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Decrease in Alcohol Use Disorder Hospitalizations in Brazil: What Does It Mean?

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Short title: Alcohol Use Disorder Hospitalizations

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ABSTRACT

Objective: To analyze the trend of alcohol use disorder (AUD) hospitalizations in the Brazilian regions, and establish its relationship with mental health care facilities. **Methods:** Data were collected through the Hospital Information System of Brazilian National Health System (SIH/SUS) and National Register of Health Establishments of Brazil (CNES). We used linear regression models to estimate the effect of SUS psychiatric beds and Psychosocial Care Centers (CAPS) on AUD hospitalizations. **Results:** During 2015 to 2020, 298,735 hospitalizations for AUD were recorded. Most of the hospitalizations were male (88.8%). Individuals aged 60 years and older represented

11.7% of our cohort. The highest concentration of hospitalizations occurred in the South region (40.1%). The rate of hospitalizations per hospital bed remained relatively constant. The number of CAPS has a negative effect on SUS psychiatric beds in Brazil (average effect -22.31 [95% CI -26.92 to -17.70]). Psychiatric beds have a positive effect on AUD hospitalizations in the country (average effect 1.82 [95% CI 0.91 to 2.74]). **Conclusions:** Prioritization guidelines for other forms of care are associated with a decrease in admissions for AUD, so we highlight the importance of adequate training of health care professionals for proper referral to hospital admission when necessary for these patients.

Keywords: Alcohol Use Disorder; Binge Drinking; Epidemiology; Mental Health Services, Public Health.

INTRODUCTION

Alcohol related disorders are one of the most prevalent psychiatric disorders worldwide, affecting mostly men.[1] According to the World Health Organization (WHO), in 2016, harmful alcohol use accounted for 5.3% of all deaths and 132.6 million disability-adjusted life years (DALYs), and of this total approximately half of the DALYs are related to non-communicable and mental health disorders. In Brazil, approximately one in every twenty-four adults has an alcohol use disorder (AUD), a proportion three times higher than in European countries such as Italy and Spain.[2]

Individuals with alcohol use disorders are also likely to seek medical help for acute episodes of alcohol poisoning. This is a serious condition, with the potential to affect almost any organ, whereby the adverse effects of alcohol causing neurological, respiratory, cardiovascular, and gastrointestinal disturbances are the most clinically relevant. Also, acute intoxication in chronic alcohol users can exacerbate potentially

reversible problems such as electrolyte disturbances, thiamine deficiency, infection, and dehydration, which if not promptly corrected can lead to sequelae and death.[3]

Brazil's National Health System (SUS) is meant to provide universal access to health care, including care for mental health and AUD. Thus, in 2001, with the sanction of Law 10,216, which provides for the protection and rights of people with mental disorders, the Psychosocial Care Centers (CAPS) were conceived as part of SUS to replace psychiatric hospitalizations.[4,5] These specialized outpatient mental health services targets people with severe disorders that require intensive care, and also works integrated with other health units, admitting users in an inter-sectoral perspective.[6] Consequently, at the same time a progressive reduction of psychiatric beds in SUS occurred.[7]

Therefore, the change in mental health guidelines in the country may have a relevant influence on hospitalizations of patients with alcohol use disorders. To investigate this hypothesis, the present study had several objectives: (a) to establish the trend of AUD hospitalizations in the SUS, number of psychiatric beds and CAPS, in the Brazilian regions during the years 2015 and 2020; (b) to analyze the association between these variables.

METHODS

Data regarding hospital admissions were collected through the Hospital Information System of SUS (SIH), while data on health establishments were extracted from the National Register of Health Establishments of Brazil (CNES).[8] Only hospitalizations for treatment of mental and behavioral disorders due to alcohol use, whose corresponding code is ICD-10 F10, between January 2015 and December 2020, were included in the study. The data analyzed for psychiatric beds and CAPS were from

December of the respective years. Rate of AUD admissions per psychiatric bed was calculated using the number of admissions as the numerator while psychiatric beds were the denominator.

To perform an inclusive analysis, we analyzed data from all CAPS services, since CAPS AD (alcohol and drugs) require cities/regions with at least 70,000 inhabitants, and thus if the analysis were restricted to them less populated cities would not be contemplated. [9]

In accordance with Brazilian National Health Council Resolution number 466 from December 2012, as the database used is of public domain, free and unrestricted access, without individual identification of the patients, the approval of the Research Ethics Committee was not necessary.

Statistical Analysis

We used regression models to assess the association of psychiatric beds and CAPS on AUD hospitalizations. We performed two simple regressions, using AUD hospitalizations as the dependent variable for psychiatric beds, and psychiatric beds as the dependent variable for CAPS. The average effect of CAPS on SUS psychiatric beds, and the average effect of SUS psychiatric beds on AUD hospitalizations were estimated. Statistical analysis was performed using Stata v. 14.2.

RESULTS

From January 1, 2015 to December 31, 2020, a total of 298,735 alcohol use disorder hospitalizations were analyzed in this study. Throughout the study period, males predominated (88.8%, n = 265,272 individuals) among the AUD hospitalizations reported

in Brazil (Table 1). The minority of our cohort was comprised of women (11.2%) and individuals aged 60 years or older (11.7%). The decrease in psychiatric beds in the SUS happened progressively, the reduction rate from December 2015 to December 2020 was 33.4%. Over the same period, the number of CAPS increased by 14.9% (Table 2). Additionally, the calculated rate of AUD hospitalizations per psychiatric bed was relatively stable (Graph 1).

Table 1. Alcohol use disorder hospitalizations by Brazilian National Health System in Brazilian regions, total number, minimum, maximum, average and standard deviation, 2015-2020.

Hospitalizations	Total	Minimum	Maximum	Average	Standard Deviation
Total					
North	2221	293	497	377,2	71,4
Northeast	50424	7443	9525	8477,7	635,9
Southeast	103169	13984	22361	17514,3	2725,3
South	119932	14908	23671	20329,1	2762,9
Central West	22989	3182	4986	3905,4	630,4
Male sex					
North	1956	257	442	326	67,9
Northeast	45385	6640	8662	7564,2	658,3
Southeast	89451	12144	19619	14908,5	2569,8
South	108825	13424	21537	18137,5	2910,1
Central West	19655	2700	4404	3275,8	639,5
Female sex					
North	265	36	55	44,2	6,9
Northeast	5039	738	1011	839,8	101
Southeast	13718	1840	2742	2286,3	318,8
South	11107	1484	2134	1851,2	214,4
Central West	3334	482	633	555,7	52,4
Adults aged 60 and older					
North	226	23	46	37,7	8,4
Northeast	4280	634	835	713,3	72,9
Southeast	13680	1926	2738	2280	273,6
South	14377	1809	2612	2396,2	303,4
Central West	2334	317	541	389	80,5

Graph 1. Rate of alcohol use disorder (AUD) hospitalizations per psychiatric, 2015-2020.
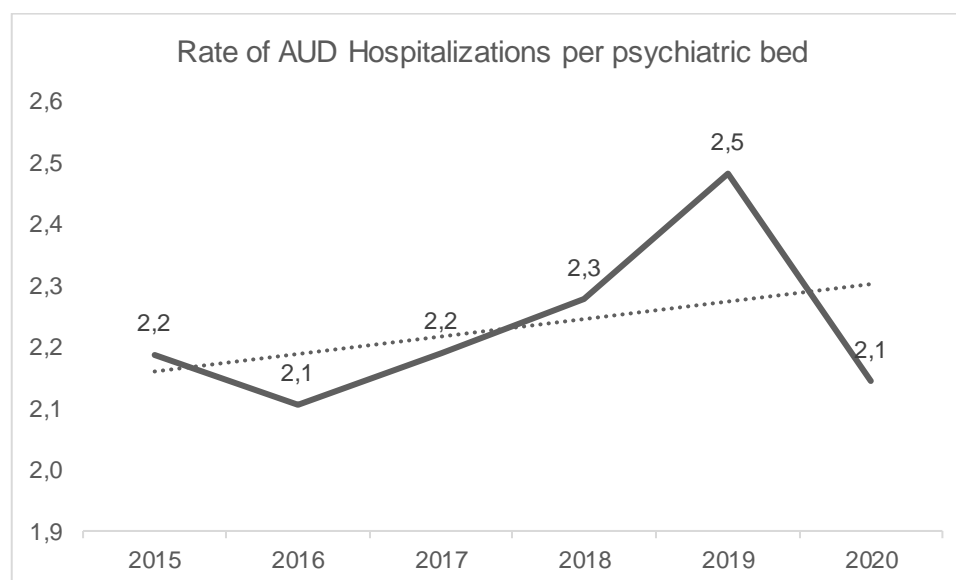

Table 2. Alcohol use disorder hospitalizations, Brazilian National Health System (SUS) psychiatric beds, and Psychosocial Care Centers (CAPS), 2015-2020.

Region	AUD hospitalizations	No. of SUS psychiatric beds	No. of CAPS
North			
2015	497	390	175
2016	405	374	180
2017	374	358	187
2018	309	291	194
2019	293	326	198
2020	343	329	202
Northeast			
2015	9525	5668	947
2016	8443	5017	966
2017	8101	4523	1008
2018	8251	4388	1038
2019	8661	3940	1041
2020	7443	3855	1055
Southeast			
2015	22361	14777	974
2016	18047	12732	1024
2017	15716	11359	1071

2018	16072	9876	1117
2019	16989	8610	1148
2020	13984	8190	1184
South			
2015	23671	5444	458
2016	21830	5411	452
2017	21491	5249	471
2018	19920	5221	479
2019	18112	5022	488
2020	14908	5004	491
Central West			
2015	4986	1633	164
2016	4110	1536	165
2017	3911	1149	175
2018	3397	1292	185
2019	3403	1228	187
2020	3182	1221	191
Brazil			
2015	61040	27912	2718
2016	52835	25097	2787
2017	49593	22638	2912
2018	47949	21068	3013
2019	47458	19126	3062
2020	39860	18599	3123

Table 1 shows the AUD hospitalizations analysis results, including total number of events, average per year and standard deviation. South region had the highest incidence of total hospitalizations (40,1%), males (41%), and individuals aged 60 years or older (41,2%). Hospitalizations of women were more prevalent in the Southeast region (41%). Despite its predominance in the number of hospitalizations, the South region accounted only 26.9% of the psychiatric beds and 15.7% of the CAPS reported in December 2020.

Table 3. Average effect of CAPS on SUS psychiatric beds in Brazilian regions.

	R squad	Coefficient	95% CI	p value
North	0.590	-2.82	-5.55 to -0.083	0.046*
Northeast	0.916	-15.05	-20.66 to -9.43	0.002**
Southeast	0.985	-32.04	-36.89 to -27.20	< 0.001***
South	0.924	-11.38	-15.41 to -7.36	0.001***
Central West	0.537	-13.32	-27.50 to 0.861	0.060
Brazil	0.973	-22.31	-26.92 to -17.70	< 0.001***

R squad: R squared adjusted

CI: Confidence Interval

To test the hypothesis of the effects of reducing psychiatric beds and increasing the number of CAPS on AUD hospitalizations we used simple linear models. The result pointed out that the number of CAPS has a negative effect on the number of SUS hospital psychiatric beds in Brazil (average effect -22.31 [95% CI -26.92 to -17.70]) (Table 4), and the number of SUS psychiatric beds has a positive effect on AUD hospitalizations in the country (average effect 1.82 [95% CI 0.91 to 2.74]) (Table 5). This result indicates that AUD hospitalizations have a direct association with the number of SUS psychiatric beds, and an indirect association with CAPS.

Table 4. Average effect of SUS psychiatric beds on AUD hospitalizations in Brazilian regions.

	R squad	Coefficient	95% CI	p value
North	0.733	1.82	0.504 to 3.14	0.018*
Northeast	0.492	0.773	-0.114 to 1.66	0.073
Southeast	0.668	0.969	0.160 to 1.78	0.029*
South	0.825	15.52	6.83 to 24.22	0.008**
Central West	0.568	2.76	-0.025 to 5.55	0.051
Brazil	0.857	1.82	0.913 to 2.74	0.005**

R squad: R squared adjusted
CI: Confidence Interval

DISCUSSION

After analyzing data from nearly 300,000 Brazilians hospitalized for AUD between 2015 and 2020, our results demonstrate that AUD hospitalizations decreased by 34.7% overall in Brazil. We also found an association between care indicators, particularly SUS psychiatric beds and the number of CAPS, and the number of AUD hospitalizations. Higher numbers of CAPS are associated with lower numbers of SUS psychiatric beds which are associated with fewer hospitalizations.

While in our study there was a decrease in the absolute number of AUD hospitalizations, proportionally to psychiatric beds, there was relative stability. The decrease in hospitalizations may represent the establishment of prioritization guidelines for other forms of care, which recommend hospitalizations only for cases where the severity renders in-hospital treatment irreplaceable or when other measures have failed.[10] In this scope, the access to community care alternatives, such as CAPS and Therapeutic Communities (TCs) by the Ministry of Health was highlighted. Furthermore, established in 2012, the receipt of the funding of psychiatric beds is no longer dependent on the production record, which may favor the under-recording of the hospitalizations performed in these beds.[11]

Even though these data emphasize a decrease in AUD hospitalizations, the real meaning of this information still needs to be clarified. Recent results of other authors show an increase in alcohol abuse among adults in the main Brazilian capitals.[12] Thus we hypothesize that the decrease in AUD hospitalizations in association with the increase in the number of CAPS means that these patients are receiving treatment in a social environment. This hypothesis is consistent with data indicating advances in the dehospitalization of psychiatric patients in Brazil.[13]

Another hypothesis is that these patients are placed in Therapeutic Communities, treatment units inside or outside the hospital environment recognized as part of the SUS mental health care network.[14] Although there are regulations for the performance of TCs guided by universal guidelines validated by science, the existence of institutions that practice irregular activities and do not follow evidence-based approaches in Brazil points to the need for adequate supervision, regulation and training of professionals with expertise in addiction disorders.[15]

In addition, TCs provide a longer treatment time compared to CAPS, and standardized institutions are able to offer a longer abstinence period for patients, which is necessary for severe cases to learn skills to avoid relapse.[16] The lack of temporal data regarding TCs in Brazil prevented their inclusion in our results.

Historically, there was an inequality in the distribution of CAPS services among the regions of the country.[17] Despite efforts to expand services, the inequality remains. The South region, responsible for the largest number of AUD hospitalizations had only 15% of CAPS in 2020. In the same period, the Northeast region had half of the number of hospitalizations and 34% of the services in the country. Moreover, Brazil has about 324,000 municipalities with populations between 15 and 20 thousand inhabitants that do not have any CAPS services, showing that there is still a long way to universalize access to mental health in the SUS.[18]

Indeed, examining the average number of AUD hospitalizations reveals interesting differences among the Brazilian regions. Admissions for AUD patients between 2015 and 2020 were highest in the South (average >18,000) and Southeast (average >14,000) regions. Given that the use of services is influenced by individual characteristics of the professionals/services, it is possible that factors regarding

professional behavior, such as stigma and preparation to work in this area, have an influence on this inequality.[19]

In the 2013 National Health Survey, the South and Southeast regions had the lowest proportions of binge drinking among Brazilian regions (11.1 and 12.8% respectively) and two of the three highest proportions of regular drinking (28.4 and 24.1% respectively).[20] In fact, the proportion of regular drinking was more compatible with hospitalizations among the regions in our study. Moreover, the Southern region has the highest prevalence of underage drinking, which is a predictor of risk for alcohol problems in adulthood.[21,22] Thus, early onset drinking could be a determinant of the development of AUD in adulthood.

In the present study, hospitalizations were more frequent among male patients in Brazil. Worldwide, AUD are more frequent in men than in women.[23–25] A systematic review linked this difference to socio-cultural sanctions, which affect women more than men.[25] Thus, women may be less likely to seek treatment because of social stigma.[26] Also, women feeling intoxicated with smaller amounts of alcohol could function as an inhibitory mechanism for excessive alcohol consumption.

According to the III National Survey on Drug Use by the Brazilian Population (2017), alcohol dependence was 3.4 times higher among men when compared to women.[27] However, the low number of hospitalizations among women in the period we studied (7.9 times lower than among men) highlights the social stigma among women with AUD, which may limit the search for help and/or access to social and treatment support networks. Consequently, it is evident the need to break this social barrier, since it is known that women develop the disorder in less time than men, and thus present more complications and more severe problems.[28]

Moreover, during the period studied there were 34,897 (11.7%) hospitalizations of individuals aged 60 years or older in Brazil. The prevalence of AUD in older people is lower than in younger people, but rates may be underestimated by under-identification or misdiagnosis. The presentation in this age group can be atypical, for example falls and confusion, and be confused with other comorbidities, which makes diagnosis difficult. However, severe disorders in older people who misuse alcohol are more common, and are associated with lower perceived health status and smaller social networks.[29] Thus, more attention is needed at the primary, secondary, and tertiary prevention levels of AUD, considering the population growth of elderly individuals in society.

[9]Developing AUD prevention strategies is critical because of its high prevalence and costs to the public health care system.[30] Globally, programs have been developed for early screening of unhealthy alcohol use and optimal intervention.[31] Mostly, the screening and care of the patient with AUD can be done in primary care, for which health professionals must have adequate training and support for these patients.[32]

Limitations

Although this study reveals important data about AUD in Brazil, some limitations should be noted: the study is retrospective, and the data used were secondary, extracted from official databases in Brazil. As already discussed, there is the possibility of underreporting of cases. In addition, socio-behavioral factors may have an influence on AUD hospitalizations, which could not be assessed by our study. Considering our limitations, further research is needed to understand AUD hospitalizations, patterns and correlations.

Conclusion

In conclusion, in Brazil, there was a decrease in hospitalizations for AUD between 2015 and 2020, with the number of beds and CAPS having an overall effect. The highest number of hospitalizations was found in the South region and in males. Studies focusing on the admission of these patients to other health services are necessary to estimate the real prevalence of the disease in the country. In the end, it is emphasized the importance of training health professionals for the proper referral to hospital admission of these patients when necessary.

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