Original Article

Readmissions and deaths from complications associated with alcohol abuse*

Reinternações e óbitos decorrentes de complicações associadas ao abuso de álcool

Cleiton José Santana[1]

Magda Lucia Felix de Oliveira[1]

Mirella Machado Ortiz Modesto[1]

Marcia Regina Jupi Guedes[1]

Paola Kallyanna Guarneri Carvalho de Lima[1]

Giovana Alves Santos[1]

[1]Universidade Estadual de Maringá.
Maringá PR, Brazil.

Corresponding author:
Cleiton José Santana
Programa de Pós Graduação Doutorado em Enfermagem,
Av. Colombo, 5.790, Zona 7. CEP: 87020-900.
Maringá, PR, Brazil.
E-mail: cleitonjsantana@hotmail.com

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ASSOCIATE EDITOR: Renan Alves Silva

ABSTRACT
Objective: to analyze readmissions and deaths of hospitalized patients due to the effects of alcohol abuse. **Methods:** documentary, longitudinal and retrospective study, by analysis of hospital records, carried out in a teaching hospital, by descriptive analysis, univariate association, using Pearson's chi-square test. **Results:** 399 readmissions of 278 patients were analyzed. Two hospitalizations predominated (69.6%). Most were male (85.2%), and the mean age was 47.15 years (± 13.91); 91.2% were readmissions due to the use of alcoholic beverages, with 45.3% of complications associated with injuries, poisoning and external causes of morbidity and mortality. Twenty-seven (9.7%) patients died. The readmissions of retirees/housewives had an odds ratio of 3.0 of progressing to death. **Conclusion:** the analysis showed prevalent readmissions and mortality in males, productive age group, with a significant association of risk in intensive care patients and cause of death associated with complications of chronic alcohol use. **Contributions to practice:** the identification of the causes of readmissions helps nursing professionals in the early recognition of signs of severity and serves as a subsidy for the development of prevention strategies and actions to improve the care network.
Descriptors: Illicit Drugs; Hospitalization; Patient Readmission; Cause of Death; Alcoholism.

RESUMO
Objetivo: analisar as reinternações e os óbitos de pacientes internados por efeitos do abuso de álcool. **Métodos**: estudo documental, longitudinal e retrospectivo, por análise de prontuário hospitalares, realizado em hospital de ensino, por análise descritiva, associação univariada, com uso do teste do Qui-quadrado de Pearson. **Resultados**: foram analisadas 399 reinternações de 278 pacientes. Predominaram duas internações (69,6%). A maioria era do gênero masculino (85,2%), e a média da idade foi de 47,15 anos (± 13,91); 91,2% foram reinternações decorrentes do uso de bebida alcoólica, com 45,3% de complicações associadas a lesões, envenenamentos e causas externas de morbimortalidade. Evoluíram a óbito 27 (9,7%) pacientes. As reinternações de aposentados/do lar apresentaram razão de chances de 3,0 de evoluírem ao óbito. **Conclusão**: a análise apresentou reinternações e mortalidade prevalentes no gênero masculino, faixa etária produtiva, com associação significativa de risco em internados em terapia intensiva e causa de óbitos associada a complicações do uso crônico de bebida alcoólica. **Contribuições para a prática**: a identificação das causas de reinternações auxilia os profissionais de enfermagem no reconhecimento precoce dos sinais de gravidade e serve como subsídio para o desenvolvimento de estratégias de prevenção e ações de melhoria na rede assistencial.
Descritores: Drogas Ilícitas; Hospitalização; Readmissão do Paciente; Causas de Morte; Alcoolismo.

Santana CJ, Oliveira MLF, Modesto MMO, Guedes MRJ, Lima PKGC, Santos GA

Introduction

The increase in the consumption of alcohol and other drugs is related to cultural characteristics of society, in leisure activities and celebrations, in the search for pleasure, relief from fears and stress, reduction of physical pain and muscle tension, causing severe organic diseases and dysfunctions. It is a global public health concern[1]. The age of initiation of alcohol use has been 12.5 years, and the prevalence of dependence of 11.2% in the general population[2-4].

Brazil leads the ranking of abusive consumption of alcohol at once; 16.5% of the Brazilian population aged 18 years or older compulsively drinks alcohol[2] - estimated consumption of 60g or more of pure alcohol, at least once a month. The world average in alcohol consumption is 6.2L per person per year and, in Brazil, this average is estimated at 8.7L, that is, it is higher than the global average[3].

Alcohol abuse can progress slowly and insidiously, often evolving into a chronic form and causing damage to the individual and collective health-disease process, in the family and in society[5]. The consequences are illness, with acute and/or exacerbated chronic problems, in addition to the clinical severity being able to indicate hospitalization[6].

Hospital admissions associated with the effects of alcohol in Brazil and in the world present alarming cases related to organic, physical, psychological and social consequences[2-3,7]. Complications are important risk factors for non-communicable chronic diseases and represent great demand for hospital services, contributing to the high rate of hospitalizations and readmissions, with high rates of disability and death[1-2,8].

The increase in demand on health services, with the need for readmission of patients due to complications of alcohol abuse, generates substantial costs associated with the worsening of the patient's clinical conditions and the repetition of acute health care, emphasizing the importance of strategic actions of prevention of drug consumption and strengthening of the Psychosocial Care Network[9-10]. Readmissions are associated with the consequences of compulsive consumption, with clinical impairment of organic diseases, as a result of chronic use or situations of external causes, mainly associated with violence and trauma[8,11-12], and weaknesses in the health care network[13].

Studies related to hospital admissions due to alcohol consumption, regardless of the consumption pattern (quantity and frequency), present consequences directly related to the effect of drugs or secondary causes[7-8,14]. However, studies on readmissions for alcoholic beverages in a general hospital are scarce in the literature.

The importance of identifying the epidemiological profile and the causes of readmissions and deaths resulting from alcohol abuse is highlighted, in order to promote disease prevention actions and improvement strategies for care, directing adequate financial resources, developing targeted training and evaluating the impacts of public policies. Analyzing the demands related to hospitalizations can be a way of evaluating existing actions and implementing new strategies[12,15].

In this context, the guiding question of this study was: What is the incidence of readmissions and deaths in individuals hospitalized for the effects of alcohol abuse? The aim of this study was to analyze readmissions and deaths of hospitalized patients due to the effects of alcohol abuse.

Methods

Documentary, longitudinal and retrospective study, carried out in the northwest macro-region of the state of Paraná, Brazil, from January 1, 2009 to December 31, 2018, through the analysis of hospital records of hospitalizations due to alcohol effects recorded in the Database of Hospitalized Patients – Active Search, which was built from the documentary recor-

ds of the Poison Control Center of the Regional University Hospital of Maringá, Brazil, linked to the National Toxicological Information and Assistance Centers. The guidelines of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) were followed.

The active search for cases is carried out daily in hospital charts and patient care forms in the hospital sectors, with subsequent completion of the epidemiological forms of Toxicological Occurrences of Alcohol Intoxication and/or Drugs of Abuse, which provide identification data of the intoxicated person, the toxicological occurrence, treatment, clinical course and outcome, in addition to the case being included in the database.

Individuals aged 13 years or older and two or more hospital admissions for the effects of alcohol abuse were eligible for the study, regardless of geographic origin, gender, age and hospitalization unit, notified to the Poison Control Center of the University Hospital Region of Maringá using the epidemiological surveillance method of active case finding, during the study period.

In the observed period, 3,562 individuals were hospitalized, 3,163 single admissions were excluded and 399 multiple admissions were analyzed. To locate the readmissions, "sensitive data" of the individuals were used, selected from the patient's full name and date of birth and the mother's name (fundamental data for the analysis of readmissions). Personal and health-related data are considered "sensitive data", according to the General Data Protection Law[13].

As a source of data, hospital records were used to prepare the structured digital form called Database of Inpatients – Active Search. The form was filled out monthly, and subsequently grouped by year, consisting of two modules, being sociodemographic and hospitalization variables (raw quantitative data). The compiled data were separated into two modules: the first composed of the sociodemographic variables gender (male and female), age (from 13 to 17, 18 to 30, 31 to 60, 61 to 80 and ≥81 years), situation in the work (employed/self-employed, retired/household and unemployed) and years of education (up to 8 years, ≥ 8 years); and the second formed by hospitalization variables, such as year (2009 to 2018), number of hospitalizations (two or more hospitalizations/readmissions), type of drug (alcoholic beverage, cocaine/crack and multiple drugs), circumstance of intoxication (acute and chronic disease), medical diagnosis according to the International Classification of Disease and Related Health Problems (ICD-10), place of admission (emergency room, medical clinic, surgery or gynecology and obstetrics and intensive care unit) and outcome (hospital discharge and death).

Data collection took place in 2019. Data were transcribed into SPSS software, version 25, being subjected to statistical treatment by descriptive analysis (absolute and relative frequency) and univariate association analysis, using the chi-square test Pearson test (Fisher's exact test, when there were fewer than five cases) and association-effect measures, with relative risk and its 95% confidence interval.

Sensitive data[13] were reported to the Standing Committee on Ethics in Research Involving Human Beings at the State University of Maringá. The study met the ethical standards in research involving human beings with a favorable opinion (Certificate of Presentation of Ethical Appreciation No. 30101620.6.0000.0104, No. 4,010,048/2020).

Results

A total of 399 readmissions at the macro-regional referral hospital in northwest Paraná were analyzed, referring to 278 patients, ranging from two to seven hospitalizations with a mean of 2.52 and a standard deviation of 0.953, with a gradual decrease and a decreasing trend, with a predominance of two hospitalizations in 69, 6% (Figure 1).
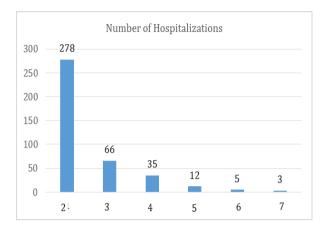
Number of Hospitalizations

Figure 1 – Hospitalizations of alcohol users notified by active search in a university hospital. Maringá, PR, Brazil, 2009-2018

The male gender was predominant in 85.2% of readmissions. The mean age of the patients was 47.15 (± 13.91) years, with a median of 48 years, mode of 47, minimum of 16 and maximum of 89 years. Age was presented in age groups, with a predominance of 31 to 60 years old (66.9%) (Table 1).

Regarding the situation in the labor market, retirees/housewives had an odds ratio of 3.0 of progressing to death, with 44.4% dying. The outcome of death from multiple hospitalizations occurred in 27 (9.7%) individuals, and all of them were associated with complications of chronic alcohol use (Table 1).

Table 1 – Sociodemographic variables and outcome in multiple hospitalizations of users of alcohol and other drugs reported by active search. Maringá, PR, Brazil, 2009-2018

Variables	Deaths n (%)	Discharges n (%)	p-valor*	RR (CI95%)
Age (years)				
13-17	–	2(0.5)		–
18-30	1(3.7)	56(15.0)		0.2 (0.03-1.37)
31-60	18(66.7)	249(67.1)	0.304	1.0 (0.43-2.26)
61-80	8(29.6)	63(16.9)		1.9 (0.80-4.43)
> 81	–	2(0.5)		–
Gender				
Male	24(88.9)	340(91.4)	0.429‡	0.8 (0.22-2.63)
Female	3(11.1)	32(8.6)		1.3 (0.38-4.63)
Situation in the job market				
Employees / self-employed	13(48.2)	244(65.7)	0.214	0.6 (0.28-1.33)
Retired/Household	12(44.4)	69(18.5)	0.005	3.0 (1.39-6.58)†
Unemployed	2(7.4)	59(15.8)	0.238	0.4 (0.10-1.77)
Place of hospitalization				
Emergency Room	19(70.4)	318(85.5)	0.036	0.4 (0.17-0.94)
Intensive therapy	6(22.2)	4(1.1)	<0.001	20.7 (8.62-49.6)†
Infirmary	2(7.4)	50(13.4)	0.368	0.5 (0.12-2.19)
Type of drug				
Alcoholic beverages	27(100)	337(90.6)		–
Cocaine/*crack*	–	11(2.9)	–	–
Multiple drugs	–	24(6.5)		–
Circumstance of intoxication				
Acute	–	42(11.3)		–
Chronic	27(100)	330(88.7)	–	–
Years studied				
Up until 8	16(59.3)	254(68.3)	0.527‡	0.7 (0.26-2.0)
>8	11(40.7)	118(31.7)		1.4 (0.50-3.88)
Number of hospitalizations				
2	16(59.3)	262(70.5)	0.158‡	0.6 (0.28-1.32)
3-7	11(40.7)	110(29.5)		1.6 (0.76-3.29)

*p value at 95% significance level; †significant association; ‡Fisher's exact test; RR: relative risk; 95%CI: confidence interval

The circumstances of hospitalization in 82.7% of cases were associated with chronic effects of drug use, with a mean of 11 days of hospitalization, median of 4 and standard deviation of 24.5 days. The emergency care/emergency care unit was the sector with the highest number of readmissions and deaths recorded, but patients admitted to the intensive care unit have a relative risk of 20.7 of progressing to death and the confidence interval (CI) indicates a sense of increased risk of death for patients hospitalized in intensive care.

The medical diagnoses coded by the ICD-10 showed the following pattern: 45.3% were injuries, poisonings and other external causes (S00-T98) and external causes of morbidity and mortality (V01-Y98); and 31.5% were organic diseases (A00-B99, G00-G99, I00-I99, J00-J99, K00-K93, N00-N99) (Table 2).

Table 2 – Diagnosis according to the International Classification of Disease and Related Health Problems and outcome in multiple hospitalizations of users of alcohol and other drugs notified by active search. Maringá, PR, Brazil, 2009-2018

ICD-10	Deaths n(%)	Discharges n(%)	p-valor*	RR (CI95%)
Injury, poisoning and other external causes (S00-T98)	8(29.7)	121(32.7)	0.755	0.9 (0.37-2.05)
External causes of morbidity and mortality (V01-Y98)	7(25.9)	60(16.1)	0.188	1.8 (0.75-4.44)
Disorders related to drug use (F10-F19)	6(22.2)	14(3.7)	<0.001	7.3 (2.92-18.30)†
Respiratory diseases (J00-J99)	2(7.4)	20(5.3)	0.655‡	1.4 (0.31-6.32)
Gastrointestinal diseases (K00-K93)	1(3.7)	71(19.0)	0.078‡	0.2 (0.03-1.20)
Other symptoms (not specified elsewhere) (R00-R99)	1(3.7)	40(10.7)	0.244‡	0.3 (0.05-2.18)
Cardiovascular diseases (I00-I99)	1(3.7)	15(4.0)	0.933‡	0.9 (0.12-7.20)
Cardiovascular diseases (G00-G99)	1(3.7)	1(0.3)	0.014‡	14.3 (1.6-120.6)†
Pregnancy, childbirth and puerperium (O00-O99)	0	10(2.6)	–	–
Infectious and parasitic diseases (A00-B99)	0	8(2.2)	–	–
Genitourinary diseases (N00-N99)	0	8(2.2)	–	–
Musculoskeletal diseases (M00-M99)	0	3(0.9)	–	–
Other mental disorders (F00-F99)	0	1(0.3)	–	–

*p value at 95% significance level; †significant association; ‡Fisher's exact test; RR: relative risk; 95%CI: confidence interval; ICD-10: International Classification of Disease and Related Health Problems

The ICD-10 classification F10 to F19 of mental and behavioral disorders related to alcohol use was associated with risk of death (relative risk of 7.3), nervous system diseases (RR of 14.3) and p-value of 0.014.

Discussion

Sociodemographic factors, sex and age are important characteristics to be analyzed when conducting research on alcohol dependence. According to the World Health Organization, in the publication of the Global Report on Alcohol and Health, in 2016, in Brazil, 21.4% of the population was abstemious in life (never ingested alcoholic beverages). In the last year, 40% of the Brazilian population consumed alcohol, men were the majority in the consumption of alcoholic beverages (44% versus 27.3% of women)[1-3]; the profile of readmitted patients corroborates the literature, with a greater predominance of males and alcohol consumption.

The male gender and individuals with preexisting psychiatric comorbidities are risk factors for compulsive use of alcohol, with recurrent hospitalizations; some symptoms are related to problems associated with alcohol abuse, such as sleep disorders, fear, sadness and anxiety have been extensively described in the literature[16-17].

The consequences of alcohol abuse are not restricted exclusively to dependent individuals. Occur-

rences associated with abusive consumption generate care in urgency and emergency services for traumatic injuries and complications related to the side effects of alcohol. Chronic consumption usually causes more severe and/or irreversible damage – and even death[1,15,17].

The effects of alcohol intoxication depend on the expectation regarding the actions of alcohol and the amount of alcohol ingested, with changes according to each organism. Chronic non-communicable diseases are caused in different organ systems by secondary effects of excessive alcohol consumption, such as esophageal varices, cirrhosis, pancreatitis, neurological diseases, dementia, polyneuropathy, myocarditis, heart attack, arterial hypertension, malnutrition, some types of cancers and musculoskeletal injuries related to external causes, such as trauma and violence[5-6].

The abusive and repetitive use of alcohol causes impacts on the professional, social and family life of the user, causing the individual's loss of self-control and affecting physical and mental health, thus characterizing chemical dependence[18] and being responsible for clinical complications and psychosocial factors for the user, in addition to being an important predictor of dependence and need for hospital admission related to the side effects of drugs[7].

In this study, an average of 11 days in readmission was observed. A study carried out with patients hospitalized for 4 days or more indicates a higher probability of adverse events and with the possibility of more frequent readmissions. Considering the national scenario with the high demand for public health services, the length of stay is an aggravating factor, which can lead to a lack of beds[15-16].

Alcohol is responsible for most complications that required readmissions and, consequently, for the increase in the clinical severity of cases associated with injuries and external causes of acute intoxication, in addition to organic diseases, mainly of the gastrointestinal and neurological system, related to the effects chronic diseases, generating temporary and permanent sequelae and death[8,11].

In 2018, there were more than 3 million deaths associated with harmful consumption of alcoholic beverages. This data is equivalent to 5.3% of all deaths in the world, which represents one in 20 deaths. Deaths in males correspond to three quarters of all deaths[1].

The mortality rate in readmitted patients may be associated with the severity and complications of acute chronic diseases. It can also be associated with old age. Mortality rate related to readmission reaches 9% and corroborates the analyzed data[16].

A significant association was observed between deaths in patients with the situation in the labor market, such as retirees/housewives, with an association measure indicating risk. The consumption of alcohol and other drugs is usually associated with early adolescence and adulthood and is perpetuated throughout life. Retirement, for some people, becomes a phase of loneliness, reduction or loss of functional capacity and chronic diseases, which can contribute to the consumption of alcoholic beverages[4,19].

Admission to the intensive care unit was significantly associated with deaths, indicating risk. Also, intensive care units are environments for critically ill patients, with impairment of their organic and vital functions. Hospitalized patients who need assistance in intensive care usually have clinical and/or traumatic, acute or chronic complications of greater severity as a result of alcohol consumption[11,20].

Worldwide, about 6% of deaths are attributed totally or partially to the harmful use of alcohol, and estimates indicate 3.3 million people die each year. This is considered a serious public health problem, representing a significant loss of economically active people related to the deaths of young people between 20 and 49 years old[1,3].

The study revealed that all deaths occurred in chronic users and were associated with the consumption of alcoholic beverages. In Brazil, the main age-standardized disability-adjusted life-years risk factors for men and women are related to alcohol dependence, as well as obesity and overweight. Excessive alcohol use is also one of the most impacting risk factors for morbidity, mortality and disability worldwide[18].

Study limitations

Data were extracted from hospital records, and the recording of information on alcohol consumption may be subject to possible underreporting. The study scenario is a macro-regional reference. Among the limitations, there is still the lack of control for the effects of confounding variables, but this potential was minimized by the number of comparisons performed in the analysis. There are few studies published on the subject of readmissions and deaths from effects associated with abusive consumption of alcoholic beverages in a general hospital.

Contributions to practice

This study identifies important data that can be used by nurses in the context of health promotion to develop plans to prevent readmissions resulting from alcohol consumption. The study contributes to the identification of the causes of readmissions for alcoholic beverages and helps nursing professionals in the early recognition of signs of severity in individuals hospitalized for the effects of alcohol, improvement in care and intervention in emergency situations.

Research related to alcohol abuse is important and serves as a subsidy for the development of prevention strategies, as well as a stimulus for actions to improve the assistance network for users, strengthening and increasing public policies and health management.

Conclusion

The study made it possible to know the profile and outcome of readmitted patients, as well as the effects of complications associated with alcohol abuse, identifying the main medical diagnoses by the International Classification of Disease and Related Health Problems and the causes of death.

The analysis of readmissions showed prevalent mortality in males, productive age group, with a significant risk association in intensive care patients.

The most recurrent causes of death were injuries, poisoning and external causes related to morbidity and mortality, associated with complications from the chronic use of alcoholic beverages.

Authors' contribution

Project design and data analysis and interpretation: Santana CJ, Oliveira MLF.
Writing of the manuscript: Santana CJ, Oliveira MLF.
Relevant critical review of intellectual content: Santana CJ, Oliveira MLF, Modesto MMO, Guedes MRJ, Lima PKGC, Santos GA.
Final approval of the version to be published: Santana CJ, Oliveira MLF, Modesto MMO, Guedes MRJ, Lima PKGC, Santos GA.
Agreeing to be responsible for all aspects of the manuscript relating to the accuracy or integrity of any part of the manuscript to be investigated and resolved appropriately: Santana CJ, Oliveira MLF, Modesto MMO, Guedes MRJ, Lima PKGC, Santos GA.

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