BRAZILIAN HIGH SCHOOL STUDENTS CONCEPTIONS ABOUT ALCOHOLIC BEVERAGES

CONCEPÇÕES DE ESTUDANTES BRASILEIROS DE ENSINO MÉDIO SOBRE BEBIDAS ALCOÓLICAS

Gabriela Luisa Schmitz
Federal University of Santa Maria, UFSM
Santa Maria, RS, Brazil
gabrielaschmitz@yahoo.com

Saulo Roth Dalcin
Federal University of Santa Maria, UFSM
Santa Maria, RS, Brazil
saulodalcin@yahoo.com.br

Cláudia Sirlene de Oliveira
Faculdades Pequeno Príncipe, FPP
Curitiba, PR, Brazil
claudia.bioquimica@yahoo.com.br

João Batista Teixeira da Rocha
Federal University of Santa Maria, UFSM
Santa Maria, RS, Brazil
jbtrocha@yahoo.com.br

Abstract. Alcohol consumption is high among adolescents. It is important to implement preventive policies to avoid alcohol consumption by adolescents. We assessed the preconceptions of 171 Brazilian adolescents (15 to 18 years) from high school, on the use of alcohol. We compared students' view with the scientific information to inform educators about the potential social and biological hazards of ethanol consumption that could be used as support material in the classroom. Students' approval of alcohol consumption was high. However, the knowledge about chronic toxicological risks of alcohol consumption was almost absent. These results indicate that, in the students' conception, the neurobiological reward provided by alcohol outweighs the negative impacts of this substance. Thus, we strongly suggest that basic school curricula must cover the socio-toxicological effects of ethanol consumption as a strategy to increase the visibility and perceptions about the negative impact of alcohol consumption.

Keywords: adolescents; high school students; alcohol consumption; alcoholic beverages.

Resumo. O consumo de bebidas alcoólicas é grande entre adolescentes. Por isso é importante implementar políticas preventivas para evitar o consumo de álcool por jovens. Nosso objetivo foi investigar as concepções prévias sobre o consumo de álcool de 171 estudantes de ensino médio (de 15 a 18 anos) de uma escola situada na região central do estado do Rio Grande do Sul, Brasil. Comparamos a visão dos adolescentes com as informações científicas para informar educadores sobre os potenciais danos sociais e biológicos provocados pelo consumo de álcool que poderiam ser usados como materiais na sala de aula. A aprovação do uso de álcool pelos adolescentes foi alta. Entretanto, o conhecimento sobre os riscos toxicológicos crônicos do uso do álcool foi quase inexistente. Esses resultados indicam que, na concepção dos estudantes, a recompensa neurobiológica proporcionada pelo álcool supera os impactos negativos dessa substância. Assim, nós sugerimos que o currículo da educação básica deve comtemplar os efeitos sócio-toxicológicos do consumo de álcool como uma estratégia de aumentar a visibilidade e percepções sobre os impactos negativos de seu consumo.

Palavras chave: adolescentes; estudantes de ensino médio; consumo de álcool; bebidas alcoólicas.

INTRODUCTION

The World Health Organization classifies alcohol as a psychoactive substance widely consumed (WHO, 2004). Of concern, alcohol is a favorite drug among children and adolescents (Lopes, Nobrega, Del Prette & Scivoletto, 2013). Ethanol consumption is part of humanity' history, being associated with the divine and healing power (Schuckit, 2008). The origins of ethanol consumption are possibly accidental because of food storage and its preservation via fermentation (Ramussen, 2015). However, the problem of ethanol consumption is that it is a psychotropic drug that has positive rewarding effects on the central nervous system (Costardi *et al*, 2015). This certainly contributed to its selection as a beverage along the evolution of the human society (Ramussen, 2015). The constant consumption of ethanol can be associated with neurobehavioral changes that will lead to physical and psychological addiction, known as alcoholism (Schuckit, 2008).

In Brazil, the use of alcohol by adolescents has been increasing (Galduróz, Noto & Carlini, 1997). The increase in the ethanol consumption is related to the fact that it is a licit drug, thus less morally stigmatized than the illicit drugs consumption (Salles, 1998). In fact, ethanol consumption is socially encouraged by Western society with a recreational purpose (Sudhinaraset, Wigglesworth & Takeuchi, 2016; Wang, Newman & Shell, 2016). According to the survey conducted by the "Secretaria Nacional Antidrogas" (SENAD), about 20 million of Brazilians are alcohol addicts. The percentage of young individuals that consume alcoholic beverages increase progressively with age. Moreover, it was noted that alcoholic beverages consumption starts approximately at the individual 13 years old (Laranjeira, 2007). In accordance

with Meloni and Laranjeira (2004), as early starts the consumption worse are the consequences and there is a greater risk of alcohol abuse and dependence. Young subjects do not have a completely mature organism and the alcohol consumption may promote cerebral damages and neurocognitive deficits, with learning and intellectual development implications (Zeigler *et al.*, 2005). Souza, Areco and Filho (2005) carried out a study with public students from Cuiabá (Mato Grosso state, Brazil), the authors observed that approximately 66% of the adolescents consume alcohol and from these, 13% present symptoms of alcoholism.

Individuals start to consume alcoholic beverages as a learned behavior that depends on social, family and personal factors (Pechansky, Szobot & Scivoleto, 2004). This behavior is developed through a learning process of imitation and reinforcement and is influenced by personal cognitions, expectations, and beliefs about substances (Botvin, 2000). In this way, it is important to promote interventions before the development and establishment of this behavioral pattern (Mcbride, Midford, Farringdon & Phillips, 2000).

Effective learning can allow reflections and behavioral changes, and for this occur, either the active participation of the student and the teacher performance based on the students' preconceptions are required (Ausubel, Novak & Hanesian, 1978; Schmitz & Rocha, 2018, 2019; Schmitz, 2019a,b). The preconceptions, in accordance with Wandersee, Mintzes and Novak (1994), are products of the individual's learning and his intellectual efforts to attribute sense and to organize a world vision. The preconceptions, in some cases, can be obstacles to the meaningful learning. In this way, Ausubel, Novak and Hanesian (1978) established that to know the students' preconceptions is the main factor that influences the learning process. Teachers should teach students in accordance with their preconceptions. Thus, the study of students' preconceptions is important to discuss it, confront it with scientific facts and theories, and, in this way, possibility the construction of a new knowledge.

Given the importance of alcoholism as a causative agent of numerous diseases, traffic accidents and violent deaths, and that adolescents are considered a group of risk, it is important to prevent the consumption of alcohol by them. The school is a fundamental institution to promote the prevention of alcoholic beverages consumption through advertisements. In this way, the objective of this study was to evaluate the conceptions about the use of alcoholic beverages in the family and community environment of high school students of Santa Maria city, Rio Grande do Sul state, Brazil. In addition, the students' conceptions were compared with scientific information coming from a review of the current literature, providing information to the educators; thus, the theme could be discussed in the classroom. We aim to incorporate in the discussions, in different disciplines, both the toxicological aspects of the acute and chronic consumption of alcohol on human biological systems and it capacity to cause addition, morbidity, and mortality, as well as to demonstrate the alcohol effects on interpersonal, familiar, social, and legal aspects.

MATERIAL AND METHODS

This study has a qualitative-quantitative approach. Qualitative analysis is indicated to studies that aim to comprehend and classify socials process and to interpret attitudes and behaviors of individuals (Oliveira, 1997).

Sample

The participants of this study were 171 students from the first, second and third year of two high school institutions from Santa Maria city, Rio Grande do Sul state, Brazil. The students' age ranged from 15 to 18 years.

Data collection

Data was collected using an open questionnaire applied to the students. The questionnaire is presented in Table 1.

Table 1. Open questionnaire applied to the students.

Questions
1) Think in the words "alcoholic beverages" and write the things that come into your mind.
2) Which side effects of alcoholic beverages consumption do you know?
3) Which benefits of alcoholic beverages consumption do you know?

Source: The authors.

Data analysis

Data were analyzed in accordance with Bardin (1977) content analysis approach. Following this approach, an exhaustive reading of the collected material was made, registration units (significant units) were highlighted, which were grouped by affinity (emergent categories).

RESULTS AND DISCUSSIONS

After read and analyze the students' answers, we identified several significant units that gave rise to six emerging categories. Figure 1 represents the significant units identified in the students' free expression about alcoholic beverages. Figure 2 shows the significant units identified in the students' answers to question two (Which side effects of alcoholic beverages consumption do you know?). Finally, Figure 3 shows the significant units identified in the students answers to the third question (Which benefits of alcoholic beverages consumption do you know?).

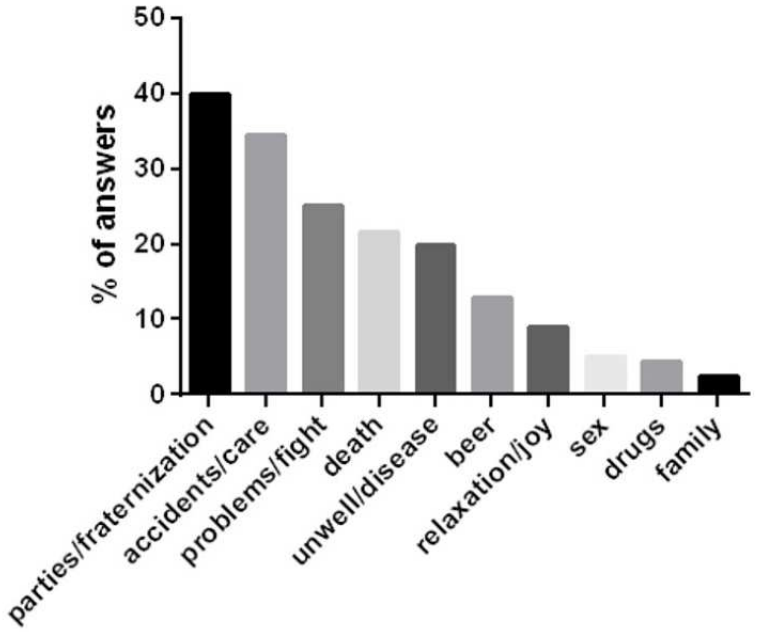


Figure 1. Significant units identified in the students' free expression about alcoholic beverages.

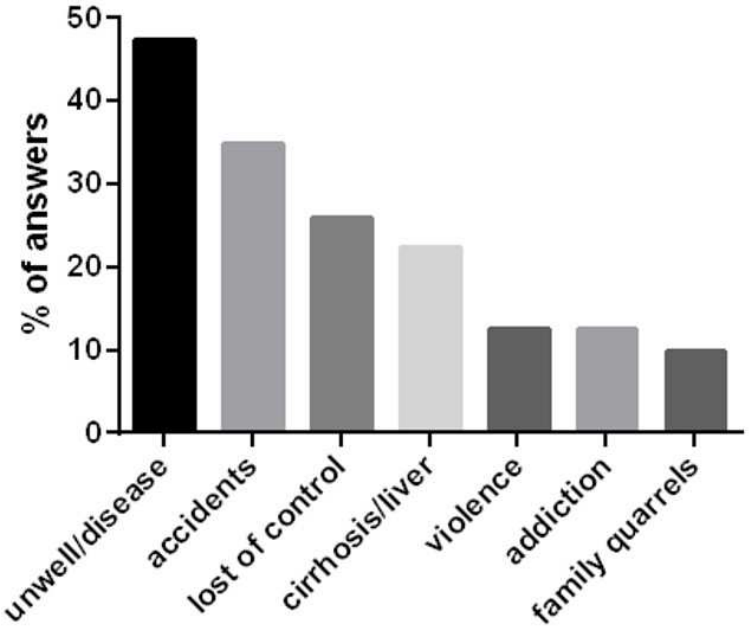


Figure 2. Significant units identified in the students' answers to question two: "Which side effects of alcoholic beverages consumption do you know?"

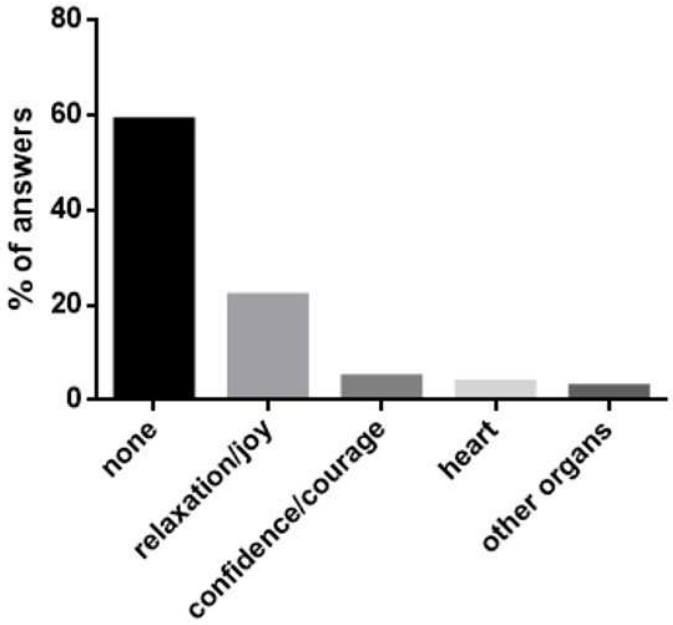


Figure 3. Significant units identified in the students answers to the third question: "Which benefits of alcoholic beverages consumption do you know?"

We grouped the significant units into six emergent categories, accordingly with their affinity. The emergent categories are described in Table 2.

Table 2. Emergent categories based on the students' answers.

Category	Significant unit	Percentage of students (%)
I	Parties/fraternization	40.00
	Relaxation/joy	22.81
	Beer	12.87
	Confidence/courage	4.68
II	Accidents	34.50
	Loss of control/loss of consciousness	26.90
	Fight/violence/interpersonal issues	25.15
	Family quarrels	9.90
III	Unwell/disease	47.34
	Cirrhosis/liver	22.20
	Death	21.64
IV	Dependence/addiction	12.87
	Drugs	2.90
V	Sex	4.68
VI	Heart	4.09
	Other organs	3.51

Source: The authors.

In emergent category I the units related to the positive perceptions of the students about the alcoholic beverages and their psychic well-fare are represented. This category shows that the preconceptions of most of the students, independently of the source (familiar, social or even by self-experimentation) reveal that,

to the students, alcoholic beverages consumption is stimulated. It is well known that alcohol has a depressant effect on the central nervous system. To those individuals that are biologically predisposed, the first doses reinforce the idea of a new experience. Adolescents with higher levels of stress present a higher rate of alcoholic abuse. The adolescents that have uncontrollable agitation, impulsivity, hyperactivity, intolerance to monotony are more susceptible to alcohol abuse and dependence (Schuckit, 2000). As alcohol is a depressor, initially, with the depression of some center in the central nervous system, it activates another center, producing the excitatory and euphoric effects, but for a short time. Alcohol reduces anxiety, so individuals with higher levels of anxiety may be more comfortable with alcohol intake (Nutt & Law, 2003). As the alcohol consumption progresses, it causes depression of the central nervous system, sleep, loss of reflexes, and motor incoordination. After acute intoxication or chronic use, psychic depression is usually observed (Schuckit, 2009).

The emergent category II represents the units related to the negative preconceptions in the neuropsychic area of the consumption of alcoholic beverages. Based on the students' answers is possible to infer that they recognize that the alcohol consumption may cause disabilities in motor coordination, consciousness, emotion or psychic control. The significant unit more reported by the students is related to the fact that alcohol can cause accidents (34.50%). The second significant unite is the loss of control/loss of consciousness (26.90%). The following significant units are related to the fact that the loss of cognitive skills and emotional control can cause problems like "fights/violence/interpersonal" issues (25.15%). Only 9.90% of the students related "family quarrel" as a negative aspect of alcohol beverages consumption.

Traffic accidents are frequently related to the high concentration of alcohol in the bloodstream. It is the second major cause of death among young people, aging from 16 to 20 years (NHTSA, 2001). A survey carried out in the IML/SP (Instituto Médico Legal of São Paulo, Brazil) on the relationship between alcohol and fatal traffic accidents in the years 2005 to 2007 shows that almost half (45%) of the fatal victims had alcohol detected in the bloodstream (Ponce, Andreuccetti, Jesus, Leyton & Muñoz, 2008) .

However, not only in the traffic but also at work or in the home environment, alcohol directly interferes with people's behavior, facilitating the emergence of dangerous situations. According to the Sociedade Brasileira de Neurocirurgia, 20% of workplace trauma is caused by alcohol, and in approximately 75% of fatal disasters on the streets and roads, a drunk driver is involved (SBN, 2009).

Suicide can be triggered and driven by depression related to alcohol consumption, or as an expression of the same pathology that led the individual to use substances of abuse. Alcoholics are 60 to 120 times more likely to take own lives than the sober individuals (Sher, 2006). The review of 632 necropsy reports of suicide victims at the IML/SP in 2005 shows that about one-third of the suicides were committed subsequently to alcohol consumption (Ponce *et al*., 2008).

Domestic violence reaches important numbers in Brazil (Silva, 2002). In this context, Edwards (1995) highlights that the alcohol consumption has a profound impact on the drinker's family and life. According to a study conducted by the Universidade Federal de São Paulo, Brazil, with 7,000 families of 108 Brazilian cities, 49.80% of the domestic aggressors were drunk, proving that alcohol acts as a fuel for domestic violence (Fonseca, Galduróz, Tondowski & Noto, 2009). Regarding adolescents, Moreira et al. (2008) observed that adolescents of both genders who consume alcoholic beverages are at greater risk of suffering community violence. An analysis of 3,097 homicide victims in 2005 at IML/SP showed that 863 individuals who had been murdered had consumed alcohol, and 785 of them had more than 0.6 grams of alcohol per liter of blood (Andreuccetti, 2007). According to Andreuccetti (2007), the relationship between alcohol consumption and the impulse to aggression is physiological, the alcoholic beverage reaches the brain, sharpens the sympathetic nervous system and increases aggressiveness.

The emergent category III is composed of the significant units related to the negative effects of alcohol on the individual's physical health. It was reported by 47.34% of the students that alcoholic beverages can cause discomfort or some disease, but the students did not mention which diseases or which organs or systems can be compromised. Only 22.20% of students believe that alcohol can cause disease in the "liver" or "cirrhosis." Only 21.64% of those interviewed demonstrated a belief in the use of alcoholic beverages as a cause of death.

The association between alcohol intake and liver disease is well documented. The regular use of alcohol can cause several types of liver damage. Although, liver cirrhosis develops in a small percentage of heavy drinkers. The prevalence of cirrhosis is 1% in drinkers who drink 30 to 60 g of alcohol/day and 5.7% in those who ingest more than 120 g/day (Bellentani *et al*., 1997). Intake of alcohol, even for a few days, can cause hepatic steatosis (fatty liver), which, although it may be reversible with abstinence, predisposes to alcoholic hepatitis and fibrosis if the individual continues to drink (Teli, Day, Burt, Benneti & James, 1995).

Hepatitis and alcoholic cirrhosis occur after several years of an abusive amount of alcohol intake, on average 100 g/day (Naveau, Giraud, Borotto &Aubert, 1997). The incidence is approximately 20% in individuals who ingest more than 120 g of alcohol/day for a period of at least 20 to 25 years (Maher, 2006).

Although the alcoholic liver disease is the most commented, the pathologies caused by alcohol are dozens, both related to acute and chronic ingestion. For example, diseases of the mild mood changes and disinhibition, stupor, coma, blackout or amnesia, sleep disorders, snoring, apnea, falls and trauma, arrhythmias, hypertension, acute pancreatitis, digestive hemorrhage, aspiration pneumonia and hypoglycemia. Alcohol intake is the triggering factor in 35% of severe acute gastrointestinal bleeding admitted to an intensive care center in Sweden (Borch, Jansson, Sjodahl & Anderberg, 1987).

Mood disorders such as anxiety or depression may predate and therefore predispose to alcohol abuse, as well as being a consequence of alcoholism. Repeated and continued use of high doses of alcohol is associated with up to 40% risk of temporary depressive episodes associated with suicidal thoughts and attempts, and severe anxiety and insomnia (Schuckit, 2009). In adolescents, due to the immaturity of the central nervous system, alcohol causes cognitive changes leading to school failure. Alcohol consumption causes changes in brain zones essential for self-control, motivation, and goal setting (Crews, He & Hodge, 2007). Structural and functional changes in the central nervous system and dementia related to chronic alcohol consumption are well documented in the literature, both by histopathological examination and by magnetic resonance imaging and computed tomography studies (De La Monte, 1988; Jernigan *et al*., 1991; Ruitenberg *et al*., 2002). Adolescents who consume a great amount of alcohol when submitted to magnetic resonance imaging have more extensive atrophy in the hippocampus than adults. Peripheral neuropathy is one of the most serious, and often permanent, problems in alcoholics. Pain, loss of limb sensitivities and motor difficulties occurs in 5% to 15% of alcoholics who ingest high amounts of alcohol chronically (Schuckit, 2008).

Low intake of alcohol (15 to 20 g) may determine mild momentary low blood pressure. However, daily use of more than 30 to 40 g results in a progressive, dose-dependent increase in blood pressure. Alcohol consumption may be an important factor, making difficult to treat hypertensive patients. Alcoholic beverages are responsible for approximately 30% of dilated cardiomyopathies (heart muscle disease and heart failure). Cardiac arrhythmias often occur in alcoholics, sometimes related to myocardiopathies (Regan, 1990). Arrhythmias caused by alcohol can cause sudden death, especially if there is previous heart disease (Lambert, Netherton, Finison, Hyde & Spaight, 1982).

Several non-neoplastic digestive pathologies are caused or aggravated using alcoholic beverages. Among them, perhaps, the one with the greatest morbidity and mortality is alcoholic pancreatitis, a chronic, progressive and irreversible disease. Alcohol in the Western world accounts for 70% to 90% of chronic pancreatitis. Ingestion of 75 g-100 g/day of alcohol for a period of 5 to 10 years can cause alcoholic pancreatitis. Around 5% to 15% of abusive drinkers that consume more than 100 g/day of alcohol are susceptible to the disease (Forsmark, 2006). Chronic use of alcohol may be a significant cause of functional symptoms, such as functional dyspepsia, gastroesophageal reflux, and esophagitis (Crean *et al*., 1994). Gastric biopsies obtained from patients with chronic alcoholism have shown a higher prevalence of chronic gastritis by *Helicobacter pylori* (Uppal, Lateef, Korsten, Paroneto & Lieber, 1991) which is related to atrophic gastritis, peptic ulcer and gastric cancer (Bienia, Sodolski & Luchowska, 2002).

Alcohol consumption is the second most important cause of human cancer (Boffeta & Hashibe, 2006). With ingestion of three or more drinks per day, alcohol has been almost universally associated with a high risk of squamous epithelial carcinoma (mouth, pharynx, larynx, and esophagus), increasing the incidence by three to five times, especially when associated with smoking (Kamangar, Chow, Abnet & Dawsey, 2009). Studies have shown a carcinogenic effect of alcohol in these epithelia independent of association with tobacco (Castellsagué *et al.,* 1999; Fioretti, Bosetti, Tavani, Franceschi & La Vechia, 1999). Alcohol consumption also correlates with increased incidence of primary liver cancer, hepatocarcinoma. There is also a link with increased risk for breast, colon and rectum cancer (Tuyns, 1996).

In the emergent category IV are those significant units related to the alcohol as a drug that can cause addiction. Only a small percentage of the students (12.87%) refer to alcohol as a drug that can cause addiction. The habitual consumption of alcohol can be associated with alcohol dependence syndrome, a psychoactive disorder characterized by the search and compulsive consumption of alcohol, and a cascade of family, social, economic, professional, legal, physical, and mental health problems (Garcia *et al*., 2007). Depending on the criteria to identify alcohol dependence, the prevalence varies from 5% to 15%. According to Schuckit (2000), the prevalence of alcohol dependence is approximately 10% for men and 3% to 5% for women. When combined abuse and dependence, the occurrence rate is 20% for men and 10% for women.

The evolution from moderate to overuse and dependence syndrome is a process that can take from a few months to decades (Ramos & Woitowtz, 2004). It has recently been found that 47% of adolescents who start drinking before age 14 will develop alcohol dependence at some time in their lives, not necessarily in adolescence. Of those who begin experimentation after the age of 20, only 9% develop alcohol dependence, i.e., 5 times less (Hingson, Heeren & Winter, 2006).

The emergent category V is composed of the significant category sex, although it was referred by a low number of students (4.68%). This category has a great importance once the disinhibiting effects of alcohol have been related to aggressive or sexually liberated behaviors (Chasin & Carlini, 2000). The alcohol-engulfed adolescent is more involved in unprotected sexual activities, with greater exposure to sexually transmitted diseases, and greater exposure to pregnancy (Scivoletto *et al.,* 1999). Being drunk increases the chance of sexual violence, both to the abuser and to the victim (Abbey, 2002).

Finally, the emergent category VI is composed of the significant units related to the benefits to the physical health of alcoholic beverages consumption. Although the probable benefits of alcohol consumption, especially of wine, on health, decreasing cardiovascular diseases and increasing longevity, more than 90% of the students reported that they do not know of any benefits from the consumption of alcoholic beverages.

The scientific consensus is very clear in concluding that more than 30 g of alcohol per day for men and 20 g for women on average are associated with avoidable health risks and evolving into addiction (Wilsnack, Wilsnack, & Kantor, 2014). On the other hand, occasional binge drinking of more than five doses (15g/dose) for males or more than four doses for females is associated with violence and neural death mainly in adolescents (Wang *et al.,* 2014). On the other hand, several studies conclude that in certain population groups, low doses of alcohol have a cardiovascular protective effect, decreasing the number of events and mortality due to myocardial infarction and ischemic stroke when compared to abstainers (King, Mainous & Geesey, 2008). This appears to occur only in men over 40 years and in postmenopausal women, and especially in older individuals with atherosclerotic disease risk (Arndt, Rothenbacher, Krauledat, Daniel & Brenner, 2004). The curve of the dose-mortality graph for myocardial infarction is U-shaped, with the lowest risk of a coronary event occurring with a maximum of 14 weekly doses (10 to 15 g/dose on average) in regular use. Starting at this dose, it would increase the risk of mortality, probably because the increase in arterial hypertension. Although, some research shows that reducing the risk of mortality from all causes of illness only occurs up to the consumption of a maximum of 3 to 5 doses per week, for reasons not well explained, perhaps due to the increase of cancer, there is not a scientifically proven safe limit of alcohol consumption.

CONCLUSION

Adolescents demonstrate in their responses, the millennial conception of our society to make alcohol an ally of pleasures, for example, the link between alcohol beverages consumption and party/socializing/relaxation/sex/confidence/courage. They also demonstrate little knowledge about personal, social and especially on the diseases caused by alcohol consumption and its risk of addiction. Despite the massive exposure in the written and television media of the current traffic law, dry law, with severe penalties for drunk driving, only 34.50% of the interviewees referred to accidents as being a complication of the use of alcoholic beverages. Although approximately 50% report that alcohol can cause the unwell/disease they are totally unaware of which diseases or organs can be compromised. The number of interviewees who reported the possibility of death by alcohol was only 21.64%. Nothing was said about the problems of absenteeism at work and loss of employment, which lead to financial losses or difficulty learning. Only 12.87% mention the possibility that alcohol causes dependence, but as we have seen, it is not an event that is rare.

The interviewees' conception seems to be: belief in the use of alcohol to search for the pleasure of euphoria, joy and fraternization and little knowledge about the fact that the risks to the user are much more present than it is transmitted to them by the experience in the family and society. This knowledge about the effects of alcoholic beverages should be discussed at school with students and educators, modify preconceptions, and build a new knowledge based on scientific facts and data. The ideal is to have as the main goal that adolescents never experiment alcoholic beverages, because they have the central nervous system and personality still in formation and are more susceptible to the effects of alcohol and to develop addiction in the future.

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