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Association between tobacco and alcohol use among hospital inpatients

Associação do uso de álcool e tabaco entre pacientes hospitalizados

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Abstract

We aimed to evaluate concurrent use of alcohol and tobacco among hospitalized patients as well as to compare the use of both substances among people living with Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome and those with other diagnoses. A cross-sectional study took place in a hospital in Minas Gerais (Brazil). Structured surveys were used to evaluate tobacco and alcohol use. Data analysis was conducted using descriptive statistics and chi-square test. We interviewed 972 patients, in which 20.3% were hazardous drinkers and 14.9% tobacco users. Almost half of the smokers (47.6%) were hazardous drinkers, while 15.5% of nonsmokers engaged in harmful consumption of alcohol

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($p < 0.001$). Tobacco use was higher among people living with Human Immunodeficiency Virus when compared with patients that did not have an Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome diagnosis (32.1% vs 14.4%, $p = 0.009$). Our findings showed the association of tobacco use and hazardous drinking among hospitalized patients in Brazil and a higher prevalence of tobacco use among patients living with Human Immunodeficiency Virus. These findings can be used to develop smoking cessation interventions that address the comorbidities associated with substance use.

Keywords: Alcohol abuse; HIV; Hospitalization; Tobacco use cessation.

Resumo

O presente estudo teve como objetivo avaliar a associação do uso de álcool e tabaco entre pacientes internados em um hospital geral e comparar o uso das duas substâncias entre pacientes que vivem com o Vírus da Imunodeficiência Humana/Síndrome de Imunodeficiência Adquirida e outros diagnósticos. Realizou-se um estudo observacional em um hospital público para avaliação do uso de tais substâncias. Entre 972 pacientes, 20,3% fizeram uso prejudicial de álcool e 14,9% de tabaco. Quase metade dos tabagistas (47,6%) fizeram uso prejudicial do álcool, enquanto 15,5% dos não tabagistas relataram uso excessivo da substância (p < 0,001). A porcentagem de fumantes foi significativamente mais alta no grupo de pacientes que vivem com o Virus da Imunodeficiência Humana do que nos demais diagnósticos (32,1% vs 14,4%, p = 0,009). Percebe-se a associação do uso de tabaco e uso prejudicial de álcool entre pacientes hospitalizados e alta prevalência do uso de tabaco entre pacientes que vivem com o Vírus da Imunodeficiência Humana/Síndrome de Imunodeficiência Adquirida. Esses dados podem direcionar o planejamento de intervenções para cessação do consumo de tabaco que consigam direcionar as comorbidades relacionadas ao uso da substância

Palavras-chave: *Abuso de Álcool; HIV; Cessação Tabágica; Hospitalização.*

Cigarette smoking is the leading cause of premature illness and death worldwide, leading to 5 million deaths every year. It is a risk factor for several diseases, including heart failure, stroke, respiratory conditions, tuberculosis and lung cancer (World Health Organization, 2008). Effective policies to reduce the prevalence of tobacco use in the general population include increasing cigarette taxes, placing bold warnings on cigarette packages, banning many tobacco marketing practices, and generally expanding tobacco control programs (Levy et al., 2012; Silva et al., 2016). However, the prevalence of tobacco use remains disproportionately high among specific subgroups, such as among people living with Human Immunodeficiency Virus or Acquired Immunodeficiency Syndrome (HIV/AIDS) as well as among heavy drinkers (Marshall et al., 2009; O'Cleirigh et al., 2015). In the US, the smoking prevalence among people living with HIV/AIDS was 34% in 2014, almost two times the rate of the general population (Frazier et al., 2018). In low-income and middle-income countries, the prevalence of smoking among men living with HIV/AIDS was 24.4%, and 1.3% among women living with HIV according to health survey data collected between 2003 and 2014 (Mdege et al., 2017). In addition, the dual use of alcohol and tobacco is also high. In a hospital facility in the US, 43.0% of patients receiving smoking cessation treatment were also alcohol users (Sherman et al., 2016).

The combined use of alcohol and tobacco increases health risks already associated with the use of each substance alone and contributes to significantly increased mortality and illness. The combination of drinking and smoking among cancer survivors was associated with higher risk for subsequent cancer when compared to never-drinker/never-smoker. Dual users have higher rates of lung cancer, for instance (Tabuchi et al., 2015). However, there is a large potential health gain if these risk factors are jointly controlled (IARC Working Group on the Evaluation of Carcinogenic Risks to Humans, 2012). In the US, a secondary data analysis using information from a randomized clinical trial showed the predictive effect of baseline tobacco use on future alcohol use and baseline alcohol use on future tobacco use among non-treatment seeking smokers with alcohol disorder, holding the promise that decreases in use of one substance may correspond with decreases in use of the other and vice-versa (Smith et al., 2020).

Substance use also has a negative association with HIV/AIDS health outcomes. Well-treated HIV-infected individuals may lose more years of life through smoking than through HIV (Helleberg et al., 2015). People living with HIV who smoke, for instance, have higher risk of pneumonia, cancer, emphysema and cardiovascular diseases (Giles et al., 2018; Rasmussen et al., 2015). Alcohol use is significantly associated with unprotected sex (Scott-Sheldon et al., 2013), higher risk for Hepatitis C infection (Taylor et al., 2016) and, an overall increase of mortality and morbidity (Azar et al., 2010) among people living with HIV. In addition, patients living with HIV that smoke are more likely to report hospitalization (O'Cleirigh et al., 2015) and HIV patients with concurrent use of alcohol and tobacco are more likely to report lower medication adherence when compared to non-smokers and non-alcohol users (González-Álvarez et al., 2019; O'Cleirigh et al., 2015).

In Brazil, just a few studies have explored the dual use of alcohol and tobacco among hospitalized patients. Knowing comorbidities associated with tobacco use is important to develop effective smoking cessation interventions for this population. Hospitalization may boost receptivity to smoking cessation treatment since hospitals are smoke-free and smokers have contact with health professionals who can provide a smoking cessation message or intervention (Rigotti et al., 2012). In this way, learning modifiable behaviors is important to develop evidence-based tobacco dependence treatment guided by individual specific clinical needs (Michie et al., 2011).

We aimed to evaluate concurrent use of alcohol and tobacco among hospitalized patients as well as to compare the use of both substances among patients living with HIV/AIDS and those with other diagnoses. Our hypothesis was that the prevalence of hazardous alcohol use would be higher among smokers compared to patients that did not smoke. The second hypothesis was that patients living with HIV/AIDS, compared to other diagnoses, would have higher prevalence of tobacco and hazardous alcohol use.

Method

This study was part of a pilot randomized clinical trial to evaluate the feasibility of phone counseling and text messages to support quit attempts among post-discharged patients. The full description of this study was previously published (Cruvinel et al., 2019).

Participants

This study used a non-probability sample with census-based design for the recruitment of patients during 30 days of hospitalization. We interviewed 972 patients from a university hospital in Minas Gerais (Brazil). All patients, 18 years or older and able to consent to participation or to authorize a relative to consent their participation, were interviewed for this study. Exclusion criteria were minimum. The only patients we excluded were those in intensive care units and those who were physically or cognitively impaired or in isolation.

Procedures

This was an observational study with cross-sectional and correlational design. Patients were selected based on information from the Electronic Medical Record (EMR) and then consented and questioned for the baseline assessment at bedside. We created a daily list with all patients admitted to the hospital with sociodemographic information (age, gender, marital status and education level) and primary diagnosis according to the International Classification of Diseases (ICD-10). After initial identification of patients through

EMR, the research team interviewed each one to assess their tobacco use in the past 30 days, passive smoking, and alcohol use in the past 12 months. Patients were approached no more than 24 hours after having been hospitalized. Patients that were hospitalized on weekends were interviewed on the following Monday. For patients that were re-hospitalized, we only used the data collected from their first hospitalization. Smokers answered an extra survey assessing their smoking history and depression symptoms. The interviews were led by PhD students and graduate research assistants who'd received training in conducting interviews with hospitalized patients.

The research was approved by the *Hospital Universitário da Universidade Federal de Juiz de Fora* (HU/UFJF, University Hospital of the Federal University of Juiz de Fora) institutional review board, under opinion nº 032.420.2011 FR 413922 CAAE 0022.420.000-11. All subjects gave their consent regarding the participation in the study that composes this article.

Instruments

Participants were interviewed using the following Instruments:

Alcohol Use Disorders Identification Test, short version (AUDIT C) – (Bush et al., 1998). We used the Brazilian version of AUDIT C that includes three questions with a maximum score of 12. The goal of the questionnaire is to screen for hazardous alcohol use. The choice to use AUDIT C was to reduce the time of data collection since patients were in constant demand for medical procedures.

Patients that reported using cigarettes in the past 30 days, even a puff, were interviewed with the following additional instruments to access the smoking history:

Fagerstrom Tolerance Questionnaire (FTQ): It is a measure of nicotine dependence. The questionnaire has six questions, and it measures nicotine dependence in low, medium or high. The FTQ has a scoring range of 0-10 points, with a score from 0 to 4 indicative of low nicotine dependence, 5 points medium and the range of 6 to 10 points indicative of high nicotine dependence (Fagerstrom & Schneider, 1989).

Patient-Health Questionnare-2 (PHQ-2): The purpose of the PHQ-2 is to screen for depression. The PHQ-2 includes two items that inquire about the frequency of depressed mood and anhedonia over the past two weeks. The PHQ-2 has a scoring range of 0 to 6 points, with a score ≥ 3 indicative of depression (Chagas et al., 2011).

Tobacco history: We assessed cigarettes per day, number of days smoked in the past month, intention and plans to quit smoking and confidence in quitting. Tobacco measures used in this instrument were adapted from measures of abstinence published by the Society for Research on Nicotine and Tobacco (Hughes et al., 2003).

Data Analysis

The data was double-entered into the SPSS software (version 19) by two independent researchers to strengthen the accuracy of the information. Then, we compared both databases and solved discrepancies by checking the questionnaire. We used descriptive statistics to present the prevalence of smokers and alcohol users as well as sociodemographic characteristics, smoking history and comorbidities. We used mean, Standard Deviation (*SD*), and percentages when applicable. We used chi square (χ^2) to compare alcohol use among smokers and non-smokers as well as both substances among patients living with HIV/AIDS and those with other diagnoses. All analyses were performed using SPSS 19.

Results

A total of 972 patients were interviewed in 30 days. Among those, 145 (14.9%) used tobacco in the past 30 days and 197 (20.3%) engaged in hazardous alcohol use. Table 1 shows the sociodemographic characteristics of the sample. Smokers tended to be younger compared to non-smokers. The prevalence of non-smokers was higher among participants that were married or had a partner (48.4% vs 35.2%) and more people that reported using tobacco in the past 30 days also had an HIV/AIDS diagnosis or other infectious diseases (9.7% vs 4.4%). The percentage of patients that reported hazardous drinking (AUDIT C ≥ 4) was significantly higher among smokers (47.6%) compared to non-smokers (15.5%). In the same way, the prevalence of patients with low alcohol use was higher among non-tobacco users (84.5%) compared to smokers (52.4%), ($p < 0.001$).

Table 1
Demographics and alcohol use by smoking status among hospitalized patients (N = 972)

Variables	Smokers *N* = 145	Non-smokers *N* = 827	Total *N* = 972
Age – *M, SD* (year)	48.5(13.7)*	51.8 (17.5)*	51.3 (17.1)
Gender – *n* (%)			
Male	81 (55.9)	390 (47.2)	471 (48.5)
Female	64 (44.1)	437 (52.8)	501 (51.5)
Married – *n* (%)	51 (35.2)*	400 (48.4)*	451 (46.4)
Education level – *n* (%)			
Middle school completed/partial	67(46.3)	418 (50.5)	485 (49.9)
High school completed/partial	40 (27.6)	194 (23.5)	234 (24.0)
No education	18 (12.4)	67 (8.1)	85 (8.7)
Some or completed college	7 (4.8)	65 (7.9)	72 (7.4)
Missing information	13 (9.0)	83 (10.0)	96 (9.9)
Hospitalization diagnoses (ICD-10) – *n* (%)			
Diseases of the genitourinary system	24 (16.6)	159 (19.2)	184 (18.9)
Diseases of the digestive system	23 (15.9)	173 (20.9)	196 (20.2)
Neoplasms	15 (10.3)	114 (13.8)	129 (13.3)
Injury, poisoning and consequences of external causes	14 (9.7)	49 (5.9)	63 (6.5)
HIV/AIDS/other infectious diseases	14 (9.7)*	36 (4.4)*	50 (5.1)
Diseases of the blood and blood-forming organs	9 (6.2)	43 (5.3)	52 (5.3)
Diseases of the musculoskeletal system	9 (6.2)	31 (3.7)	42 (4.3)
Others	37 (25.5)	219 (26.5)	256 (26.3)
AUDIT C, hazardous drinking ≥ 4 – *n* (%)	69 (47.6)**	128 (15.5)**	197 (20.3)
AUDIT C, low risk ≤ 4 – *n* (%)	76 (52.4)**	699 (84.5)**	775 (79.7)

Note: *$p < 0.05$; **$p < 0.001$. AUDIT C: Alcohol Use Disorders Identification Test; ICD-10: International Classification of Diseases.

Table 2
Comparison of tobacco and alcohol use among patients living with HIV/AIDS and among patients hospitalized with other diagnoses (N = 972)

Variables	HIV		Other diagnoses		Total	
	n	%	*n*	%	*n*	%
Past 30 days tobacco use						
Yes	9	32.1*	136	14.4	145	14.9
No	19	67.9	808	85.6	827	85.1
AUDIT C, hazardous drinking ≥ 4	9	32.1	188	19.9	197	20.3
AUDIT C, low risk ≤ 4	19	67.9	756	80.1	775	79.7

Note: *χ^2 tests was used to assess associations between categorical variables (χ^2= 6.74 *df* =1, $p = 0.009$). AUDIT C: Alcohol Use Disorders Identification Test. HIV: Human Immunodeficiency Virus.

The results stratified by diagnoses suggested a significant correlation among HIV/AIDS and tobacco use. Twenty-eight patients (2.9%) had an HIV/AIDS diagnosis. The percentage of smokers was higher among patients with an HIV/AIDS diagnosis compared to other diagnoses (32.1% versus 14.4% $p = 0.009$). Hazardous drinking was also higher among participants living with HIV (32.1%) compared to other diagnoses (19.9%), but not statistically significant (Table 2).

Table 3 shows the tobacco history of 145 smokers. A high percentage of smokers (37.2%) reported symptoms of depression. Most smokers (71.0%) had the intention to remain abstinent or try to quit smoking post discharge.

Table 3
Tobacco-related variables of patients hospitalized at the University Hospital of the Federal University of Juiz de Fora, HU/UFJF (N = 145)

Variables	Smokers (*N* = 145)
Days smoked cigarettes in past 30 days – *M (SD)*	25.3 (7.5)
Cigarettes/day – *M (SD)*	14.6 (11.2)
Nicotine dependence (FTQ) – *n* (%):	
Low dependence	69 (47.6)
Medium dependence	28 (19.3)
High dependence	48 (33.1)
Use other tobacco products (ex: unfiltered cigarette, pipe, cigar or snuff) – *n* (%)	28 (19.3)
Current depressive symptoms, PHQ-2, ≥ 3 – *n* (%)	55 (37.2)
Living with other smoker(s) – *n* (%)	64 (44.1)
Commitment to quitting after discharge* – *n* (%)	
Planning to remain abstinent after discharge	39 (26.9)
Planning try to quit after discharge	64 (44.1)
Not sure if will quit after discharge	22 (15.4)
Not planning to quit after discharge	18 (12.6)
AUDIT C, hazardous drinking ≥ 4 – *n* (%)	69 (47.6)

Note: *Two patients had missing data and were excluded of this analysis. AUDIT C: Alcohol Use Disorders Identification Test; FTQ: Fagerström for Nicotine Dependence Test; PHQ-2: Patient Health Questionnaire-2 Item.

Discussion

The results of this study showed that 14.9% of hospitalized patients were tobacco users, results close to the national prevalence in Brazil of 15.0% (Instituto Brasileiro de Geografia e Estatística [IBGE], 2014). Almost half of smokers (47.6%) were also hazardous drinkers, confirming the first hypothesis of this study. The association of alcohol use and tobacco was higher than findings from the national data showing that 32.3% of the smokers were also hazardous drinkers (Cruvinel et al., 2020). However, these findings were similar to the prevalence found among low-income smokers hospitalized in the US, where 43.0% of patients receiving smoking cessation treatment were also alcohol users (Sherman et al., 2016). Alcohol use is one of the factors associated with low rates of tobacco abstinence (Kupiainen et al., 2012; Yang et al., 2015). For instance, smoker participants of a population-level cross-sectional household survey who reported they had tried to quit in the past week were less likely to be classified as hazardous drinkers (Brown et al., 2016).

Another important finding from this study was the high prevalence of tobacco use (32.1%) among patients hospitalized with HIV/AIDS. This percentage is significantly higher than the prevalence among patients hospitalized with other diagnoses (14.4%), confirming the second hypothesis of this study. This result was similar to the national prevalence of current smokers (33.6%) among HIV-positive adults in the US in 2014 (Frazier et al., 2018). A few studies assessed the prevalence of tobacco use among patients living

with HIV/AIDS in contexts different from developed countries. A study published in 2017 using data from national health surveys from 28 low-middle-income countries, not including Brazil, showed that the global prevalence of tobacco smoking among men living with HIV/AIDS was 24.4% (Mdege et al., 2017). The prevalence of tobacco use is usually higher among men compared to women (IBGE, 2014). However, the general prevalence of smoking among patients living with HIV/AIDS in our study (32.1%) was higher than the global prevalence for men living with HIV/AIDS in low-middle income countries (Mdege et al., 2017). This difference may be driven by the context where the data was collected from. Data from hospitalized patients, different from national data, is more likely to include sicker patients that may have been hospitalized by health issues related to substance use.

Patients involved in this study were hospitalized with health conditions that could be aggravated by using tobacco and alcohol. Evidence suggests that smoking has negative associations with HIV health outcomes. Patients living with HIV/AIDS who smoke are more likely to report recent hospitalization compared to non-smokers. They also report lower medication adherence, attend fewer routine medical visits, and are more likely to have a detectable viral load (O'Cleirigh et al., 2015). In addition, people living with HIV who smoke cigarettes are more likely than nonsmokers to develop heart disease (Schultz et al., 2014), which is one of the most frequent causes of death in this population (Trickey et al., 2016).

Most participants in this study had plans to quit smoking after being discharged, reinforcing hospitalization as a perfect timing to offer treatment or brief advice to quit smoking (Rigotti et al., 2012). However, it is important to point out that besides hazardous drinking, 37% of smokers had symptoms of depression. Those patients probably have a harder time quitting, thus demanding more intensive treatment. In Brazil, the smoking cessation treatment freely available through public health has increased access to tobacco treatments. However, findings from national data showed that less than 4% of smokers reported receiving any kind of treatment to quit smoking (Cruvinel et al., 2020). In addition, most treatments are available in primary care facilities and are rarely implemented in hospital settings.

The results from this research call attention to smoking cessation interventions tailored for people living with HIV/AIDS. Tobacco treatments usually target the general population and do not address the needs of specific groups. We urge for the development of smoking cessation interventions that focus on decreasing tobacco use among groups that suffer more intensively from the burden of tobacco diseases.

This study has several limitations. First, recruitment was restricted to a single hospital in Brazil, which limits the generalizability of the findings. Despite this, the university hospital selected for this study is public and covered by the Brazilian Sistema Único de Saúde (Universal Health System) as with many other hospitals in Brazil. Second, we used brief screening questionnaires, such as AUDIT C, instead of the full version of the instrument to reduce time with data collection. However, the full version of AUDIT might have provided more precise information on alcohol use. Finally, we had only a small number of patients with HIV/AIDS included in this study, thus precluding additional analysis that requires a larger sample size.

Conclusion

This correlational study found a positive association among tobacco use and hazardous drinking as well as among HIV/AIDS diagnoses and tobacco use among hospitalized patients in Brazil. These findings call attention to the need for the implementation of smoking cessation treatment and alcohol abuse interventions in hospital facilities. Evidence shows the benefits of quitting smoking and reducing alcohol use on health outcomes, especially for people living with HIV/AIDS. In addition, the hospital stay represents a unique opportunity to engage patients in behavior interventions. These data reinforce evidence from other countries and should be used to guide interventions initiated in the hospital for this population.

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Contributors

E. CRUVINEL, K. RICHTER and T. M. RONZANI contributed to the conception and design, data analysis and interpretation, and discussion of the results. T. FORMAGINI and R. R. Erviha contributed to the data collection, data entry, interpretation, and discussion of the results. L. AMARAL contributed to the conception, supervision of data collection, interpretation, and discussion of the results. F. A. B. COLUGNATI contributed to the data analysis, interpretation, and discussion of the results.

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