

# EARLY IDENTIFICATION OF ALCOHOL USE IN WORKERS AND APPLYING BRIEF INTERVENTIONS

## *IDENTIFICAÇÃO PRECOCE DO USO DE ÁLCOOL EM TRABALHADORES E APLICAÇÃO DE INTERVENÇÃO BREVE*

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### ABSTRACT

**Purpose:** This study aimed to identify the pattern of alcohol consumption in workers and then apply a brief intervention (BI) in those who presented a pattern of excessive drinking in order to achieve withdrawal or at least decrease consumption.

**Design/methodology/approach:** This was an exploratory, descriptive, and quasi-experimental study carried out in four stages: initial screening, interview, BI, and follow-up sessions. Two hundred and thirty workers participated in the first stage, and sociodemographic and alcohol use disorders identification (AUDIT) data were collected, and thirty-four percent of workers were classified as positive (at risk, under harmful use, or alcohol dependent). Afterward, the drinking pattern was investigated by applying the modified brief drinker profile and alcohol dependence scale (ADS). The positive participants in the AUDIT and ADS were divided into the experimental and control groups. In the third stage, the BI was performed in the experimental group. In the follow-up sessions (the fourth stage), the AUDIT was applied three months and six months after the BI to the experimental and control groups for comparison purposes.

**Findings:** The results showed that the BI was effective. In all follow-up sessions, the data revealed that the experimental group had lower amounts of drinking. The control group also reduced drinking, albeit not in the same proportion as the experimental group. We believe that these results can contribute to implementing programs aimed at employee health.

**Originality:** Applying the BI on workers with excessive drinking patterns.

**Keywords:** alcoholism; brief intervention; employee health; alcohol use disorders; AUDIT.



## RESUMO

**Objetivo:** esta pesquisa teve por objetivo identificar o padrão de uso do álcool em trabalhadores e posteriormente realizar uma aplicação de Intervenção Breve (IB) nos que apresentarem padrão de beber excessivo, visando o retorno à abstinência ou pelo menos à moderação.

**Metodologia:** a pesquisa foi exploratória, descritiva e quase-experimental, realizada em 4 etapas: levantamento inicial, entrevista, BI e seguimento. Inicialmente, participaram 230 trabalhadores foram coletados dados sociodemográficos e foi aplicado o AUDIT. Classificaram-se como positivos 34% dos trabalhadores (uso de risco ou nocivo ou dependente do álcool). Posteriormente investigou-se o padrão do beber através do Perfil Breve Bebedor Modificado e foi aplicada a Escala de Dependência de Álcool (EDA). Os positivos no AUDIT e EDA foram divididos em grupo experimental e grupo controle. Na 3ª. etapa foi realizada a BI com trabalhadores do grupo experimental. Nas sessões de seguimento, foi aplicado o AUDIT após 3 e 6 meses da BI em todos os participantes dos grupos para comparação.

**Resultados e Conclusões:** Confirmou-se a eficácia da BI entre trabalhadores e o grupo experimental diminuiu a quantidade de beber. O grupo controle também diminuiu a quantidade de beber, mas não na mesma proporção do grupo experimental. Estes resultados contribuem para a implantação de programas voltados para a saúde do trabalhador.

**Originalidade:** consiste em aplicar BI em trabalhadores com padrão de beber excessivo.

**Palavras-chave:** alcoolismo; intervenção breve; saúde do trabalhador; transtornos relacionados ao uso de álcool; AUDIT.

## 1 INTRODUCTION

Alcohol is the most widely used drug in the world, with roughly 2.3 billion people consuming it, which represents over half of the population of some regions (e.g., the Americas, Europe, and the Western Pacific) (World Health Organization, 2018a; Pan American Health Organization, 2018). The total alcohol consumption per year in individuals over 15 years old rose from 5.5 liters of pure alcohol in 2005 to 6.4 liters in 2010, and by 2016, it remained at 6.4 liters (World Health Organization, 2018a); considering only those who use alcohol, an average 32.8 grams of pure alcohol is consumed per day.

More recently, the World Health Organization (WHO) reported that the estimated alcohol consumption in Brazil in 2016 was 7.8 liters of pure alcohol per person (ages 15 years and older) (WHO, 2018b); men consume 13.4 liters of pure alcohol per year, while women consume 2.4 liters of pure alcohol. These data suggest a reduction in alcohol consumption by the Brazilian population compared to 2010, which was 8.7 liters of pure alcohol per person. Even so, Brazil exceeds the world average of 6.4 liters of pure alcohol per person despite being below the standard for the Americas, which is 8 liters of pure alcohol per person (WHO, 2018a; PAHO, 2018).

Given this scenario, alcohol consumption by workers is an integral part of the overall pattern of use. In the 17<sup>th</sup> and 18<sup>th</sup> centuries, alcohol was used as a psychoactive substance that increased worker performance, enabling them to undergo the most adverse working conditions. Therefore, employers encouraged alcohol use, often “paying” part of their wages with alcoholic beverages. What is more, the Industrial Revolution in the 19<sup>th</sup> century was marked by the appearance of complex machinery, large-scale production, more specialized labor, and the need to meet deadlines and work routines with high and constant productivity. Hence, alcohol use in these new parameters of work organization brought significant losses (Rehfeldt, 1989; Lacerda, 1999; Moraes & Pilatti, 2004).

Alcohol abuse is considered a public health problem; it is the third cause of absenteeism from work and the eighth cause of paid sick leave in Brazil. What is more, workers’ performance and their environment are affected by alcohol abuse, decreasing productivity and work quality as well as leading to absences during working hours, changes in personal habits, bad relationships with cow-



orkers, work accidents, among other vulnerabilities. Alcohol is also the most commonly consumed substance by workers in their work environment, which is one reason that confirms the relevance of studying this issue in work organizations (Barros et al., 2009).

Justifiably, the International Labor Organization (ILO) considers alcohol consumption a problem of concern to many organizations (ILO, 1996), and the harmful effects of alcohol and drug use in the workplace and on work performance are common at all levels and sectors of enterprises. Job safety and productivity can be adversely affected by employees under the influence of alcohol, and how much workers consume alcohol and drug has a significant impact, extending to family and coworkers, who are affected in terms of income loss, stress, and low morale. Therefore, alcohol and the use of other drugs affect not only the user but also their work environment and company effectiveness (ILO, 1996; Mangado & Gúrpide, 2008).

For companies, alcohol abuse has been associated with work and commuting accidents, absenteeism, health complaints, excessive sick leaves, conflicts with coworkers and customers, increased task failures, loss of productive capacity, drop in pace and personal performance, destruction or misuse of work material, negligence regarding work objectives, inability to take responsibility for specific tasks, accumulation of duties, dissatisfaction, demotivation, and non-compliance with hygiene/safety in the workplace (possibly putting jeopardizing their physical integrity and that of other workers). In addition, there are psychosocial risks (job insecurity, low control over the activity, high demands, and imbalance between effort and reward) and work-related stress (Fiorelli, 2018; Magallón & Robazzi, 2005; Montalvo & Echeburúa, 2001; Brasil, 2017).

Besides these consequences, alcohol use is associated with over 200 types of diseases and psychiatric disorders that include behavioral, anxiety, and eating disorders, depression, pathological gambling habits, antisocial behavior, among others, increasing occupational and social impairments of users. In fact, alcohol use is also associated with high-risk behaviors, including unprotected, sexually transmitted diseases, and the use of other psychoactive substances (Duailibi & Laranjeira, 2007).

Given this context, alcohol-dependent people, who are unable to work, put society at risk, and organizations lose professionals in the age group of higher productivity, victims of accidents and violence. The detection of the problem in companies and investment in preventive measures to combat alcohol dependence syndrome (ADS) are still infrequent in Brazil (Fiorelli, 2018).

According to the ILO (2008), workplaces are increasingly recognized as effective places for substance abuse prevention activities that influence workers, families, and the community. It is also recognized that workplaces are appropriate sites to deal with substance abuse problems before they reach the stage of dependence and require medical intervention. Thus, the information presented about ADS in organizations and society point us to contemporary challenges regarding the concepts, mentality, and ways of thinking about use and abuse of alcohol by workers as well as their vulnerabilities. Hence, the importance of this research topic is clear and justifies identifying early alcohol use among workers using the alcohol use disorders identification test (AUDIT) and the subsequent application of a brief intervention (BI) protocol aimed at attaining abstinence or at least moderate alcohol use (Babor et al., 2001).

The AUDIT is widely used given its conciseness (2 to 4 minutes) and being a low-cost and easy to apply method consisting of 10 questions. The total score ranges from zero to 40 points, allowing four patterns of alcohol use to be identified: low-risk alcohol use or abstinence, risky use, harmful use, and probable dependence.

We began the literature review in January 2017 by selecting the keywords “Alcohol Work” and “Alcoholism Work” in the Coordination for the Improvement of Higher Education Personnel Foundation (CAPES) thesis and dissertation database and the Brazilian Digital Library of Theses and Dissertations (BDTD). We only analyzed the manuscripts focusing on the theme of this study, and 13



papers were found, being two theses (15.4%) and 11 dissertations (84.6%); 38.4% of them had been published over ten years ago. In the analyses, we noted that the interview and AUDIT were the main data collection techniques. However, this information could have been enriched if they were complemented with at least one instrument that confirmed the diagnosis of problematic alcohol use, thereby increasing the reliability of the information obtained. All of the studies made the diagnosis of alcohol abuse and suggested interventions in the final considerations.

In May 2017, we searched on the Research Unit on Alcohol and Drugs (UNIAD) (n.d.) website, and 123 articles on alcohol were found; however, none of them proposed the theme of ADS in organizations. The same occurred when checking the thesis database of the National Institute of Science and Technology for Public Policy on Alcohol and Other Drugs (INPAD) (n.d.). Thus, the review made it possible to verify that no study has applied another technique to confirm the diagnosis or performed any intervention aiming to minimize the problem.

The difficulty in finding up-to-date references in theses, dissertations, scientific articles, and books addressing alcohol use among workers is noteworthy, and confirming the problematic diagnosis of alcohol use and performing an intervention were methods applied in this study and carried out over three years (2017-2020). The goal was to identify the pattern of alcohol use among workers of two companies in São Paulo State and later perform the BI with the participants who presented excessive drinking patterns in order to achieve abstinence or at least moderation.

To this end, the specific objectives consisted of investigating the appropriateness of the AUDIT to identify the pattern of alcohol use in workers (Babor et al., 2001), determine the drinking pattern of workers, and investigate the appropriateness of a brief intervention, which was developed for college students and later adapted for high school students to reduce binge drinking among workers.

Therefore, this paper is organized with this introduction, a theoretical section on alcohol, alcoholism, and alcohol dependence syndrome and covering the definition of the main terms, diagnostic criteria, epidemiology of alcohol and its effects, and pattern of consumption, a methodology section describing each step of the study, the results, and finally the conclusion.

## 2 ALCOHOL, ALCOHOLISM, AND ALCOHOL DEPENDENCE SYNDROME

Drinking is an ancient custom, and humans have been consuming alcoholic beverages since prehistoric times. Research has shown that the first alcoholic beverage was prepared in China and dates back to 8000 BC according to the chemical analysis of residues found inside ceramic jars discovered in a tomb in Jiahu, northern China. These jars contained fermented drinks made with rice, honey, grapes, and cherries (Gately, 2008). Nonetheless, Masur (2017, p. 38) reported that it is hardly possible to know how the discovery of alcohol occurred, although “we can be certain that alcohol, as well as the problems of its misuse, are ancient acquaintances of man.”

Alcohol is a psychoactive drug that can be used without major problems by healthy adults depending on the dose, frequency, and circumstances (Masur, 2017). However, as it is a depressant drug (i.e., it decreases mental activity), it affects the brain and causes it to function more slowly, decreasing attention, concentration, emotional tension, and intellectual capacity (National Secretariat for Drug Policy, 2017; Cruz et al., 2016). Inappropriate alcohol use can lead to consequences at the organic, psychological, social, and behavioral levels as it acts on the central nervous system, possibly causing users to develop alcoholism (Masur, 1990).

Masur and Carlini (2004) described alcohol as the drug that produces more harmful conse-



quences to the human organism than the other drugs analyzed, including tobacco, cocaine, heroin, and marijuana. In 1849, the term alcoholism was coined by Magnus Huss in Sweden, who defined it as “the set of pathological manifestations of the nervous system, in the psychic, sensitive, and motor spheres,” as observed in subjects who consumed alcoholic beverages continuously and excessively for long periods (Heckmann & Silveira, 2009, p. 67).

There are numerous plausible explanations for the spread of alcohol use, including that it can be easily acquired due to being a legalized psychoactive substance, it is socially accepted, it is a behavior adapted to most cultures, and it is associated with social and cultural events such as celebrations, ceremonies, among others (Laranjeira et al., 2007).

In 1960, the concept of alcoholism was restructured and became more widespread globally with the publication of *The Disease Concept of Alcoholism* by Morton Jellinek (Vaissman, 2004). In it, alcoholism was classified as a disease based on the quantity of alcohol consumed only when the user presented: **tolerance** (the need for increasingly higher doses of alcohol to exert the same effects or a decrease in the effects of alcohol with previous doses), **abstinence** (physical and/or psychological discomfort when alcohol consumption is reduced or suspended), and **loss of control** (Gigliotti & Bessa, 2004; Heckmann & Silveira, 2009). In 1967, the WHO included alcoholism as a separate item from alcoholic intoxication and alcoholic psychoses in the International Classification of Diseases (ICD). Alcoholism was declared a disease and classified by ICD-10 in the chapter concerning mental and behavioral disorders due to alcohol use (F10); in 1956, it was also classified as a disease by the American Medical Association (Vaissman, 2004; Laranjeiras & Nicastrí, 1996; Barros et al., 2009).

In 1976, Edwards and Gross (1976) proposed a new syndrome: the ADS, which was validated and whose criteria are adopted until today by ICD-10 and the American Psychiatric Association. In the medical-psychiatric conception, the syndrome develops slowly and insidiously over, on average, 15 years of continuous use, daily or almost daily, in quantities above 40 grams of pure alcohol (WHO, 1992). It is characterized by compulsion, loss of control, physical dependence, and tolerance (Edwards & Gross, 1976; Vaissman, 2004; Gigliotti & Bessa, 2004; Laranjeiras & Nicastrí, 1996; Barros et al., 2009).

Alcohol dependence involves behavioral, cognitive, and physiological aspects, implying a wide variety of diseases, disorders, and injuries, as well as social and legal problems; it can cause substantial risks or harm to the individual, including intoxication and physical or psychological dependence (Babor et al., 2001). What is more, alcohol dependence is a major contributor to the decline in global health and a leading cause of 5.1% of diseases, being correlated with over 200 diseases, including infectious diseases such as tuberculosis, HIV/AIDS, and pneumonia (WHO, 2018a). Temporal comparisons of estimates of the global burden of disease attributable to different risk factors suggest that deaths and disability-adjusted life years (DALYs) attributed to alcohol have increased in recent decades worldwide (Sanchez, 2017).

In Brazil, ADS is one of the main factors of disease (between 8 and 14% of all health problems) and mortality, also causing economic, family, social, and psychological problems (Babor et al., 2001; Laranjeira & Meloni, 2004; Magallón & Robazzi, 2005). Moreover, it is the third predictable cause of death, only behind smoking (cigarettes) and obesity, and responsible for 3 million deaths (5.3% of all deaths) worldwide. In the 20-39 age group, approximately 13.5% of total deaths are attributed to alcohol use (Branco et al., 2009; WHO, 2018a). Notably, Vaissman (2004) found that alcohol and drug use by workers has an on-the-job injury cost of about one hundred billion dollars a year; it also causes USD\$ 500 million a year.

In 2013, the estimated cost of alcohol-related benefits was R\$ 340.80 million in social security benefits and R\$ 79.90 million in welfare benefits in Brazil, totaling R\$420.70 million. In addition



to this expense, another aggravating factor is the lack of social security contributions from the workers on leave, and the concession of this set of benefits has exceeded the mark of 15 thousand per year and with a tendency to increase (Ministério da Previdência Social, 2013, p. 34).

According to the Brazilian Social Security Secretariat and the Ministry of Finance (2017), the first four-monthly report on workers' disability benefits due to falling ill as a result of alcohol use (F10) had an increase in the number of cases in the 2012-2016 period. Alcohol consumption appears in seventh place (4.86%) as an important risk factor for employee absence in the analyzed period, being among the top 20 causes for granting benefits for temporary and permanent work disability, regardless of the relationship between illness and occupation. Alcohol consumption ranks sixth (1.38%) in the granting of occupational accident-related sick leave benefits. In the permanent absence of the individual from work, mental and behavioral disorders due to alcohol use (F10) appear in fifth place (5.82%) as one of the most frequent types of mental disorders. Lastly, in the granting of disability retirement, it appears in tenth place (2.82%).

Thus, because it is costly to society and organizations, ADS must be continuously targeted by research to identify its prevalence and etiology and develop preventive methods to guide both employees and employers to the misuse of alcohol and other drugs due to the vulnerabilities it brings to worker health and production.

## 2.1 Alcohol and work: prevention

According to Campana (1990) and Vaissman (2004), research on companies have shown that absenteeism has increased, mainly due to medical certificates (sick leave) and tardiness, work accidents, decline in productivity, staff turnover, health system overload, early retirements, granting of sick leave by social security, among others. These indicators give a rough idea of the extent of the problems related to alcohol consumption and that decrease workers' quality of life. Campana (1990) cited two main reasons for organizations to plan and execute prevention programs: a) companies save money, avoiding the loss of specialized workers, reducing efficiency deterioration, the cost of training, accidents, absenteeism, and expenses with diseases; b) the company motivates the alcoholic towards treatment. Thus, it will benefit both the employer, who saves resources by avoiding layoffs, labor turnover, outplacement, and training of new workers, and the worker, who would be risking their job and then motivated to seek help (Vaissman, 2004).

Other gains for the worker would be access to adequate information about drugs and their effects, opportunity for reflection and professional help to change their consumption pattern, opportunity for reflection and professional help to change their lifestyle, and proactive participation in actions to promote health and safety at work. Other gains for the company would be greater worker commitment, improved public image as a socially responsible company (in the market and community), lower costs related to health and safety, increased productivity, and reduced turnover (Duarte et al., 2008).

The active participation of workers' and employers' organizations is essential for developing national policies and programs to prevent occupational diseases such as alcoholism. According to the ILO (2013), employers have a duty to prevent occupational diseases by taking preventive and protective measures based on assessing and controlling risks at work. Companies have a structure and place to detect alcoholism that other social situations do not have, including leaders in direct contact with their subordinates, periodic health examinations, weeks dedicated to accident prevention, and the internal commission for accident prevention (Araújo, 1986).

According to the Brazilian Ministry of Health (2001), alcoholism prevention actions, which are limited to courses and lectures to transmit scientific knowledge and counseling on the harmful actions of alcohol on the body, are often innocuous. Only programs that identify organizational and environ-



mental aspects related to alcohol risk in work and daily life situations and seek to implement actions to transform them achieve positive results (Ministério da Saúde do Brasil, 2001; ILO, 2013; ILO, n.a).

Campana (1990, p. 218) demonstrated that “published research has shown a recovery rate between 50 and 70% in companies compared to about 30% in those that leave hospital treatment.” At Petrobras (a state-owned Brazilian multinational corporation in the petroleum industry), in the ‘90s, there were savings of 60 to 70% in losses caused by work absenteeism, diseases, and in the number of accidents after the implementation of the chemical dependency program at the Duque de Caxias Refinery (Vaissman, 2004).

## 2.2 Brief intervention

One intervention modality attracting increasing interest from clinicians and other health professionals is the brief intervention (BI) due to its benefits: lower costs and higher effectiveness (Neumann, 1992; Micheli et al., 2017). It is a modality of clinical care with limited time and focuses on changing the patient’s behavior and effectively reducing alcohol and drug use, regardless of age and gender, more than other techniques (Micheli et al., 2017).

The BI aims to help in developing the person’s autonomy, detect the problem, and motivate the patient to achieve specific actions, such as seeking treatment or improving their level of information about the risks associated with substance use by increasing their sense of risk and self-care, granting them the ability to take the initiative and responsibility for their choices. It has as theoretical assumptions the idea that dysfunctional behavior can be modified (Dimeff et al., 2002; Marques & Furtado, 2004; Micheli et al., 2017).

Studies for alcohol treatment conducted by Miller et al. (1995, p. 22 *apud* Dimeff et al., 2002) showed that BIs were more positive and had more significant literature bases. Other studies have also confirmed the effectiveness of BI (Minto et al., 2007; Dimeff et al., 2002; Micheli et al., 2004; Marques & Furtado, 2004).

Moreover, we performed analyses and combined the results of research on the effectiveness of BI and found that: a) BI can reduce alcohol consumption in men and women (regardless of the age); b) this method could reduce alcohol consumption by 34%; c) BI can reduce mortality rates by 23-26% (Formigoni & Ronzani, 2014). In fact, the doctoral and post-doctoral theses of Cruz (2011) and Martins (2006), respectively, confirmed the effectiveness of BI. These studies originated the book “My students are drinking! What now? A theoretical and practical guide for educators on brief intervention to reduce alcohol consumption among students” (Cruz et al., 2016), which presented the procedure followed by our study, adapting it to a group of workers.

Thus, BIs that use focal techniques of brief counseling, short motivational interviewing, and didactic resources to quickly obtain a higher level of information from the patient about their current problems, assessing and motivating for change, and preparing them to make decisions, have become a way to reduce harm from alcohol consumption. Nonetheless, this strategy can be used in other settings and different populations (Dimeff et al., 2002; Marques & Furtado, 2004; Micheli et al., 2017).

## 3 METHODOLOGY

As to its objective, this study was exploratory and quasi-experimental and employed standardized instruments and interviews in the technical procedures for data collection. This type of research allowed for greater familiarity with the problem since the subject matter is scarcely investigated. Hence, from an approximate overview of the research object, it was possible to develop,



clarify, and modify more precise and operationalizable concepts and ideas (Gil, 2019). Quasi-experimental designs are widely used in applied research such as with social interventions (drugs, alcohol, etc.) and compare treatment and non-treatment conditions, so it is conducted with non-equivalent groups or the same subjects before treatment, which is known as a pre- and post-test design with a non-equivalent control group (Selltiz et al., 1987).

The comparison between treatment and non-treatment conditions was made with the same subjects by analyzing the cause-effect relationships with and without experiments and carefully collecting data in both situations, thus creating a quasi-experiment. Developing a pre- and post-test design and comparing participants to one measure before the intervention (pre-test) and another measure after the intervention (post-test) produces an even more useful quasi-experimental design. Hence, repeated measures were not used, but between subjects, and subjects were randomly assigned to different conditions (two) and each participant was only subject to one of the experimental conditions. And thus, an index of change from the pre-test to the post-test could be calculated and, consequently, the effects produced by the treatment (Selltiz et al., 1987; Cozby, 2003; Allen, 2017).

A total of 230 workers (24.3%) out of 944, of all hierarchical levels, from two companies located in medium-sized cities in São Paulo State participated in this study (a large state-owned company and a medium-sized private company). The autarchy is an indirect public administration entity that has provided water and sewage collection and treatment for the city government since 1962 (58 years), with 694 workers (date of survey collection). The private company is in the printing sector and was founded in 1944 (77 years); it has 250 workers and produces notebooks and diaries for the school sector, exporting its products to several countries (date of survey collection).

Before starting data collection, this research project was approved by the Ethics and Research Committee of the School of Philosophy and Sciences (UNESP Marília Campus) (CAAE no. 82958118.4.0000.5406). All the workers of the companies were invited to participate in a one-hour lecture entitled “Alcohol and Work,” whose objective was to sensitize the participants and invite them to participate. Those who accepted signed the free and informed consent form and answered the questionnaires of the initial survey.

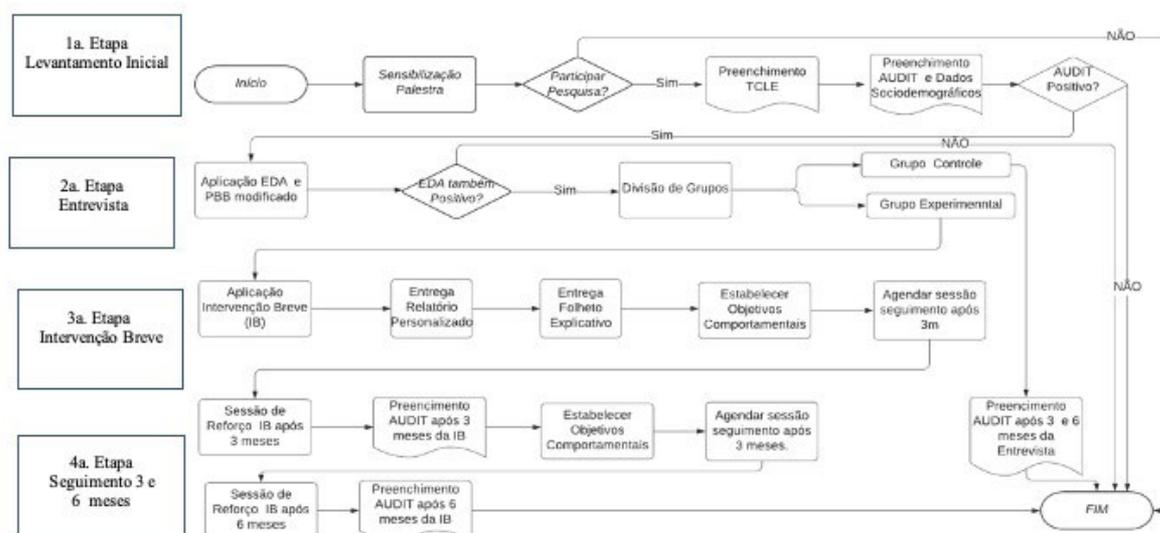
Of the research participants, 78.7% were male and 20.9% were female. As for marital status, 64.8% were married, 19.1% were single, 10% were divorced, 1.3% were in a common-law marriage, and 4.8% did not answer this question. A large portion of the workers (57.9%) was in the productive age brackets (17 to 45 years old), and the percentage of workers under 35 was 27.9%. Most of the workers (30%) were between the ages of 36 and 45. As a whole, the group had a mean age of 42.43 years (SD = 10.72).

As for the hierarchical positions held by the participants, 77% were from the operational level, 13.5% from the tactical level, 5.2% from the strategic level, and 4.3% did not answer. As for the time they have been in their position, 17.2% were in the company for a few months to 2 years, 16.7% for 3 to 5 years, 16.8% for 6 to 10 years, 43.6% for over 11 years (maximum 40 years), and 5.7% did not answer (average of 13 years and standard deviation of 12.6 years in the position).

The socioeconomic level presented by workers, according to the Brazilian Association of Research Companies (2018), is B2 (39.6% of respondents), followed by C1 (27.4%), B1 (16.5%), A (7.4%), and C2 (5.2%). The socioeconomic level D-E was established in only four workers (1.7%), and 2.2% did not answer. The study was conducted in four stages: initial survey, interview, brief intervention, and follow-up. In all, five sessions were conducted and distributed as follows: the initial survey (stage one), the interview (stage two), the brief intervention (stage three), and two follow-ups (stage four) (Figure 1). All stages were conducted in the companies’ environment during work hours and in a private room.



Figure 1 - Flowchart: stages of the research



Source: the authors (2020)

The research data were collected in two ways: collectively (company room, initial survey questionnaire) and individually (interview and 3- and 6-month follow-ups). The data obtained were entered into an electronic spreadsheet and exported to the statistical software SPSS Statistics 25 (International Business Machines Corp, 2017), in which the percentages and frequencies (absolute and relative), the association test, and the mean differences were computed using a significance level of 0.05. The independent variables were control and experimental group, gender (male and female), and position. The dependent variables were analyzed according to the instruments used.

In the first stage, we identified the risks (low, risky, harmful, and dependent) of alcohol use by workers. To do so, a questionnaire was applied in which the participants identified themselves, provided sociodemographic data, and answered the AUDIT (Babor et al., 2001), which accurately tracks the problematic use of alcohol and was developed by a group of researchers from the WHO and adapted to Brazil by Mendez (1999), proving to be reliable (0.86). The 10-question AUDIT is easy to apply and can be used in various fields such as health, driver's licenses, companies, and clinical treatment programs (Santos et al., 2012). Its correction is performed by scoring each question according to the answer given by the respondent. With this sum, the pattern of alcohol consumption can be classified into four levels: **low risk or abstinent** (0-7 points), **risky use** (8-15 points), **harmful use** (16-19 points), and **dependence** (20≥ points).

Therefore, workers who scored 8 or higher on the AUDIT were classified as positive because they were classified as risky, harmful, or dependent users. The interview was conducted in the second stage with the workers who scored 8 or above to acquire information on the drinking pattern using the modified DBP (Cruz et al., 2016); the ADS was applied to compare and confirm the AUDIT results (Skinner & Horn, 1984; Jorge & Masur, 1986).

The modified BDP is an interview method used to assess the habitual pattern of alcohol consumption, episodic occasions, and drinking time (Cruz et al., 2016). For each period (day of the week), the type of drink, the alcohol content, the amount consumed, the approximate time the drink was consumed, the people the respondents were with, and the location are verified. Finally, the respondents answered how many times they drank five or more drinks on a single occasion in the last six months and their weight. These data allow the blood alcohol levels to be calculated.

The ADS, developed by Skinner and Allen (1982) with internal consistency reliability (0.92), is a quantitative instrument that measures the severity of alcohol dependence during life. It is a widely used and reliable scale that was validated for Brazil by Jorge and Masur (1986). It has 25 items that analyze the cognitive, physiological, and behavioral domains, abstinence symptoms, impaired control while drinking, the compulsion to drink, alcohol tolerance, and salience of drinking behaviors (Skinner & Horn, 1984). Each item has two, three, or four alternative answers that can be assigned 0 to 3 points: alternative a (0 points), alternative b (1 point), alternative c (2 points), and alternative d (3 points). According to the authors, the ADS classifies individuals into levels: **low dependence** (1-13 points), **moderate dependence** (14-21 points), **substantial dependence** (22-30 points), and **severe dependence** (31-47 points) (Jorge & Masur, 1986).

The workers in whom excessive alcohol use was confirmed were separated into two groups equally divided in quantity by job level and drinking pattern: group 1 (the experimental group), in which the BI was performed, and group 2 (the control group), in which no BI was performed.

In stage three, the BI (explained in section 2.2) developed by Cruz et al. (2016) was only performed with workers from the experimental group. In the follow-up sessions (stage four), the AUDIT was applied 3 and 6 months after the BI in all experimental group participants and in the control group to compare the drinking patterns of the workers. After the survey was completed, the BI was applied to the workers in the control group.

## 4 ANALYSIS RESULTS

The results will be presented according to the stages developed: initial survey, interview, BI, and 3- and 6-month follow-ups of the experimental and control groups. Initially, the frequencies and means of the AUDIT applied in the initial survey were analyzed, which obtained Cronbach's alpha 0.82, showing good reliability (Cronbach, 1990). We selected 78 workers (33.3% from the private company and 66.6% from the state-owned company) who scored eight or more points (i.e., 34.1% of the total survey participants). This finding corroborates another study that applied a survey on alcohol and drug use in the workplace and conducted in 1995 by Fridman and Pellegrini (1995) through SESI (Industry Social Service) in 23 companies in Rio Grande do Sul State and involving 51,600 employees, concluding that 34% had problems resulting from alcohol use.

The highest classification of harmful and dependent was among the workers of the private company ( $\chi^2 = 11.310$ ;  $p = 0.010$ ), with 10.2% of workers in the first classification (harmful) compared to 1.7% of the employees in the state-owned company. In the second category, 8.5% of the workers were dependent compared to 3.5% of their counterparts in the state-owned company. The data showed that alcohol abuse is present in all professional hierarchical levels and sectors of the companies analyzed (Table 1, where f = frequency), as also noted by Trucco et al. (2009).

Table 1 - Comparison of alcohol use pattern and job level

	Job level	Strategic		Tactical		Operational		Total	
		f*	%	f	%	f	%	f	%
Low risk		8	5.5	19	13	119	81.5	146	65.4
Risk		3	5.2	13	22.8	41	72.0	57	25.5
Harmful		0	0.0	1	11.1	8	88.9	9	4.2
Dependent		2	18.0	0	0.0	9	82.0	11	4.9
		13	6.0	33	14.7	177	79.3	223	100.0

Source: the author (2020).



In the second stage, the workers that were classified as positive (risky, harmful, and dependent alcohol use) by the AUDIT participated, and the ADS and modified BDP were applied. Regarding the AUDIT, a Cronbach's alpha of 0.81 was obtained, showing good reliability for this scale (Cronbach, 1990).

Of the 78 workers classified as positive in the AUDIT, 71 participants who also scored the ADS participated, making it possible to compare and confirm the results obtained in the AUDIT (positive as to alcohol abuse). When crossing the results of both tests, it was observed that the AUDIT was more severe in classifying alcohol abuse. This is expected because the AUDIT is used for an initial survey in which a reasonable number of false positives and a low number of false negatives are obtained, while the ADS is a scale for diagnosis confirmation.

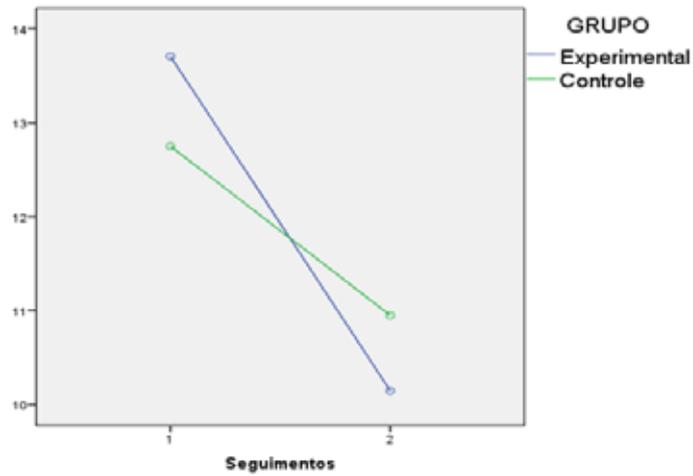
The modified BDP assessed the drinking pattern of workers who drank at least once a week (Cruz et al., 2016). There are six measures performed: the first corresponds to the type of drink consumed, the second to the total number of doses consumed in the week, the third to the time spent drinking, the fourth to the number of people with whom they drank, the fifth to the place where they drank, and lastly, the number of times they drank five or more doses on a single occasion in the last six months. As for the frequency of drinking by day of the week, it was found that the occurrences were less than five or six doses or did not occur at all from Monday to Thursday. The day when workers drink the most are Saturdays, followed by Fridays and Sundays, and, in the same sequence, are also the days when the number of people they drank with was higher. As for the type of drink consumed per day of the week, beer is the most consumed, followed by spirits. The place preferred by workers to consume alcoholic beverages is at home, followed by bars. In general, workers consume an average of 3.59 drinks per week (SD = 5.96); the average time spent drinking is 1 h 37 min (SD = 1.00).

The groups were divided, selecting the 71 positive workers in the AUDIT and ADS. As for the characteristics of this group regarding gender, age, participants per company, and hierarchical level of the position, it was verified via variance analysis that they did not present significant differences per company; therefore, it was possible to treat them as one group. The experimental group totaled 43 workers, and the control group totaled 28 workers. The groups were divided equally by job level, drinking pattern (Table 1), and company so that the groups did not have the same number of workers. In the third stage, the BI was applied to the 43 workers of the experimental group.

Finally, in the fourth stage, 10 participants dropped out of the study. Thus, the AUDIT was applied to 61 workers (41 from the experimental group and 20 from the control group) after three months of BI (follow-up). The data obtained were analyzed by repeated-measures analysis of variance (ANOVA) (Field, 2009). The results revealed that there was a significant effect only for time ( $F_{1,59} = 12.942$ ;  $p < 0.001$ ), as both groups had lower AUDIT scores (Figure 2). Although there was no significant effect between the groups, one can see, especially in Figure 2, that the experimental group decreased the AUDIT score more than the control group. In the former group, the average decreased by 3.56 points, while the control group only by 1.8 points.



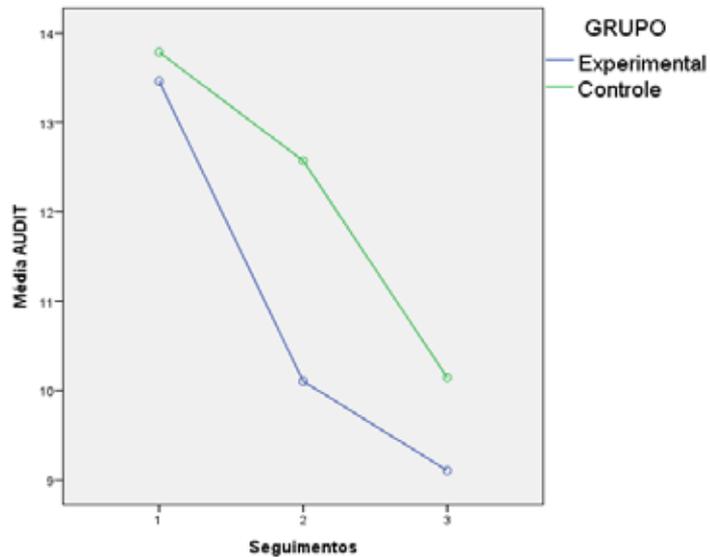
Figure 2 - Mean, standard deviation in AUDIT at the interview, and three-month follow-ups after BI per group.



Source: the authors (2020).

Six months after the BI, the AUDIT was followed up in the experimental and control group. At this stage, 05 participants dropped out of the study, so the AUDIT was applied to 56 workers (39 from the experimental group and 17 from the control group). The data were analyzed by repeated-measures ANOVA between the experimental group and the control group (Field, 2009). The results show that there was a significant effect only for time ( $F_{1,51} = 24.489; p < 0.001$ ), as at the three-month follow-up, where both groups decreased the AUDIT score (Figure 3), although the experimental group had an even lower AUDIT score than the control group.

Figure 3 - Mean, standard deviation in the AUDIT at interview, 3- and 6-month follow-ups after BI per group.



Source: the authors (2020).



## 5 CONCLUSIONS/CONTRIBUTION

Returning to the objectives proposed herein, we sought to identify early on the abusive use of alcohol by workers and promote the application of brief interventions to reduce alcohol consumption. The most consumed beverage among workers is beer, and this may be associated with the high production of beer in Brazil (the third-largest beer producer in the world), producing roughly 14.1 billion liters per year (Brazilian Beer Industry Association, 2017).

Another factor that may be associated with the preference for beer is that beer itself, according to Araújo et al. (2003), “[...] is a highly labile beverage, possessing a complex but moderate aroma and flavor. The balance of its volatile and non-volatile compounds is responsible for consumer acceptance and the quality of the beverage.” Workers drink preferentially on weekends on Saturdays, followed by Fridays and Sundays, respectively, with more consumers. According to Dimeff et al. (2002), this peer influence is the most common environmental risk factor for alcohol use, and the authors believe that peers “socialize” with each other by imitating or “reinforcing” drinking behavior, as well as by “peer selection” (associating with peers whose lifestyles are similar to their own). Thus, one can see that alcohol has its social function to the point that the person who drinks sparingly or not at all causes, at the very least, strangeness, if not marginalization. Many times, an individual’s masculinity is measured by the amount of alcohol they can ingest, as well as, on certain occasions, it is almost impossible to avoid drinking without being shunned from the group. Thus, drinking habits foster alcohol abuse (Rehfeldt, 1989).

As for the preferred place for workers to consume beverages, their home was predominant, and this is likely because of two factors: they can purchase alcohol at lower prices in supermarkets than in bars (Miozzo, 2018); concern with the penalties of anti-drinking legislation, such as *Lei Seca* [“The Dry Lay”] (Laws no. 11.705/2008 and 12.760/2012), which amended the Brazilian Traffic Code and established zero tolerance regarding driving under the influence of alcohol. This law imposes stiff fines and the loss of the offender’s driver’s license for 12 months and even detention of the driver who, criminally prosecuted, can be detained for six months to three years in prison. Hence, “with this law, Brazil became one of the countries with the most severe legislation” (Salgado et al., 2012, p. 972).

One of the specific objectives proposed herein was to investigate the suitability of the brief intervention by Cruz et al. (2016), which was based on the Brief Alcohol Screening and Intervention for College Students (BASICS) model used for reducing excessive alcohol use among workers (Dimeff et al., 2002). The BASICS method intervention also uses BI, aiming at moderate alcohol use and consequent reduction of harm that alcohol abuse can cause in college students.

Since there is no known research regarding BI application with workers, two groups were used for comparison: the experimental group that received the BI, which is widely used by health professionals, following the six essential elements or “active principles” common to BIs – FRAMES (F for feedback, R for Responsibility, A for Advice, M for Menu, E for Empathy and S for Self-efficacy), and the control group, which did not receive any type of intervention (Cruz et al., 2016).

At all follow-ups, the data showed that the experimental group decreased the amount of drinking, demonstrating that the BI was effective at both the first follow-up (three months of BI application) and the second one (six months of BI application), thereby confirming the effectiveness of BI in organizations as workers demonstrated that reduced drinking patterns in the follow-ups where the AUDIT was applied. We noticed that the control group also decreased the amount of drinking, albeit not to the same extent as the experimental group. This occurred because the intervention was carried out in the companies (lectures, BI, and the presence of the researcher), which indirectly benefited those who did not receive the BI.



Thus, this study has shown the effectiveness of the BI among workers by presenting reduced drinking patterns in both groups (Cruz et al., 2016). In addition, the AUDIT proved adequate for the initial survey process by presenting a Cronbach's alpha of 0.82 with good reliability and for the three- and six-month follow-ups (Babor et al., 2001; Cronbach, 1990). The ADS also proved adequate in confirming the diagnosis of the initial survey, with a Cronbach's alpha of 0.81, showing good reliability (Skinner & Horn, 1984; Jorge & Masur, 1986; Cronbach, 1990).

As for the modified brief drinking profile (Cruz et al., 2016; Dimeff et al., 2002), it also proved suitable for assessing alcohol consumption by the number of doses consumed, the type of drink, the time spent on this activity, who the worker was with, and the location. Given that the effectiveness of BI has been proven, its adoption in the organizational environment is highly recommended. Its practicality and speed favor the training of professionals (managers of people management, education, social assistance, health, etc.) and its adoption in different contexts and treatments, especially those aimed at users with risky, harmful, and even dependent consumption patterns. In addition, it is perceived that the BI provided better results in risky and harmful drinking patterns.

Action must be taken, as the WHO (2018a) projected an increase in alcohol consumption in the Americas, potentially reaching 6.6 liters of pure alcohol per person in 2020 and 7.0 liters of pure alcohol per person by 2025. Organizations today occupy a vital place in the worker's life - they work, eat, and practice leisure there, anywhere from 10 to 12 hours a day. Therefore, it has become a place where stimuli and responses are produced that occupy people's day-to-day lives, thus being a suitable place for preventing substance abuse that influences workers and provides well-being (ILO, 2008). The purpose of the organization is to make a profit and produce, but for this to be possible, it is necessary to think of man above everything else.

As demonstrated herein, there are almost no records of data obtained from experiences with preventive actions against alcoholism in companies. Different living conditions do not influence the propensity to abuse alcohol; the incidence occurs in any population segment, as it was seen, in all hierarchical levels of an organization (operational, tactical, and strategic management). Businessmen seem to be aware of the seriousness of this issue, although they are reluctant to admit it, denying that it can affect their particular company. They possibly see alcoholism as "[...] a weekend behavior and, therefore, a private behavior in which the company should not interfere" (Fridman & Pellegrini, 1995, p. 137).

The organization that is determined to face the problem that collects information of the damage (e.g., work accidents, absences, delays, and occupational diseases) that it causes to individuals (i.e., workers, families, and communities) must implement, organize, and follow up on all the strategies and policies to be developed, seeking effective solutions promptly and the way to achieve the established goals. Prevention against alcoholism must also become an integral part of occupational medicine because it enables a greater involvement of the affected workers, producing conditions for improvements in the efficiency of the measures adopted.

Nonetheless, without the clear and open "endorsement" given by the company's top management, strategies and policies may be doomed to failure. In the same way, the simple delegation of tasks to supervisors/sectors/departments without the express identification and recognition of the problem by the management, just to formally correspond to a social and moral commitment, will fail.

Given the above, our findings may contribute to a better understanding of alcohol consumption among workers and show the possibilities of using brief intervention, which is quick, cheap, and efficient. Further research must be conducted for better scientific clarification, such as understanding under which working conditions, occupational groups, business particularities, leadership style, internal business situations, line of business, company size, and work organization is there a significant incidence of alcohol abuse. In addition, we are currently experiencing the COVID-19 pandemic, which has triggered lifestyle changes, especially regarding alcohol consumption (PAHO, 2020), making studies on alcohol consumption by workers paramount and a present-day topic.



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## Contribution of authors

Every author should account for at least one component of the work. Paper approved for publication need to specify the contribution of every single author.

Contribution	[Author 1]	[Author 2]
1. Definition of research problem	√	√
2. Development of hypotheses or research questions (empirical studies)	√	√
3. Development of theoretical propositions (theoretical work)	√	
4. Theoretical foundation / Literature review	√	√
5. Definition of methodological procedures	√	√
6. Data collection	√	
7. Statistical analysis	√	√
8. Analysis and interpretation of data	√	√
9. Critical revision of the manuscript	√	√
10. Manuscript writing	√	
11. Other (please specify)	-	-

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