

Reducing accidents related to excessive alcohol intake? A retrospective study of polytraumatized patients undergoing surgery at a Brazilian University Hospital

A lei seca cumpriu sua meta em reduzir acidentes relacionados à ingestão excessiva de álcool?

REGINA HELENA GARCIA MARTINS¹; CAIO BOSQUÊ HIDALGO RIBEIRO²; THALITA FRACALOSSO³; NORIMAR HERNANDES DIAS⁴

A B S T R A C T

Objective: To assess whether the Brazilian Driving Dry Law reached its goal after the three years following its enactment. **Methods:** We conducted a retrospective study of patients with craniofacial fractures who underwent surgery at a university hospital in two periods: before the Law (2005 to 2008) and after the Law (2008 to 2011). **Results:** 265 patients (220 men and 45 women) were operated on during this period, 149 (56%) before and 116 (44%) after the Law, which indicates a reduction in the number of traumatisms ($p=0.04$). The age range between 19 and 40 years predominated in both periods. The main causes of traumas were car accidents, physical aggression and falls. Alcohol abuse was identified in 15.4% patients before and 19% patients after the enactment. The jaw and the maxillo-zygomatic complex were the most affected bones. **Conclusion:** The drop in the number of polytraumatized patients operated on at this institution in the three years following the Driving Dry Law was 22%, which is below the expected and desired percentage. These results must be compared to those of different services offering the same attendance type in order to compile data and enlarge statistics. The low index of reduction in the number of traumatisms and the report of alcohol abuse by several patients at the moment of trauma, even after the law, evidence the need of adopting stricter measures to control and punish violators.

Key words: Wounds and injuries. Legislation. Alcoholism. Accident prevention. Facial bones.

INTRODUCTION

The increased incidence of craniofacial traumatisms in the last decades, associated especially with car accidents and urban violence, reflects the real need of studies to plan and assess current preventive measures, as well as to prepare codes of conduct^{1,2}.

Several studies have evidenced direct association between alcohol intake and car accidents¹⁻⁶. The abusive use of alcoholic beverages was responsible for 3.7% deaths and 4.4% diseases all over the world⁷, thus constituting a public health problem. A survey carried out by the Brazilian Center for Psychotropic Drug Information (CEBRID)⁸ showed that 74.6% of the Brazilian population consume alcohol during life, 12.3% are dependent and 7.3% become involved in a risk situation due to consumption of alcoholic beverage.

Article 165 of Law 9.503 of 1997, which establishes the Brazilian Traffic Code⁹, considers infraction

the act of driving under the influence of alcohol at a level superior to six decigrams per liter of blood. In Brazil, however, 18% of victims of car accidents were driving with blood alcohol concentration inferior to that limit and still committed indiscretions in traffic¹⁰. Similar results were shown by the National Highway Traffic Safety Agency (NHTSA)¹¹, of the United States, indicating that 13% of drunk drivers who died in accidents had blood alcohol levels below the maximum allowable limit in the country.

With the aim of reducing car accidents related to alcohol abuse, on June 19, 2008, the Brazilian Congress approved Law 11.705¹² which imposes stiffer penalties for drivers caught under the influence of alcohol, like six months to three years of detention, fines and driver's license withdrawal or prohibition on obtaining a driver's license.

The impact of the promulgation of this law on accident statistics is not totally known. Thus, the present study aims to analyze whether the goal established by the

Study conducted at the Department of Ophthalmology, Otorhinolaryngology and Head and Neck Surgery of The Botucatu Medical School, São Paulo State University- UNESP.

1. Associate Professor, Department of Otorhinolaryngology, Botucatu Medical School, UNESP; 2. Undergraduate medical student, Botucatu Medical School, UNESP; 3. Medical Resident, Otorhinolaryngology, Botucatu Medical School, UNESP; 4. Otorhinolaryngologist, Department of Ophthalmology, Otorhinolaryngology and Surgery of the Head and Neck, Botucatu Medical School, UNESP.

Brazilian Driving Dry Law was reached in the three years following its promulgation.

METHODS

After approval by the Human Ethics in Research Committee of Botucatu Medical School (protocol nº 4280), we recovered the medical records of patients with craniofacial fractures undergoing surgical correction by the Otolaryngology Discipline from June 2005 to June 2011. The study did not include patients who underwent fracture reduction in emergency or outpatient units since the data available in the records at such units were incomplete. The study period was divided in two, according to the accident date: before the Dry Law, between June 2005 and June 2008; and after the Dry Law, from July 2008 to June 2011. The analyzed parameters were: gender, age, occurrence date, cause of trauma, site of fracture(s), and report of alcoholism.

For statistical analysis, groups were compared by the Chi-square test and significance level was set to 0.05.

RESULTS

In the whole study period, 265 patients with craniofacial traumatism were submitted to surgery

correction, 220 men (83%) and 45 women (17%),. Of these, 149 patients (56%) were attended before the Dry Law and 116 (44%) after, indicating a drop of 22.14% in the number of patients operated on due to traumatisms ($p=0.04$). After the law, the number of accidents was distributed as follows: 49 cases in the first year, 30 cases in the second year and 37 cases in the third year. Age ranged from 4 to 93 years (mean 31), and the highest concentration of accidents was found in patients aged between 19 and 40 years old in both periods (Table 1). As to the causes of traumatisms, car accidents, assaults and falls predominated ($p=0.69$) (Table 2). Alcohol abuse at the moment of the accident was identified at similar proportions in both periods (Table 3). The most affected facial bones in both study periods were the jaw and the maxillo-zygomatic complex (Table 4).

DISCUSSION

Currently considered one of the major global public health problems, traffic accidents correspond to the tenth cause of death and are responsible for the death of over one million people every year^{4-6,11}. They are also responsible for wounds in 20 to 50 million people, according to data from the World Health Organization (WHO)^{13,14}. Economically, traumatisms due to traffic affect from 1 to 2% of countries' gross domestic product (GDP). According

Tabela 1 - Distribuição dos traumatismos craniofaciais de acordo com a idade.

Idade	Antes da lei - N (%)	Depois da lei - N (%)
Menores de 18 anos	21 (14,1)	18 (15,5)
19 a 40 anos	93 (62,4)	70 (60,3)
41 a 60 anos	31 (20,8)	25 (21,6)
Maiores de 61 anos	4 (2,7)	3 (2,6)
Total	149 (100,0)	116 (100,0)

$p=0,98$

Tabela 2 - Etiologia dos traumatismos craniofaciais.

Etiologia	Antes da lei - N (%)	Depois da lei - N (%)
Acidente automobilístico	46 (30,8)	37 (31,9)
Agressão física	34 (22,8)	29 (25,0)
Quedas	17 (11,4)	12 (10,3)
Acidente com animais	15 (10,1)	8 (6,9)
Acidente durante prática esportes	12 (8,0)	9 (7,7)
Acidentes com bicicletas	11 (7,4)	9 (7,7)
Acidentes de trabalho	5 (3,3)	8 (6,9)
Trauma com arma branca/fogo	1 (0,7)	2 (1,7)
Outros	8 (5,4)	2 (1,7)
Total	149 (100,0)	116 (100,0)

$p=0,69$

Tabela 3 - Relato de abuso de álcool no momento do acidente.

Abuso de Álcool	Antes da lei - N (%)	Depois da lei - N (%)
Sim	23 (15,4)	22 (18,9)
Não	126 (84,6)	94 (81,1)
Total	149 (100,0)	116 (100,0)

$p=0,45$

Tabela 4 - Locais das lesões nos traumatismos craniofaciais.

Lesões	Antes da lei - N (%)	Depois da lei - N (%)
Fratura de mandíbula	62 (41,6)	38 (32,8)
Fratura maxilozigomática	36 (24,2)	32 (27,6)
Fratura nasal	28 (18,8)	32 (27,6)
Fraturas complexas (Le Fort, base de crânio)	15 (10,1)	8 (6,9)
Ferimento de partes moles	6 (4,0)	5 (4,3)
Fratura frontal	2 (1,3)	1 (0,8)
Total	149 (100,0)	116 (100,0)

$p=0,44$

to the Institute of Applied Economic Research (IPEA), the sum of these costs in Brazil reached 30 billion a year between 2003 and 2006¹⁵. The dimension of this problem, not only in Brazil but also all over the world, has led the UN (United Nations) to define the ten-year period between 2011 and 2020 as the decade of actions for road safety worldwide, which include planning and implementing preventive measures.

In Brazil, an important measure to control car accidents related to excessive use of alcoholic beverages was the promulgation, in 2008, of the Dry Law¹². Soon after it had come into effect, surveillance in national roads was tight and breathalyzers were used to detect alcoholic indexes. These measures, however, were gradually left aside and the number of inspections decreased, raising doubts about whether the goals of this Law have been reached. The lack of permanent inspection associated with the sense of impunity has promoted over the years a reversion in the tendency towards a decrease in accidents. Stricter and more effective traffic legislation is essential to reduce traffic accidents, as evidenced in several countries¹⁶⁻¹⁹.

Thus, our results indicated that, although there was a statistically significant drop of 22% in the number of facial fracture surgeries in the three years following the implementation of this Law, such a percentage is still far from ideal, based on the high expectations of the impact of the Dry Law on car accidents. Data related to alcohol abuse reported by victims must be carefully interpreted, since they can be underestimated. This piece of information is generally extracted from records of emergency services or given by patients who are not always aware of their drunkenness level. In addition, objective measures, such

as breathalyzer tests or blood dosage, were not adopted to confirm drivers' blood alcohol concentration. Furthermore, a large number of patients seek medical care 12 or 24 hours after the accident, a period sufficient to attenuate the clinical signs of intoxication.

Another important point to be discussed, considering the results of this study, is that the goals of the Dry Law should not be assessed based on the activity of only one hospital service. Although indicating a small reduction in the index of accidents after the law, the present results should not be analyzed separately, but compiled with those of other services so that statistics can be enlarged and compared. Another problem is scarcity of national studies on this subject. In the international literature, Hitosugi *et al.*¹⁹ and Imai²⁰ reported a decrease in car accidents in Japan after the introduction of a law imposing reduced blood alcohol concentration of drivers and increased penalties for violators. Such effectiveness was also proven in the United Kingdom, Canada and Netherlands¹⁵.

Controlling the blood alcohol concentration of drivers is of extreme importance, since alcohol is a psychotropic substance capable of altering perceptions and behaviors, compromising several neuromotor functions, impairing attention, leading to longer reaction time, somnolence, decreased peripheral view, causing euphoria and false perception of velocity and luminosity²¹. The alcohol level in a beer can, a glass of wine or half a glass of whiskey ranges from 12 to 14 grams; consumption of two units of any of these beverages by a man weighing around 70 kg or a woman weighing around 62 kg results in blood alcohol concentration of 0.3 to 0.5 g/l²². Heng *et al.*²³ analyzed

the effects of blood alcohol concentration and pointed out that drivers with a concentration equal or superior to 0.2 g/l already have impaired abilities. For blood alcohol concentrations between 0.2 and 0.5 g/l, there is a two to four-fold higher risk of involvement in fatal accidents compared with sober drivers, while most individuals are significantly debilitated when their blood alcohol concentration is superior to 0.5 g/l. Fell and Voas¹⁷ demonstrated that individuals with blood alcohol concentration superior to 0.5 g/l show a four to ten-fold higher risk of becoming involved in fatal accidents.

At the beginning of the implementation of the Dry Law, the only way to identify drunk drivers was through the breathalyzer test and dosage of blood alcohol levels. With the recent changes approved by the National Congress, other means were accepted to prove the degree of intoxication of the driver, as the testimony of police officers, photos, videos, witness reports and clinical trials. The fines were set to higher values, especially in cases of recurrence, and the driver's license suspended for a year. In more severe cases, detention from six months to three years can be applied.

The present results showed that the epidemiological profile of patients with facial fractures follows that reported by different authors^{1,3,24-26}. There was prevalence of men (83%) in both study periods, before and after the law. Such preference for men was attributed by Montovani *et al.*¹ and Leles *et al.*² to their larger amount

of exposure to risk factors (traffic, sports of physical contact, drug and alcohol abuse). Predominance of accidents among young adults was also observed in this study, corroborating the data obtained by different authors^{1,3,26}.

Although the etiology is highly heterogeneous and dependent on demographic, socioeconomic, cultural and environmental factors, a large number of authors have ranked car accidents as one of the major causes of accidents, as also noted in this study^{1,3,24,26}. A previous study carried out at this same institution assessed the etiology of craniofacial traumatism in 513 adult patients between 1991 and 2004 and pointed out car accidents as responsible for 28% facial traumatism, followed by assaults (21%) and accidental falls (19.5%)¹.

The results obtained in the present study lead to the conclusion that the drop in the number of polytraumatized patients operated on at this institution in the three years following the promulgation of the Dry Law was of 22.14%, well below the expected and desired outcome. The present results must be compared to those of other services offering the same attendance type to compile data and enlarge the statistics. The low index of reduction in the number of traumatism and the report of alcohol abuse by several patients at the moment of the accident, even after the law promulgation, justify the recently adopted stricter measures to control and punish offenders, making Brazilian Dry Law one of the strictest in the world.

RESUMO

Objetivo: avaliar se a Lei Seca cumpriu sua meta após três anos da promulgação. **Métodos:** estudo retrospectivo dos pacientes com fraturas craniofaciais submetidos a tratamento cirúrgico em um hospital universitário, em dois períodos: antes (2005 a 2008) e após a implantação da lei (2008 a 2011). **Resultados:** foram operados 265 pacientes (220 homens e 45 mulheres) nesse período sendo, 149 (56%) antes da lei e 116 (44%) após a lei, indicando redução no número de traumatismos ($p=0,04$). Houve predomínio da faixa etária entre 19 e 40 anos, em ambos os períodos. As principais causas dos traumas foram os acidentes automobilísticos, as agressões físicas e as quedas. O abuso de álcool foi identificado em 15,4% dos pacientes antes e 19% após a lei. A mandíbula e o complexo maxilozigomático foram os ossos mais acometidos. **Conclusão:** a redução no número de politraumatizados operados ficou aquém do esperado e almejado.

Descritores: Ferimentos e lesões. Legislação. Alcoolismo. Prevenção de acidentes. Ossos faciais.

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Received on 03/09/2012

Accepted for publication 08/11/2012

Conflict of interest: None.

How to cite this article:

Martins RHG, Ribeiro CBH, Fracalossi T, Dias NH. Has the Brazilian driving dry law reached its goal of reducing accidents related to excessive alcohol intake? *Rev Col Bras Cir.* [periódico na Internet] 2013;40(6). Disponível em URL: <http://www.scielo.br/rcbc>

Address for correspondence:

Regina Helena Garcia Martins
E-mail: rmartins@fmb.unesp.br