* 2023). It will also analyse the demographics of young people admitted for alcohol and drug-related medical issues and identify the main substances involved. The findings may inform effective service planning and care delivery, offering insights that are particularly relevant for the ongoing development of substance use interventions in Ireland.

Measures

Data on admissions were extracted from the Hospital In-Patient Enquiry (HIPE) system (National Centre for Classification in Health 2018). The HIPE system, managed by the Health Service Executive (HSE) Healthcare Pricing Office, served as the data source for this study and was accessed via the Health Atlas Ireland system maintained by the HSE National Health Intelligence Unit. This database is a well-established, quality-assured national hospital care information system that employs the International Classification of Diseases, 10th Revision – Australian Modification (ICD-10-AM), the Australian Classification of Health Interventions (ACHI), and the Australian Coding Standards (ACS) to capture demographic, clinical, and care data at discharge for all episodes of emergency and elective care across publicly funded hospitals in Ireland.Administrative staff may assign up to 20 diagnoses per admission, following the ICD-10-AM criteria (National Centre for Classification in Health 2018). The HIPE system is designed to capture hospital activity data and is the principal source of demographic, administrative, and clinical data on all inpatient and day-case discharges from 53 publicly funded acute hospitals in Ireland. HIPE categorises admissions as either emergency or elective, with the latter sub-categorised as day or non-day cases (Australian Consortium for Classification Development 2018). The quality of HIPE data was not impacted by the COVID-19 pandemic, as any missing data was imputed retrospectively if needed, ensuring the records are complete. However, HIPE does not include data from psychiatric admission units or drug treatment centres, so these were excluded from the analysis. Administrative staff may assign up to 20 diagnoses per admission, following the ICD-10-AM criteria (National Centre for Classification in Health 2018). The HIPE system is designed to capture hospital activity data and is the principal source of demographic, administrative, and clinical data on all inpatient and day-case discharges from 53 publicly funded acute hospitals in Ireland. HIPE categorises admissions as either emergency or elective, with the latter sub-categorised as day or non-day cases (Australian Consortium for Classification Development 2018). The quality of HIPE data was not impacted by the COVID-19 pandemic, as any missing data was imputed retrospectively if needed, ensuring the records are complete. However, HIPE does not include data from psychiatric admission units or drug treatment centres, so these were excluded from the analysis.

Ethical approval and methods

Ethical approval

This study utilised secondary analysis of anonymised, routinely collected data for the purpose of health service improvement. Consequently, formal ethical approval was not required in line with local regulations (Section 7, Health Act 2004). All data were processed in accordance with legal and ethical best practices. All data were extracted from anonymised administrative sources for secondary analysis and cannot be linked to individual patients. Data were obtained and used with the permission of the Health Service Executive Ireland Health Intelligence Unit.

Data acquisition and inclusion criteria

We obtained admission data through the HIPE database. The study encompassed all emergency hospital admissions from January 1, 2017, to December 31, 2022. Admissions were determined to be drug-related if any of the discharge diagnosis codes were F11 to F16, F18, F19, or T40.1 to T40.9. These ICD codes include hospitalisations and poisonings due to opioids, cannabinoids, cocaine, stimulants, and polydrug use. Admissions were determined to be alcohol-related if F10 was included among the discharge diagnoses. The study was limited to individuals aged 15 – 24 years and excluded those known to reside outside of the Republic of Ireland.

Lockdown and control periods

During 2020 – 2021, Ireland experienced three level 5 lockdowns of nine, six, and fourteen weeks, respectively.

Level 5 restrictions in Ireland included the following measures:

People were advised to stay at home and only leave for essential reasons, such as work (if unable to work from home), exercise within a 5-kilometre radius, and essential shopping. Schools, colleges, and universities were closed. No social gatherings were permitted. Non-essential travel was restricted. People were required by law to stay within their county or a 5-kilometre radius from their home. Non-essential retail was closed. Essential retail, such as grocery stores, pharmacies, and certain other services, remained open. Bars and restaurants were closed. Gyms, leisure centres, cinemas, theatres, and other cultural venues were closed. Religious services moved to online or broadcast formats. Limited numbers were allowed to attend weddings and funerals, with strict social distancing measures in place.

The corresponding weeks in 2017 – 2019 and 2022 served as control periods for comparison. We compared the 29 lockdown weeks with the same weeks in the control years, resulting in a total of 116 control weeks. Utilising identical weeks in the control years allowed us to control for potential seasonal effects upon drug-related hospital admissions (DRHA).

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Calculation of admission rates

We calculated the rate of DRHA per week per 1,000,000 population and also the rate of DRHA per 100 all-cause admissions in this age range. The estimated population of people aged 15 – 24 years for each year was obtained from the CSO census database.

Comparison with alcohol-related hospital admissions (ARHA)

As a contrast measure, we also examined alcohol-related hospital admissions (ARHA) in this age range during the same period.

Analysis of substance categories and lockdown effects

To understand potential variations in the impacts of lockdowns on different substance categories, we compared the proportion of DRHA attributed to each main substance category during lockdowns with the corresponding proportions in non-lockdown control periods.

Statistical analysis

As the dataset was small and based on an a priori hypothesis, we deemed corrections for multiple comparisons unnecessary and assumed the data was likely to be non-normal. We compared proportions using the chi-square test, reporting an uncorrected two-tailed p-value. Due to the small number of weekly rates, non-normality was assumed.

To contrast weekly rates of admissions between lockdown periods and control periods, we used a non-parametric test, the Mann–Whitney *U* test. We used this test instead of a parametric test such as a *t*-test, as the number of rate measures was quite small and it does not require an assumption of normal distribution. In addition to comparing the entire group of lockdown weeks with all of the control weeks, we also examined each individual lockdown period and compared it with the corresponding control period. The level of significance for all tests was set at 0.05. No correction was made for multiple testing.

Results

There was a total of 4008 drug-related hospital admissions (DRHA) across the six years among 15- to 24-year-olds. Males accounted for 2859 (71.3%) of these admissions. The mean age at admission was 20.4 years (SD = 2.6). Two-thirds (65.1%) of these admissions were aged 20 to 24 years. The geographic distribution of admissions is given in Table 1, with 61% living in Leinster.

The top 10 primary admission diagnoses are listed in Table 1, but these most common diagnoses only account for 37% of all admissions, indicating that primary diagnoses were heterogeneous. The mean number of bed days per DRHA was 3.4 days (median = 1 day, range = 0.5 – 360 days). There were a total of 1,764 days spent in ICU (mean = 0.4 days) among DRHA across the six years. The most common day of admission was Monday (17%), while Wednesday accounted for the lowest proportion (12.5%).

During the 145 lockdown and control weeks focused upon in this study, there were 1752 DRHA. The drug classes involved with the greatest frequency in these DRHA were cannabinoids (37%), cocaine (32%), and opioids (32%).

Comparing all the lockdown weeks with all the control weeks, the median rate of emergency hospital admission for any reason was 20% lower during the lockdown weeks in this age range (Table 2).

The median rate of DRHA per million per week during the lockdowns was 23.8 (interquartile range [IQR] 19.0 – 29.9), while it was 18.2 (IQR 13.7 – 22.2) during the control weeks ($p < 0.001$). Table 2 also shows that DRHA accounted for a median 3.81% of admissions during lockdown weeks, while they comprised 2.16% during the control weeks ($p < 0.001$).

Table 1. Characteristics of drug-related hospital admissions among people aged 15 – 24 years old (2017 – 2022)

Primary Admission Diagnosis	
Diagnosis	Number (*N*)
Convulsions, other/unspecified	319
Paracetamol overdose	292
Benzodiazepam overdose	181
Cocaine overdose	164
Alcohol related disorder	114
Syncope/collapse	96
Other Opioid overdose	90
Heroin overdose	77
Other chest pain	76
Chest pain unspecified	68
Home Region	
Region	Number (*N*)
Dublin	1142
Rest of Leinster	1303
Munster	1049
Connacht	246
Ulster	212
NFA	56

The median rate of alcohol-related hospital admissions (ARHA) fell by 10% during the lockdown weeks when compared to the control weeks ($p = 0.006$). However, this decline seemed broadly in line with the general reduction in overall hospital admissions for this young age range, as the proportion of admissions related to alcohol did not alter significantly during lockdowns compared to control periods ($p = 0.91$).

There were also significant differences in the median proportion of admissions accounted for by DRHA in each individual lockdown period (see Table 2). The median weekly rate of DRHA per population was significantly elevated during the second and third lockdowns, but the increase was non-significant during the first lockdown.

In exploring changes in the relative contribution of different drug classes to the proportion of DRHA across the lockdowns, no significant change was noted overall. However, when examining patterns during individual lockdowns, cannabinoids accounted for a lower proportion of DRHA during the first lockdown (28% *v.* 39%, $p = 0.03$), and opioids accounted for a lower proportion of DRHA during the third lockdown (22% *v.* 32%, $p < 0.01$) when compared to the same periods in the control years.

Discussion

We found an increase in drug-related hospital admissions (DRHA) among individuals aged 15 – 24 years during the severe lockdown periods from 2020 to 2021, compared to corresponding weeks in control years.

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Table 2. Rates of substance-related hospital admissions during COVID-19 lockdowns and control periods

	Lockdowns		Control period		
	Median	IQR	Median	IQR	*P* value
Overall Lockdown Periods					
All cause admissions					
Admissions/population*	690	(519 – 767)	866	(794 – 931)	<0.001
Alcohol Related Admissions (ARHA)					
ARHA/population*	15.8	(9.5 – 18.9)	17.6	(14.6 –24.3)	0.006
ARHA/100 admissions^	2.45	(1.74 – 2.87)	2.10	(1.62 – 2.77)	0.91
Drug Related Admissions (DRHA)					
DRHA/population*	23.8	(19.0 – 29.9)	18.2	(13.7 – 22.2)	<0.001
DRHA/100 admissions^	3.81	(2.82 – 4.44)	2.16	(1.58 – 2.67)	<0.001
1st Lockdown - DRHA					
DRHA/population	22.2	(19.0 – 24.6)	18.4	(13.7 – 22.8)	0.10
DRHA/100 admissions	4.39	(3.70 – 4.96)	2.25	(1.73 – 2.72)	<0.001
2nd Lockdown - DRHA					
DRHA/population	27.7	(22.6 – 38.4)	18.5	(13.0 – 21.5)	0.008
DRHA/100 admissions	3.27	(2.23 – 4.60)	2.11	(1.49 – 2.45)	0.015
3rd Lockdown - DRHA					
DRHA/population	25.2	(16.9 – 30.3)	18.0	(13.9 – 22.7)	0.017
DRHA/100 admissions	3.73	(2.65 – 3.94)	2.13	(1.57 – 2.71)	<0.001

ARHA = Alcohol related hospital admissions.
DRHA = Drug related hospital admissions.
*Admission/population, DRHA/population and ARHA/population. In each case the rate is the number of admissions per week per 1,000,000 people.
^ ARHA/100 admissions and DRHA/100 admissions. In each case, the rate is the number of admissions per week per 100 all cause emergency admissions in this age range. This also indicates the percentage of all cause admissions per week attributable to either alcohol or to drugs.

This finding aligns with some international studies (Ng *et al.* 2022; Zhang *et al.* 2022; Roehler *et al.* 2023). However, research on this topic remains sparse, and our results contrast with findings elsewhere (Perino *et al.* 2023; Akhoundzadeh *et al.* 2022). Variations could be attributed to differences in the length and severity of pandemic restrictions in Ireland compared to other nations.

DRHA represent a significant healthcare burden in this age range (Rajabali *et al.* 2023). The substances most frequently involved were cannabinoids, cocaine, and opioids, indicating significant health issues within this demographic. While the prominence of cocaine and opioids could be anticipated, the high number of cannabis-related admissions might surprise clinicians. The increasing involvement of cannabis in hospital admissions has been noted across Europe (MIRÓ, *et al.* 2023). Our observations of increased cannabis-related hospital presentations in our studied age range were also evident in parts of America during the pandemic, especially in regions where cannabis use is legal (Roehler *et al.* 2023). Leinster, which contains approximately 36% of the Irish population, accounted for 61% of DRHA, indicating an overrepresentation of DRHA in the province. This overrepresentation is likely related to Dublin's higher population and traditional opioid use patterns in Ireland's capital city.

Our findings also highlighted the heterogeneity in primary admission diagnoses, suggesting the complexity and diversity of health problems that develop in the context of substance use among young people. Comparing the weeks of hard lockdown with control weeks, we observed a notable decrease in the median rate of all-cause admissions during lockdowns, reflecting a general decline in emergency department attendances by youth during the pandemic peaks (Marron *et al.* 2022). In contrast, there was a significant increase in DRHA during lockdown weeks, leading to a substantial rise in the proportion of DRHA among all admissions.

Our findings suggest that pandemic restrictions may have increased acute drug-related problems requiring medical management in youths aged 15 – 24 years. These findings align with the national survey indicating relapse and increased drug use during this period (Bruton *et al.* 2021).

Furthermore, we explored changes in the proportion of DRHA attributed to different drug categories during lockdowns versus control periods. Overall, changes occurred evenly across drug classes. The population survey during the first lockdown suggested greater declines in use among users of cocaine versus cannabis (O'Connor *et al.* 2021). However, during the first lockdown, we found that the contribution of cannabinoids to overall DRHA declined.

The increase in drug-related hospital admissions among children and young adults during the pandemic could be attributed to several interconnected factors:

Firstly, the pandemic significantly heightened stress, anxiety, depression, and isolation, profoundly impacting young individuals (O'Connor *et al.* 2021). School closures and disrupted routines led to increased unsupervised time, which potentially resulted in greater instances of substance experimentation. Furthermore, the

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loss of support systems and restricted access to youth services exacerbated these challenges. With many activities cancelled, young adults were left with unstructured time, making them more prone to engaging in risky behaviours. The disruption of school-based prevention programmes further reduced resources available to educate youths about the risks associated with substance use. Additionally, many families faced financial and health challenges that increased stress levels, potentially contributing to an uptick in substance use. Parents, often dealing with their own struggles, had less capacity to closely monitor their children. Moreover, increased online time exposed youths to pro-substance messages (Rutherford *et al.* 2023). Some individuals faced barriers in accessing mental health services, including addiction treatment. From previous international examples (Day *et al.* 2006), we know that disruption or changes in drug supply can alter patterns of use also.

Limitations

Certain limitations of this study must be acknowledged. The data relied on the Hospital Inpatient Enquiry (HIPE) database, which might have inherent biases and limitations. Additionally, our analysis focused on a specific age range and only one country, potentially limiting generalisability. A limitation of the study is that it excludes psychiatric admissions data; however, we believe that capturing drug-related hospital admissions in the acute hospital setting in Ireland is important and highlights that pandemic restrictions appear to have led to an increase in drug-related hospital admissions. The ICD system may bias data due to its broad classifications, leading to potential underreporting and data inconsistencies in healthcare.A limitation of the study is that it excludes psychiatric admissions data; however, we believe that capturing drug-related hospital admissions in the acute hospital setting in Ireland is important and highlights that pandemic restrictions appear to have led to an increase in drug-related hospital admissions. The ICD system may bias data due to its broad classifications, leading to potential underreporting and data inconsistencies in healthcare.

Conclusion

Our study highlights a concerning increase in drug-related hospital admissions (DRHA) among individuals aged 15 – 24 during the severe lockdown periods from 2020 to 2021. This rise in admissions, while notable, should be interpreted with caution. The data show an association between the lockdowns and the surge in DRHA, but we cannot establish a direct causal relationship due to the study's limitations in capturing contributory factors.

The decline in overall emergency department attendances during the lockdowns (Marron *et al.* 2022) contrasts sharply with the significant increase in DRHA, underscoring the unique challenges posed by substance-related issues amidst pandemic restrictions. These findings suggest that lockdowns may have been associated with specific harms to youth, but further investigation is needed to better understand these dynamics.

The potential factors contributing to the rise in DRHA, such as disruptions in education, increased mental health challenges, and reduced access to support systems, reflect the need for comprehensive public health responses. However, as our study does not provide direct evidence linking these factors to the observed increase, caution must be exercised when interpreting these findings.

Looking ahead, future research should aim to explore the underlying factors driving these trends in more depth and develop targeted strategies to mitigate the negative effects of substance misuse among youth, particularly during periods of social disruption. If society faces similar challenges in the future, the potential adverse impacts on youth must be carefully weighed when implementing restrictive measures.

Acknowledgements. This study utilised secondary analysis of anonymised routinely collected data for the purpose of health service improvement. Consequently, formal ethical approval was not required in line with local regulations (Section 7, Health Act 2004). All data was processed in line with legal and ethical best practice. All data was extracted from anonymised administrative sources for secondary analysis and cannot be linked to individual patients. Data was obtained and used with the permission of the Health Service Executive Ireland Health Intelligence Unit.

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Competing interests. The authors confirm there are no conflicts of interest to declare.

Ethical standards. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committee on human experimentation with the Helsinki Declaration of 1975, as revised in 2008.

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