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The impact of the COVID-19 pandemic on alcohol-related emergency department visits in a large European city

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ABSTRACT

Introduction: The COVID-19 (Coronavirus infectious disease 2019) pandemic has caused global behavioural changes due to the need to remain in quarantine by large groups of the population. Earlier work on the effects of other epidemics on the human psyche has revealed a possible increase in the number of people who abuse alcohol as a method of coping with mental stress. Despite this, the studies on the COVID-19 pandemic have not shown a clear correlation between lockdowns and quarantines and an increase in alcohol consumption. This study focused on examining the impact of the pandemic on the number of alcohol-related attendances in the Emergency Department in Poznan (Poland).

Material and methods: The periods of one year before the pandemic (control trial) and the first year of the COVID-19 pandemic (study group) were analysed retrospectively using the data of ED patients who were under the documented influence of alcohol. Total number, alcohol concentration, waiting time for a medical examination, the patient's aggressive behaviour, length of stay in the ED, the need for additional examinations, suturing wounds or endotracheal intubation were analysed.

Results: 954 patients were identified, which constituted 2.9% of all patients admitted to the ED during this period (the total number of patients admitted was 33510). During the control period, the total number of ED admissions was 30388 and 794 (2.6%) of them were in the control group. The median body alcohol concentration was 2.6‰. It has been shown that during the pandemic more women and fewer men under the influence of alcohol were admitted to the ED (212 (22.2%) females and 742 (77.8%) males) than in the pre-pandemic period [135 (17.0%) females and 659 (83.0%) males]. Additional examinations were performed less frequently (84.1% vs. 73.9%; $p = 0.00000$) and patients were admitted to other departments more often (25.7% vs. 40.9%; $p = 0.00000$). Other examined parameters did not change significantly.

Conclusions: The study shows an increase in the number of patients under the influence of alcohol during the pandemic presenting to the ED and a noticeable change in management patterns' variables such as shorter LOW, fewer performed laboratory tests and more admissions to wards. However, this data requires further analysis and comparison with studies from other centres to draw more general conclusions.

Key words: alcohol-related disorders; emergency department; social behaviour; disease outbreaks; emergency medicine

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Introduction

A new Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) infection started in December 2019 and quickly spread outside China and subsequently was officially declared a pandemic in March

2020. This rapidly evolving situation resulted in countries introducing strict hygiene regimes and lockdown measures. COVID-19 pandemic-related mandatory quarantine kept many people in their homes, leading not only to a massive change in their lifestyle and habits but also to conceivable mental health issues. Studies conducted during the first SARS-CoV2 outbreak and

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an equine influenza outbreak in Australia showed that those who had been quarantined reported a high prevalence of symptoms of psychological distress and disorder, including stress, low mood, irritability and emotional disturbance [1].

As one can learn from studies conducted during the COVID-19 pandemic, an increase in the COVID-19 impact index (established by the significant indicators of human mobility and daily SARS-CoV-2 rate) was associated with an increase in the prevalence of major depressive and anxiety disorders [2]. Under such circumstances, there is a risk for changes in lifestyle habits, such as smoking and alcohol consumption [3].

Moreover, stress itself is a well-known risk factor for substance abuse. Stressors that were highly predictive of addiction were characterized as highly emotional, distressing events that are uncontrollable and unpredictable [3]. The COVID-19 pandemic, constantly changing situation and restrictions, cannot be described in a better way. Another study has found that symptoms of posttraumatic stress disorders and depression, using drinking as a coping method, as well as being quarantined (prolonged stay at home) and working in high-risk locations were significantly associated with increased alcohol abuse/dependence symptoms observed 3 years after previous severe acute respiratory syndrome outbreak [4].

However, numerous studies found that alcohol consumption changes during the COVID-19 pandemic weren't consistently significant. The overall intake ranged from 21.7% to 72.9%. The most common correlation was found to be related to mental health factors. 3 studies reported a decrease in alcohol consumption, 3 studies reported no change and 7 - an increase. [5] Moreover, 14 papers found a mixed effect on alcohol intake [5].

These differences suggest that the relationship between mental health and alcohol consumption is a complex and delicate matter and requires further investigation. Considering all the above there is also understandable concern about the impact of the COVID-19 pandemic on alcohol consumption in Polish society.

The role of the emergency department (ED) in hospitals' functioning is invaluable also with managing alcohol-related attendances. Most patients presenting to the ED do not require admission and are discharged home after initial treatment, which prevents wards from overcrowding [6]. However, during the COVID-19 pandemic, its role changed. Not only COVID-related attendances started to appear, but also the utilization of EDs was reported lower than in pre-COVID times with a decline ranging from 16 to 60% [7, 8]. This decrease is not related to a single cause and it is not the purpose of this study to establish that. However, one of the given

reasons is social distancing and lockdown measures resulting in the closure of bars, pubs, restaurants etc., which might lead to a decrease in alcohol consumption [9]. On the other hand, psychological factors and/or social isolation discussed above might play a role in an increase in alcohol intake [10].

This study aimed to estimate the impact of the COVID-19 pandemic on alcohol-related attendances in large ED in the city of Poznan and to explore whether management patterns changed during this time.

Material and methods

The hospital - Hipolit Cegielski Medical Centre (HCP) is one of 3 EDs placed in Poznan, the 5th largest city in Poland. During the COVID-19 pandemic from the 16th of March 2022, one of these hospitals started admitting only covid positive patients, which left 530 000 citizens with 2 working EDs — one of them being neighbouring HCP Medical Centre.

Ethical consideration

According to Polish law, retrospective analysis of medical records does not meet the criteria of a medical experiment and does not require the consent of the Institutional Review Board.

Study protocol

The study was designed as a retrospective analysis of medical records. The data was collected retrospectively from the hospital information system. Initially, information on confirmed alcohol consumption in the description of the summary was searched for. These were categorized as alcohol-related and extracted. One year time period was chosen — from 12 March 2020 to 12 March 2021. An identical 1-year period (from 10 March 2019 to 10 March 2020) was selected as a control period. On 11 March 2020 WHO made an assessment which characterized COVID-19 as a pandemic thus this date was chosen as the beginning of the pandemic in the present study. ED visits during the control period were labelled as "pre-COVID" and visits during the study period — as "COVID".

Records with missing information were excluded, patients who left ED before being seen by a doctor, but after being triaged (LWBS — left without being seen by a physician). Patients who were brought by the police to be examined before custody were characterized as "police" and excluded, as their records are not related to any emergency health situation and are the result of an agreement between the police department and

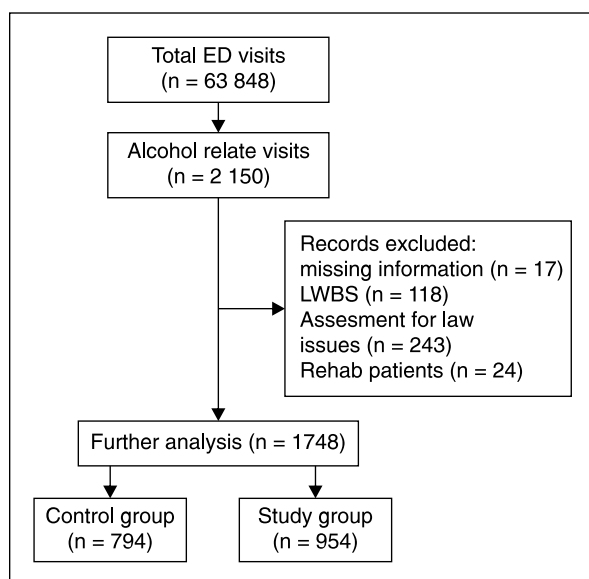


Figure 1. Study flowchart. ED — emergency department; LWBS — left without being seen by a physician

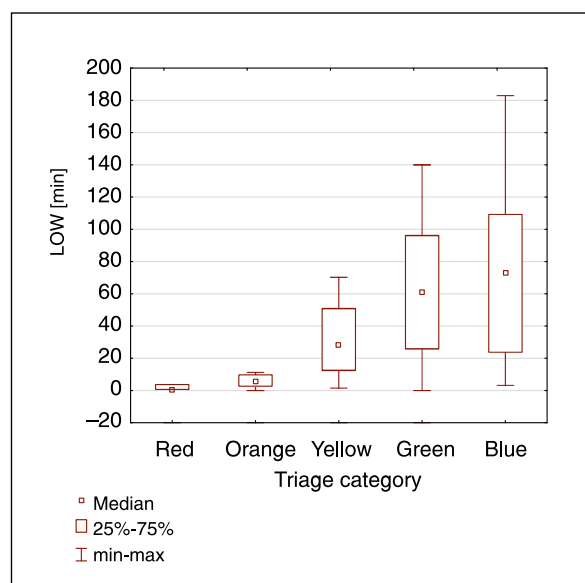


Figure 2. The median length of wait in relation to the triage category. LOW — length of wait

the hospital’s director. Also, patients who presented themselves to the ED to enter rehab (they were directed to the Centre of Mental Health, as they didn’t need help from ED) were characterized as “rehab” and excluded. The study flowchart was presented in Figure 1.

Variables

Following variables were measured and analysed: sex, age, the priority of admission (triage), body alcohol concentration (BAC), length of wait (LOW — defined as the time between triage and admission by a physician), length of stay (LOS — defined as the time between admission by a physician and decision (discharge or referral to other units), any performed laboratory tests, performed/head CT scan, administered medications, performed procedural sedation, wound stitching or endotracheal intubation, aggressive behaviour.

Statistical analysis

First, data were prepared using the author’s database prepared in Microsoft Excel (Microsoft Corporation, Redmond, Washington, USA). Then, analysis was performed using the Statistica 12 software (Tibco Inc., Tulsa, OK, USA). Descriptive statistics of measurable variables were performed. The categorical variables were expressed as the numbers (n) with percentages (%). Quantitative data were presented as median [interquartile range] as they did not present normal distribution (confirmed in the Wilk-Shapiro W test). To evaluate

the significance of differences chi-square test and Mann-Whitney test were used as appropriate. A value of $p < 0.05$ was considered statistically significant.

Results

During the control period, the total number of ED admissions was 30388 and the control group accounted for 2.6% (n = 794) of them. In contrast, during the study period, 33510 patients were admitted and 2.9% of them (n = 954) were at the point of interest. According to this data, 1748 ED alcohol-related admissions were analysed. The control group constituted 45.4%, while the study group 54.6% of the total analysed patients.

Most patients were men — 1401 (80.1%). The median age was 41 [31–54] years old. The youngest patient was 18 years old, while the oldest was 90 years old.

Most individuals were triage yellow (n = 961, 55.0%), then orange (n = 430, 24.6%) followed by green (n = 281, 16.1%). Only 56 patients (3.2%) had the highest — red priority and 20 (1.14%) had the lowest — blue.

Median LOW was 14 [6–35] min. The shortest LOW was 0 min and the longest was 347 min. Median LOW in comparison to triage priority was presented in Figure 2.

Median LOS was 210 [120–353] min. The shortest LOS was 6 min and the longest 1428 min. Most patients were referred by paramedics (n = 1119, 63.9%). The rest were admitted via walk-in zone (n = 629, 36.1%).

Median BAC was 2,63 [1.82–3.4]‰. The lowest was 0,21‰ and the highest at 6,05‰.

Table 1. Comparison of results between study and control group

Variable	Control group	Study group	P-value
Sex			
Male	659 (83%)	742 (77.8%)	0.00645*
Female	135 (17%)	212 (22%)	
Admission			
Ambulance	486 (61.2%)	629 (66.1%)	0.03491*
Walk-in	308 (38.8%)	325 (33.9%)	
Age			
Age	41 [30–55]	42 [31–54]	0.962075†
BAC [%o]			
BAC [%o]	2.63 [1.9–3.4]	2.63 [1.8–3.4]	0.829323†
LOW [min]			
LOW [min]	20 [6–46]	13 [6–27]	0.00000†
LOS [min]			
LOS [min]	202 [116–392]	217 [124–386]	0.059792†
Aggressive behaviour			
Aggressive behaviour	74 (9.3%)	101 (10.6%)	0.37952*
Admission			
Admission	204 (25.7%)	390 (40.9%)	0.00000*
Medications			
Medications	472 (59.5%)	597 (62.6%)	0.18089*
Labs			
Labs	668 (84.1%)	705 (73.9%)	0.00000*
CT scan			
CT scan	753 (94.8%)	878 (92.0%)	0.01956*
Sedation			
Sedation	171 (21.5%)	225 (23.6%)	0.30836*
Wound stitching			
Wound stitching	53 (6.7%)	57 (6.0%)	0.54834*

Values are presented as numbers (%) or median [IQR]; *chi-square test; †Mann-Whitney test; BAC — body alcohol concentration; LOW — length of wait; LOS — length of stay

594 patients (34.0%) were referred to other wards. Laboratory tests either blood or urine were performed in 1373 cases (78.6%) while head CT scan in 1631 (93.3%) cases. Any medications were administered to 1069 (61.1%) individuals. Sedation was performed in 396 (22.7%) cases and endotracheal intubation in 56 (3.2%) cases. 110 patients required wound stitching. Aggressive behaviour has been noted in 175 (10.0%) patients.

Comparison of study and control groups

There was a statistically significant difference between sex in both groups. More women were admitted to ED in the COVID period when compared to the pre-COVID era ($p = 0.00645$). During the pandemic, more patients were admitted to the hospital (25.6 vs. 40.9%, $p = 0.00000$) and fewer laboratory tests were performed (84.1% vs. 73.9%, $p = 0.00000$). LOW was significantly shorter in the pandemic period. Furthermore, the following differences were found to be not statistically significant. Aggressive behaviour was more frequently observed and sedation was performed in more patients. Also, the time when the patient was in ED was longer. In contrast, fewer patients required stitching and CT scans. Table 1 summarizes all results in detail. Figure 3 presents a comparison of LOW and LOS in the study and control groups.

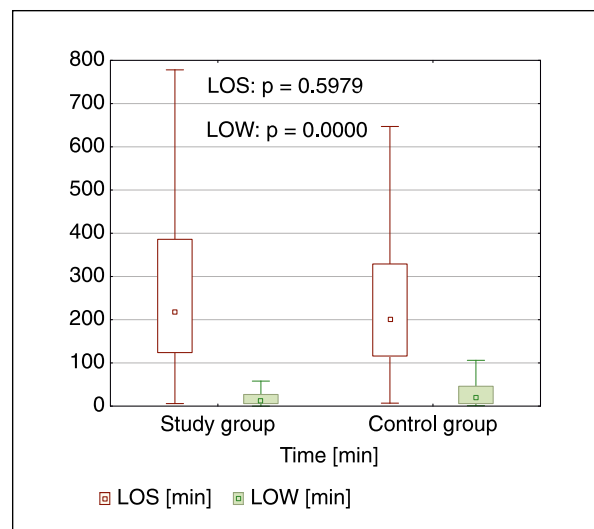


Figure 3. Comparison of LOW and LOS between study control groups. LOW — length of wait; LOS — length of stay

Discussion

All over the world alcohol-related ED visits are a recognizable problem, especially Acute Alcohol Intoxication (AAI) and related injury. Studies showed that rates of patients attending ED due to alcohol-re-

lated causes vary between countries — starting at 5% in Australia [11], 12% in the UK [6] to 28% in the USA [12]. According to WHO alcohol-attributable fractions are responsible for 6.9% of all deaths in Poland. Also, alcohol-related incidents were estimated to be responsible for 1.3–3.3% of total health costs [13]. Moreover, alcohol intake was found to be associated with 52.3% [14] of violence in the emergency room, which is not only a danger to other patients but also may have significant psychological consequences for staff members such as burnout [15]. Moreover, workplace violence was linked with diminished job performance [15]. All this may contribute to alcohol being an additional burden to ED health care workers.

The main aim of this study was to estimate the impact of the COVID-19 pandemic on alcohol-related ED attendances. The prevalence of alcohol-related ED visits was higher in the study group. This slight increase is consistent with findings from a Polish study [16], which showed a similar change during the pandemic. Several studies showed non-uniform changes in overall alcohol consumption during the COVID-19 pandemic. Hazardous drinking varied from 28.2% to 52.7% with some studies reporting an increase, problematic drinking was 7.1% [5]. No significantly consistent change on this matter could have been observed, which reflects different coping mechanisms that can be used [17]. Several papers regarding a similar topic also showed that in some countries alcohol-related attendances were higher [18], but in others lower [19]. Poland did not implement any alcohol-related restrictions during the COVID-19 pandemic as seen in other countries with declined ED attendances [19]. Moreover, in this study, the overall number of patients in this study group was higher. This increase is not consistent with studies conducted in other countries [19] but can be explained by the fact that 1 of 3 EDs in Poznan was closed which increased the population that is served by the HCP Medical Centre from which the study data was collected.

In both groups, there was a significant difference between the sexes. These differences are consistent with a general pattern of alcohol consumption being more common in males in Poland. Furthermore, there was a statistically significant difference between sex in both groups stating that more women were admitted to ED during the COVID era. This increase is probably multifactorial. First, women usually report more mental health problems than men [20] and the impact of the COVID-19 pandemic on mental health is widely researched [2]. Second, women are more likely to self-medicate with alcohol in their emotional distress [21]. Third, more males than females drink in public settings [22], which might have contributed to a decrease in the percentage of males presenting to the ED as lockdowns significantly restricted social life. Fourth,

women drinking heavily are at greater risk of developing medical problems [19], which can then lead them to present in the ED.

In the study group, significantly more patients were admitted to the hospital. This increase is consistent with changes noted in several other studies. In the US researchers showed all hospital admissions were significantly lower except for alcohol-related causes [23]. Another study conducted in 6 trauma centres reported a significant increase in alcohol-positive patients who were admitted [24]. This change can reflect the complexity of alcohol-related presentations to the ED during the COVID-19 pandemic. In the study group, more patients were transported by ambulance which may suggest more severe presentations and correlate with a higher number of patients being admitted to the wards.

LOW was significantly shorter in the pandemic period. Not many studies conducted during the COVID-19 pandemic assessed this variable. The differences were established to be a result of telemedicine [25], which is not the case in the present study. Another study, however, reported significantly less dissatisfied comments about wait time in ED [26]. The shortest length of the wait was 0 min which correlated with the red triage category, meaning the highest priority and immediate admission and treatment. This means that the patient was examined by a physician directly after or even before triage. In ED the Manchester Triage System was used. The maximum waiting time in this system differs between priorities and presents as follows: red-immediate, orange 10 min, yellow 60 min, green 120 min, blue 240 min. During this study period, almost all median LOWs were under the target time, which is a desirable outcome, reflecting efficient ED functioning.

LOS was reported to be slightly increased in the pandemic period. However, this difference was not statistically significant, and in the authors' opinion, clinical relevance was not harmful. Other studies reported an increase in length of stay during the COVID-19 pandemic, so this matter requires further investigation and more complex assessment [27].

We also found that fewer laboratory tests were performed. This cannot be explained by any noticeable change in recommendations or patients' management patterns. Also, no other paper regarding COVID-19 pandemic alcohol-related ED attendances assessed this variable. However, such a significant decrease is worth emphasizing and requires further evaluation. No significant difference in the number of patients requiring stitching or CT scans was observed but alcohol consumption is correlated with an increased risk of presentation with trauma [28], which would require further workup e.g. lab tests. However, the number of patients presenting with trauma was not measured, so this matter requires further investigation.

Conclusions

The COVID-19 pandemic made a noticeable change in alcohol-related ED visits and the number of patients who required hospitalization. An increase in the overall number of patients under influence of alcohol attending the ED was noticed. Moreover, more women presented to the ED in the COVID period than in the pre-COVID era. Also, differences in variables which were taken into consideration showed an adjustment of management patterns to this new situation, such as increased length of wait and a higher number of patients admitted to the wards. Furthermore, fewer laboratory tests were performed. This matter, however, is susceptible to influence by many factors and requires further investigation, before establishing any definite conclusions.

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