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Use of alcohol and its consequences on health in Argentine Northwest. Sex differentials and impact of life expectancy at birth during 2011

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Use of alcohol and its consequences on health in Argentine Northwest. Sex differentials and impact of life expectancy at birth during 2011

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Abstract

In 2012, harmful alcohol consumption was responsible for 5.9% of the world's deaths. In Argentina, during 2008, 11,013 deaths were due to this risk factor, representing 3.6% of the country's total deaths. However, the use of alcohol in that country has remained at about 9.5 liters of pure alcohol per capita in recent years, 3.3 liters superior to world consumption.

We make a quantitative, transversal and descriptive study in order to study the mortality attributable to alcohol consumption in the Argentine Northwest in 2011 and how it affects the life expectancy of the region in men and women.

The methodology proposed by the CDC (1990) - Attributable Mortality to Alcohol Consumption (MACA) and Years of Life Expectancy (Arriaga, 1996) is applied. It is intended to simulate two scenarios of the possible impact of certain public policies on the mortality measured with the latter indicator.

We use secondary sources of data as National Vital statistics, specific health surveys and also population projections of official organisms. Previously we make a brief estimation of statistics data quality using Murray and Lopez (1996) garbage codes.

Introduction

Harmful alcohol consumption causes around 3.3 million deaths (5.9%) all over the world. This level of alcohol consumption is considered responsible for more than 200 diseases and mental and behavioral disorders; it affects people of early ages generating disability, and account for up to 25% of deaths between the ages of 20 and 39 (World Health Organization, 2014). Most of these deaths are due to cardiovascular diseases, injuries, gastrointestinal diseases and cancer (World Health Organization, 2014).

Alcohol consumption causes a considerable burden of disease in the Americas, surpassing global estimates: 5.4% of all deaths that could be attributed to alcohol consumption, with most of the burden falling on Central and South America (Rehm et al. 2006 cited by (Monteiro, 2007)). It is estimated that in 2002, alcohol caused the death of one person every two minutes in the Region (Monteiro, 2007).

Alcohol consumption per capita of people aged 15 years and over in Argentina remained around 9.5 liters of pure alcohol (equivalent to 25 grams of alcohol per day) in recent years, 3.3 liters higher than the estimated worldwide.

Psychoactive substances consumption survey carried out in Argentina in 2010 (called EnPreCoSP) detected a prevalence of alcohol consumption of 44.5% (95% CI: 42.8%-46.2%). This prevalence has almost not changed between 2005 and 2011, according to other health surveys. Meanwhile, the prevalence of excessive episodic alcohol consumption in 2010 was 12.0% in general population and 20.4% of alcohol users (World Health Organization, 2014).

As a result of the use of alcohol in Argentina, 3.6% of deaths in 2008 (N: 11.013) were caused by this risk factor. Of these, 73% occurred in men, affecting mainly young people whose causes of death were external causes. Life expectancy, as an indicator of the level of mortality, was affected four times more in men than in women (Acosta, Bertone & Peláez, 2012). Same authors affirm that in the Argentine Northwest, 2.5% of the deaths are attributed to alcohol consumption. Although it is a region in which this public health problem is apparently less important than in other regions, however, we aware that grouping the data can hide inequalities that must be considered.

We aim to study the mortality attributable to alcohol consumption in the Argentine Northwest, given that there is updated data on alcohol consumption prevalence in Argentina (INDEC, 2011) and also on population attributable fraction (PAF) of causes of death related to alcohol consumption (Disease Control and Prevention, 2013). On the other hand, we simulate two scenarios to evaluate the impact of some national and provincial policies implemented in recent years that attempt to regulate alcohol consumption.

Objective

This paper aims to study the mortality attributable to alcohol consumption in each of the provinces that make up the Argentine Northwest in 2011, assessing how it affects life expectancy in these populations.

Methodology

This is a quantitative, transversal and descriptive study considering the deaths produced in 2011 (the average number of deaths produced between 2010 and 2012) in each province. These deaths are studied according to causes of death directly and indirectly attributable to alcohol consumption. It is based on the methodology proposed by the Center for Disease Control and Prevention (CDC) (1990) and Mortality Attributable to Alcohol Consumption (MACA). Afterwards, to assess the impact on life expectancy at birth, the Years of Lost Life (YLL) is calculated (Arriaga, 1996).

Data were provided by Health Statistics and Information Division (DEIS) of the Ministry of Health. We use deaths data from 2007 to 2012, according to causes of death attributable directly and indirectly to alcohol consumption. We also use population projections of the National Institute of Statistics and Census for each province of Northwest Argentina: Jujuy, Salta, Catamarca, La Rioja, Santiago del Estero y Tucumán.

First, we make a death data quality analysis using garbage codes such as PAHO recommends. Secondly, we calculate Alcohol-Related Deaths. Third, we calculate the impact on life expectancy at birth in women and men with Years of Life Lost (YLL) performed by Arriaga (1996). We use two scenarios in order to assess the possible impact of certain public policies on alcohol-related mortality: a 10% reduction and a 20% reduction in deaths. For which, we use a calculation sheet from PAS package, prepared by Arriaga, called PLANMORT.

In order to estimate the MACA for causes indirectly related to alcohol consumption, it was necessary to calculate the PAF¹ (Population Attributable Fraction), which requires the prevalence of the population for which the analysis is carried out (see Centers for Disease Control and Prevention, 2013).

The prevalence of alcohol consumption was obtained from the National Survey on Prevalence of Psychoactive Substance Use in 2011 (EnPreCoSP-2011, INDEC). Several variables have been taken from the Alcoholic Beverages block of that survey, which allowed the calculation of average daily alcohol consumption:

$$[(Q*AF)+(BF*BQ)]$$

¹ PAF is the proportional reduction in population disease or mortality that would occur if exposure to a risk factor were reduced to an alternative ideal exposure scenario

Where:

Q is the average number of drinks per day,

AF is the adjusted frequency of alcohol consumption: number of days on which alcohol is consumed minus the number of drunkennesses,

BF is the number of drunks,

BQ is the amount of drinks consumed in drunkenness.

For the calculation of BQ the survey did not include a variable that shows the number of drinks consumed in a drinking event. However, there is a categorical variable regarding whether the respondent had excessive consumption of beer, wine or strong drinks. If this variable responds positively, it is assumed that at least 8 drinks of beer, 5 of wine and 3 of strong drinks have been consumed as defined by excessive consumption in the CDC.

To determine the type of consumption, the cut-off points used are:

Table 1 Cut-off points used to establish average consumption level		
Sex	Males	Females
Low	Up to 3,0	Up to 1,5
Medium	3,1	1,6
High	4,5	3,0

Source: English y col.,1995, y Ridolfo y Stevenson , 2001

Once this prevalence rate was obtained, it was applied to the FAP calculation:

$$PAF = \left(\frac{r1}{(r1)+1} \right) p1 + \left(\frac{r2}{(r2)+1} \right) p2$$

Where:

r1= comparison between medium and low relative risk (CDC, 2013)

r2= comparison between high and low relative risk (CDC,2013)

p1= prevalence of alcohol use, medium range (INDEC, 2011)

p2= prevalence of alcohol use, high range (INDEC, 2011)

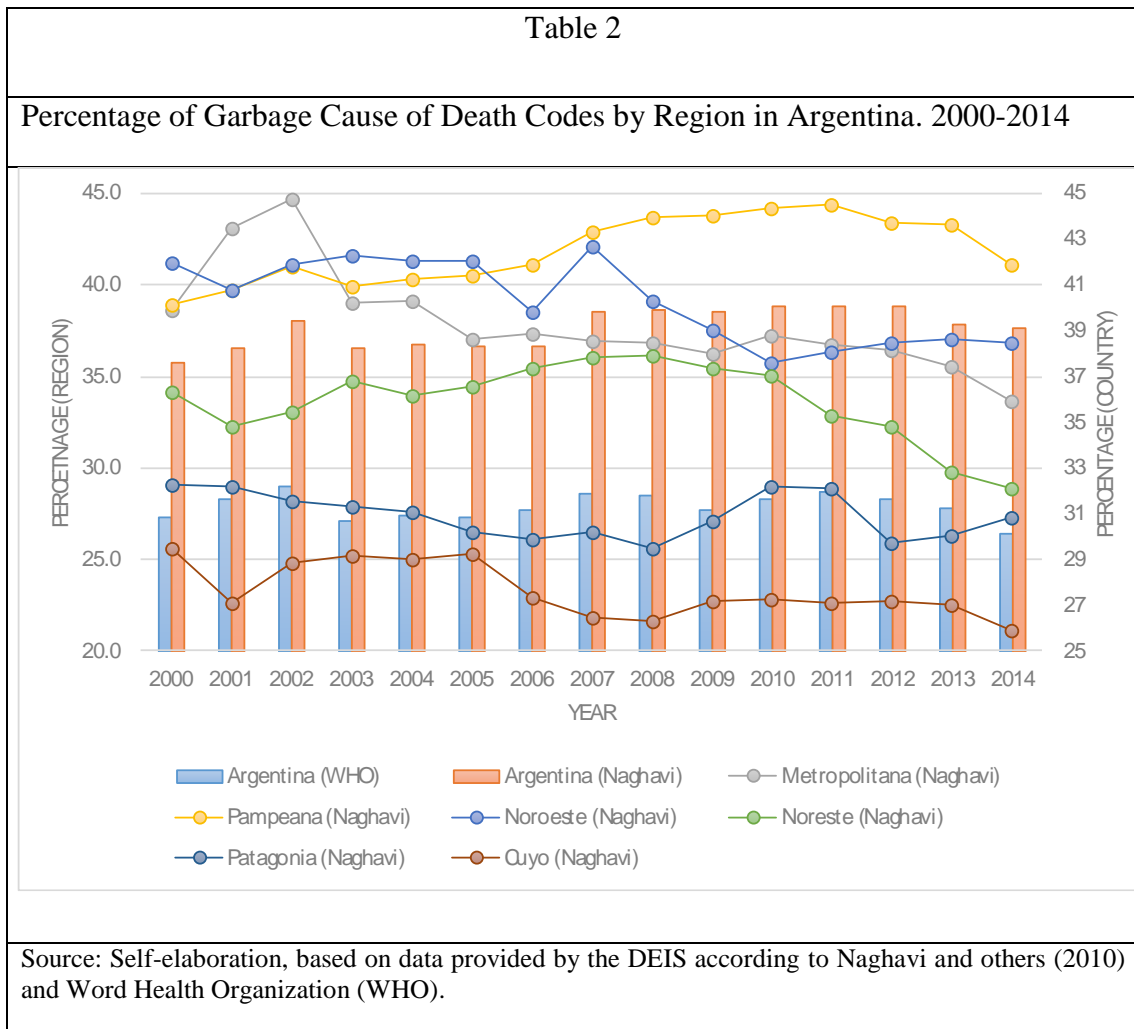
After the FAPs of indirect causes have been obtained, the deaths attributable to alcohol consumption (MACA) were estimated from the deaths observed in the region.

In addition to the causes indirectly related to alcohol consumption (CICA), there are certain causes directly related to alcohol consumption (CDCA), some of them are chronic and some acute. These are -by definition- attributable to the consumption of alcohol and are considered 100% attributable, so they have a FAP of 1.00.

Then the YLL was estimated for each of the provinces of Northwest Argentina in order to assess the impact of MACAs on life expectancy at birth for these populations. Life tables were used for each province estimated by INDEC for the 2008-2010 period, a necessary input for the estimation of the YLL.

Finally, in order to assess the possible impact of certain public policies on mortality due to alcohol-related causes, two possible scenarios are presented: a 10%, 20%, and 30% reduction in deaths due to certain selected causes of death. This is done with PLANMORT, a spreadsheet of the PAS package developed by Arriaga. This simulation will provide an overview of how the life expectancy of these populations could be improved with efficient policies in order to improve the status of the consequences of this risk factor.

About quality of Vital Statistics Data



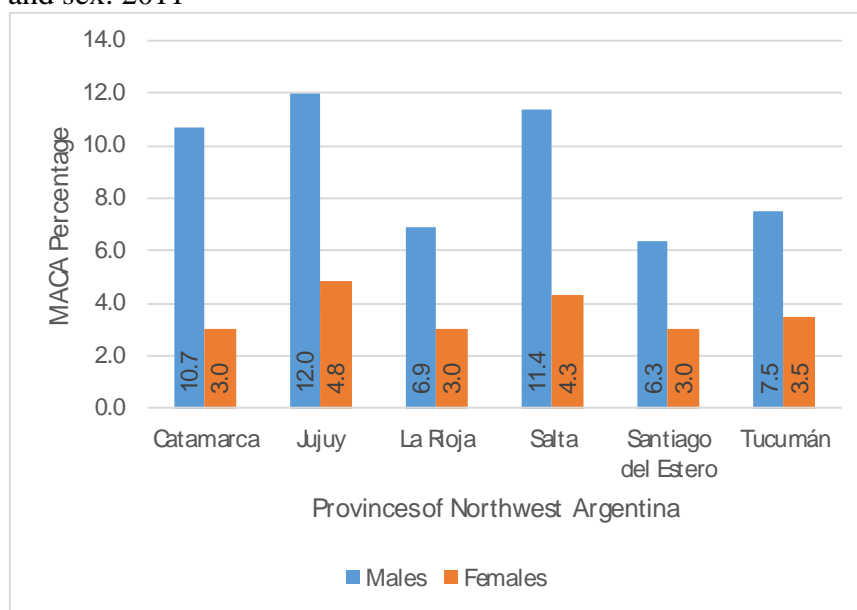
It is important to be aware about the quality of data sources, particularly the quality of the declaration of causes of death (Bay & Orellana, 2007). According to WHO (Health Information Platform for the Americas (PLISA), s.f.) data, in the period 2000-2014 Argentina has had between 30% and 32% of deaths under "garbage code". However, using DEIS data (based on the method proposed by Naghayi) the percentage is about 40%. Nevertheless, the region used in this paper presents a slightly lower percentage than the total country (37%) and although it is clear that progress must be made in the declaration of death codes, these are the data available to carry out studies.

Main results

Mortality attributable to alcohol consumption in Northwest of Argentina during 2011 is around 9% in men and 3.5% in women over total deaths, respectively. However, there are differences between the provinces in the region: Catamarca, Jujuy and Salta are above 10% of male deaths due to alcohol consumption. Jujuy and Salta are particularly important in women's terms: Salta has a higher percentage of deaths due to this risk factor in both sexes than the average for all provinces as a whole (see Figure 1).

Figure 1

Proportion of deaths attributable to alcohol consumption in Northwest Argentina by province and sex. 2011



Source: Self-elaboration, based on data provided by the DEIS and INDEC (2010-2012).

Table 3 presents the deaths in Northwest Argentina during 2011, mortality rates, their respective relative standard errors and the ratio between the causes attributable and those not attributable to alcohol consumption. The mortality rates for causes attributable to

alcohol consumption in the Argentine Northwest during 2011 were between 34 and 67 deaths per 100,000 male inhabitants, while the female rates were between 13 and 21 deaths per 100,000 women living in the provinces of Northwest.

As we mentioned, women were less affected by morbid states related to alcohol use: between 3 and 5 women died from these causes for every 100 female deaths in the region. The next section presents how this mortality affects the life expectancy of people based on the Years of Life Lost indicator.

Table 3

Number of deaths and mortality rates from causes attributable to alcohol consumption and ratio of rates with other causes not attributable to alcohol consumption by province. Northwest Argentina. 2011

Men

Province	Population	Deaths from causes not attributable to alcohol	Mortality rates from causes not attributable to alcohol*	EER	Deaths from causes attributable to alcohol	Mortality rates from causes attributable to alcohol	EER	Rate Ratio
Catamarca	206.929	838	405,0	3,5	100	48,5	10,0	0,12
Jujuy	351.266	1728	492,0	2,4	235	66,9	6,5	0,14
La Rioja	182.266	845	463,8	3,4	63	34,5	12,6	0,07
Salta	641.628	2933	457,1	1,9	376	58,6	5,2	0,13
Santiago del Estero	451.272	2266	502,1	2,1	153	33,9	8,1	0,07
Tucumán	757.874	3871	510,8	1,6	312	41,2	5,7	0,08

Women

Catamarca	205.307	854	415,8	3,4	26	12,9	19,5	0,03
Jujuy	356.438	1.503	421,6	2,6	76	21,5	11,4	0,05
La Rioja	180.236	727	403,4	3,7	26	12,9	19,5	0,03
Salta	647.644	2.483	383,4	2,0	111	17,2	9,5	0,04
Santiago del Estero	441.466	1.866	422,6	2,3	58	13,1	13,2	0,03
Tucumán	771.651	3.667	475,2	1,7	132	17,1	8,7	0,04

* Rates calculated per 100,000 inhabitants

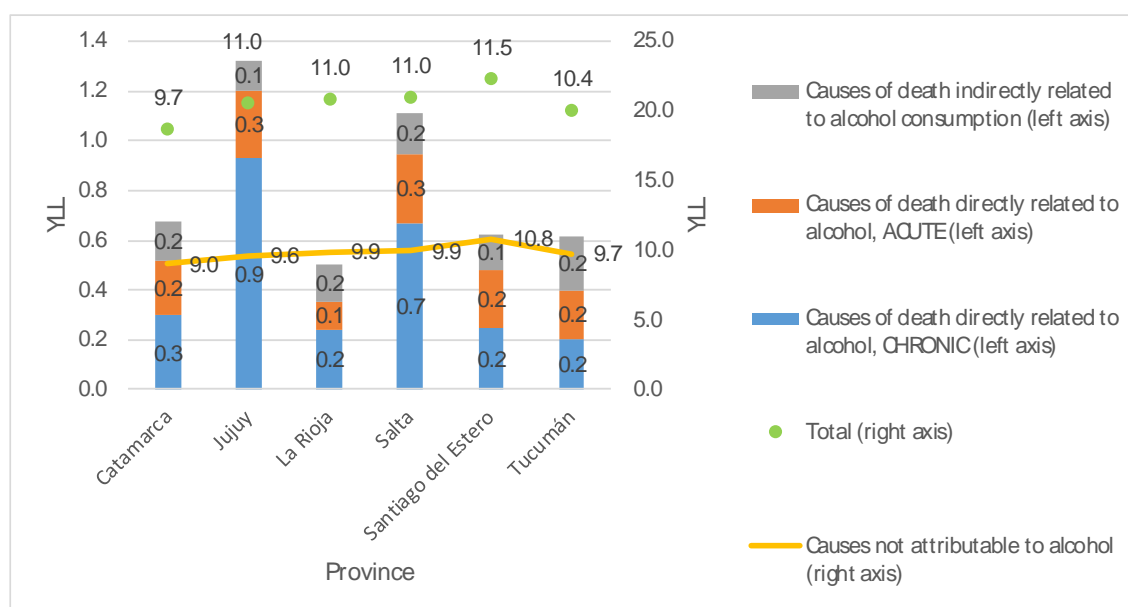
Source: Vital Statistics- DEIS del Ministerio de la Salud de la Nación (2010-2012); Encuesta Nacional sobre Prevalencias de Consumo de Sustancias Psicoactivas (ENPRECoSP) 2011.

Years of Life Lost due to causes attributable to alcohol consumption

a) Men

In the northwestern provinces, approximately 11 years of life expectancy were lost for all causes in men, of which an average of 0.8 years was due to causes attributable to alcohol consumption. Catamarca and Tucumán lost a few years less (9,7 and 10.4 respectively). The YLL for causes not attributable to alcohol consumption varies from 9 (Catamarca) to 10.8 (Santiago del Estero). On the other hand, those attributable to alcohol consumption have generated between 0.5 and 1.3 YLL in La Rioja and Jujuy, respectively.

Figure 2
Years of life lost by causes attributable to male alcohol consumption, by province.
Northwest Argentina. 2011



Source: Vital Statistics- DEIS del Ministerio de la Salud de la Nación (2010-2012); Encuesta Nacional sobre Prevalencias de Consumo de Sustancias Psicoactivas (ENPRECoSP) 2011.

As we explained, there are three types of causes related to alcohol consumption: Direct causes (acute and chronic) and causes indirectly related to alcohol consumption. By observing mortality in relation to these categories, the directly related causes lead to more years of life lost than the indirect causes. And within direct causes, chronic diseases generate higher YLL than acute ones. Chronic direct causes triple the number of YLL provoked by the acute causes in Jujuy, and double it in Salta.

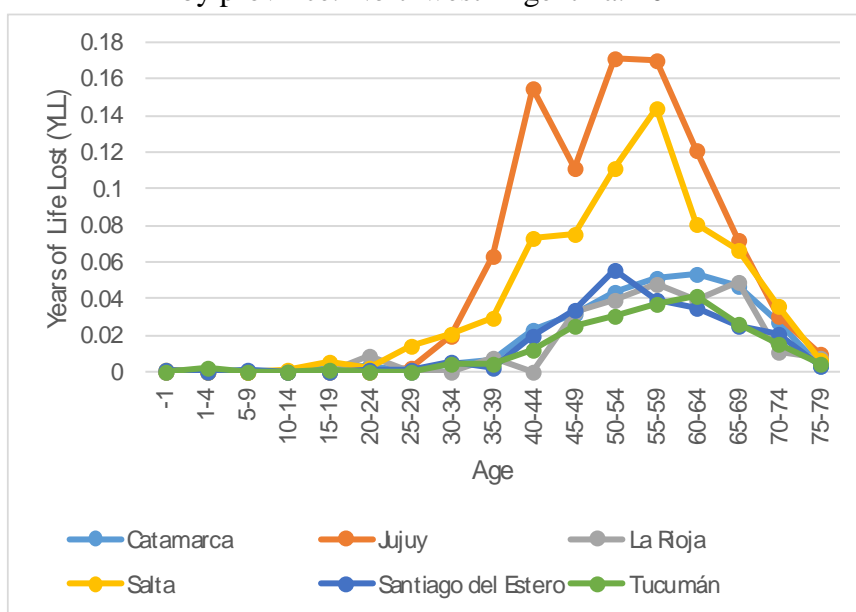
Analyzing chronic causes by age group, YLL increase at an early age in Salta and Jujuy describing two peaks: one around the age of 40 and the other after the age of 50. Bearing in mind that the YLL will give more weight both to premature deaths and to a large number of cases in later ages, it explains why this group of causes generates the greatest loss in the life expectancy of these populations. In the rest of the provinces, the YLL were progressively increased from the age of 35, describes a plateau and decreases towards the age of 70 (see Figure 3).

Analyzing what causes triggered the aforementioned peaks in Jujuy and Salta, it was possible to detect that most of them were due to alcoholic liver disease (K70) in the earliest deaths, and liver cirrhosis (K74 and K76) and alcohol dependence (F10.2) in the second peak. It should be noted that liver cirrhosis is the final stage of alcoholic liver disease and both morbid conditions occur after years of prolonged alcohol abuse.

One hypothesis is that in these two provinces, and on the assumption that men in these populations are biologically equally susceptible to illness from alcohol consumption, there is a greater public health problem due to the harmful use of alcohol than in the rest of the region.

Figure 3

Years of life lost according to causes directly related to alcohol consumption in men, by province. Northwest Argentina. 2011

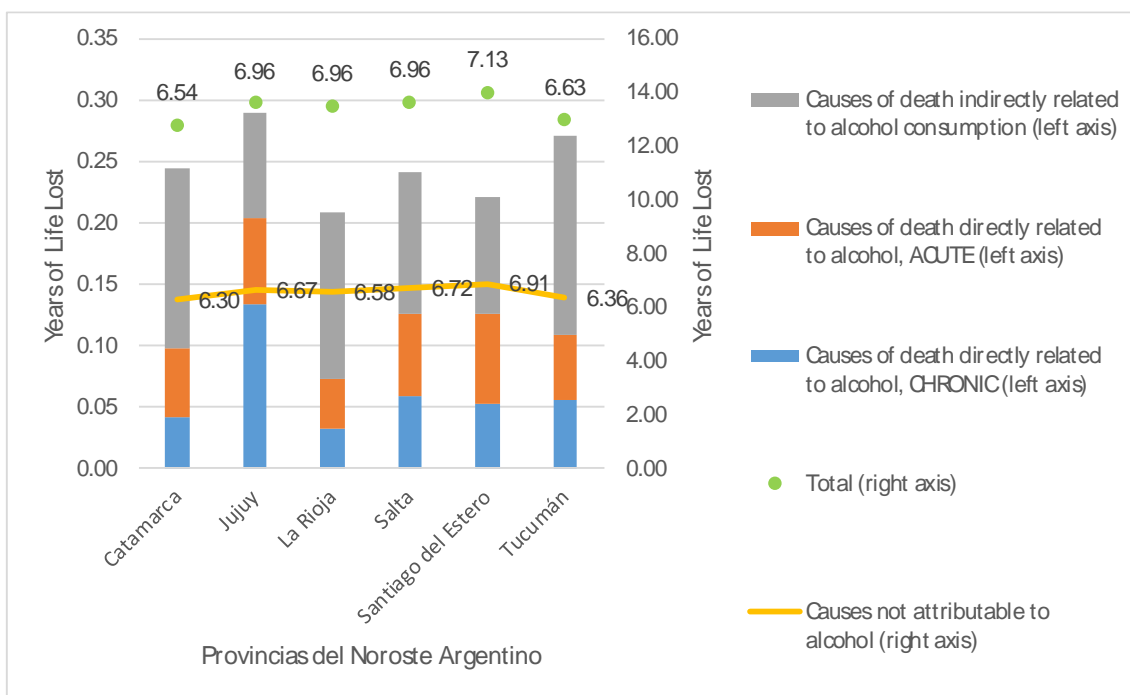


Source: Vitals Statistics- DEIS del Ministerio de la Salud de la Nación (2010-2012); Encuesta Nacional sobre Prevalencias de Consumo de Sustancias Psicoactivas (ENPRECoSP) 2011.

b) Women

Female mortality generates around 7 YLL, with the lowest value being Catamarca and the highest Santiago del Estero. As expected, mortality in women is lower compared to men. Jujuy and Tucumán are the provinces where the YLL were estimated for causes attributable to alcohol consumption higher than the NOA, where the average YLL is 0.2. As opposed to men, the causes indirectly related to alcohol consumption generate almost as many YLL as direct ones, and even in some provinces cause more YLL, as in the case of Tucumán, La Rioja and Catamarca. On the other hand, in Jujuy, chronic direct causes generate most of the YLL in that province.

Figure 4
Years of life lost by causes attributable to female alcohol consumption, by province.
Northwest Argentina. 2011



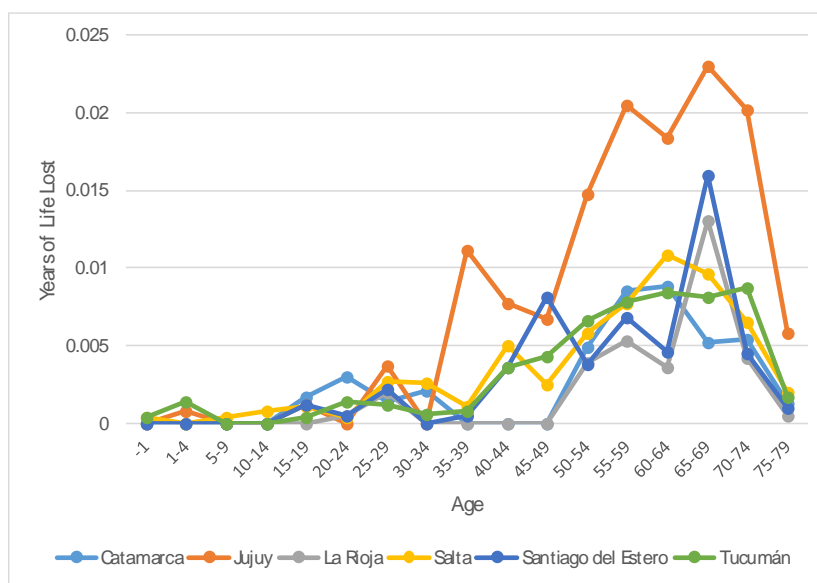
Source: Vitals Statistics- DEIS del Ministerio de la Salud de la Nación (2010-2012); Encuesta Nacional sobre Prevalencias de Consumo de Sustancias Psicoactivas (ENPRECoSP) 2011.

Analyzing the YLLs for chronic direct causes by age group in women shows a similar behavior to that of men with the presence of two peaks: one around 30 years of age and the other from 50. As in the male case, the causes that most contribute cases to this group of causes are alcoholic liver disease and liver cirrhosis.

The indirect causes that increase YLL in Tucumán, La Rioja and Catamarca are: Acute hemorrhagic stroke (I60-I62, I69.0-I69.2) in Catamarca; ischaemic heart disease (I20-I25) in Tucumán; and arterial hypertension (I10-I15) in La Rioja.

Figure 5

Years of life lost according to causes directly related to alcohol consumption in women, by province. Northwest Argentina. 2011



Source: Vitals Statistics- DEIS del Ministerio de la Salud de la Nación (2010-2012); Encuesta Nacional sobre Prevalencias de Consumo de Sustancias Psicoactivas (ENPRECoSP) 2011.

Current Legislation on alcohol consumption in Argentina and Northwest Argentina

Argentina has had a National Law on Combating Alcoholism (24.788) since 1997, which stipulates among its articles: it is forbidden to sell alcohol to persons under 18 years of age, prohibited to drink in public and advertising that encourages the consumption of alcoholic beverages to persons under 18 years of age that does not clarify that the drinking age is greater than 18 years of age and –also- that it must be drunk in moderation. It also proposes the creation of National Programmes for the Prevention and Control of Excessive Alcohol Consumption; the inclusion of curricular content on excessive consumption and its pathologies at all educational levels. It also prohibits driving under the influence of alcohol, establishing a limit of 500 milligrams per litre of blood for private drivers and zero for vehicles intended for the transport of minors and cargo passengers.

All the provinces of Northwest Argentina adhere to this national law, which in turn have enacted their own laws on alcohol consumption. La Rioja, Tucumán, Jujuy and Catamarca are the provinces in which actions are visualized that seek to provide preventive care and assistance for alcohol consumption. In the provinces of Salta, Tucumán, La Rioja and Catamarca, they establish within the framework of "zero alcoholism" that drivers must not have any type of alcohol content in blood. Sanctions are diverse and vary from vehicle restraint, fines, up to 30 days of arrest. The last ones to adhere to this type of measures were Salta and Tucumán. Jujuy, since 2012 the Law stipulates places and hours of sale, also contemplated in the laws of other provinces.

From what we have studied with the articles of the respective laws and considering the contributions of each of the provinces according to the social and particular needs of the moment, beyond the articles contemplated in National Law 24.788 we can say that the provinces of Catamarca, La Rioja and Tucumán are the provinces with more rigorous laws regarding the consumption and sale of alcoholic beverages. They are added to Salta in a second instance with the law "zero alcohol" or "zero tolerance" from 2014.

The province of Jujuy is one of the provinces with the least provincial policies in relation to this issue. And finally, Santiago del Estero, where, in addition to adhering to the National Law, only Decree 56/2000 has been observed, which regulates the sale of alcoholic beverages.

The National Law to Combat Alcoholism (24.788/1997) is complemented by Law 26.363/ 2008, Traffic and Road Safety Law, which regulates matters related to driving under the effects of alcohol, sale and advertising of beverages. In addition, in 2014, the Comprehensive Plan for Addressing Problem Consumption (National Law 26,934) is promulgated, the objectives of which include preventive, welfare and integration aspects and protection of subjects with some sort of problematic consumption, which adversely affects the subject's physical or psychological health and/or social relations in a chronic manner. This regulation commits provinces to provide free assistance to those affected by this type of problem.

Two different scenarios to assess the possible impact of certain public policies on alcohol-related mortality

The analysis of the breakdown of the difference between two life expectancies at birth by causes of death can be extended to see what future possibilities exist for predicting the level of mortality (Arriaga, Analisis Demográfico de la Mortalidad, 2012, pág. 235). In this case, the mortality for 2008 and 2011 was used to predict the impact on life expectancy at birth after 10 years in Northwest Argentina with possible reductions of 10, 20 and 30% in all causes and five-year age groups. It should be noted that the greatest impact on life expectancy at birth in 2021 is due to the direct causes of acute death from alcohol use, as alcohol consumption affects younger people (see Table 4).

Table 4							
Simulation of the change in life expectancy at birth in 2021 if reductions in deaths due to causes attributable to alcohol consumption of 10,20 and 30% were achieved. Northwest Argentina.							
		Men			Women		
Period of reference	Year	2008	2011	Change	2008	2011	Change
		Life expectancy	72.26	72.47	0.21	77.70	77.87
Simulation	Simulation 10 years forward						
	Reduction		LE	Change		LE	Change
	10%		72.61	0.14		77.93	0.06
	20%		72.75	0.28		77.98	0.11
30%		72.90	0.43		78.04	0.17	
Source: Self-elaboration based on data provided by the Ministry of Health 2007-2012							

The change in life expectancy between 2008 and 2011 was greater for men. who have a life expectancy almost five years lower than women. Based on this. it can be seen that a 30% reduction in all ages and causes of alcohol-related deaths would have earned almost half a year of life expectancy in men. Meanwhile, Women gain 2.5 months of life expectancy with a reduction of 30%, which men achieve with a reduction of only 10%. Women are less affected by causes attributable to alcohol consumption, besides the fact that YLLs change between 2008 and 2011 were lower than in men.

Closing remarks

In 2011, the Northwest of Argentina has a mortality rate attributable to alcohol 2% higher than the world in men, and 0.5% lower in the deaths of women (World Health Organization. 2014) in 2012, and are higher than those found in other studies conducted in the country with data from 2008 (Acosta. Bertone. & Peláez. 2012).

Nearly a year of life expectancy is lost throughout the region due to the consumption of alcohol by men, affecting especially Jujuy and Salta residents, who suffer and die mainly from pathologies directly related to alcohol consumption such as alcoholic liver disease and liver cirrhosis. These deaths occur from about age 30 with a peak in their 40s and another at age 60.

Women are less affected by these causes of death. losing the equivalent of about 2 months of life expectancy from alcohol consumption and are mainly affected by causes indirectly attributable to alcohol consumption. However, in Jujuy, not only is it the jurisdiction with the most AEVP for alcohol consumption, but also the causes that most affect women in Jujuy are chronic. as is the case in men. The opposite is true in Tucumán and Catamarca. where indirect causes are the ones that generate the most YLL. These 3 provinces are the ones that lose the most years of hope because of alcohol consumption in women.

To summarize. the provinces of Jujuy and Salta are the Northwest jurisdictions that are most affected by this public health problem. This is not exclusive to the male population, so it is possible to hypothesize some cultural influence that places these populations in particular situations in relation to the rest of the provinces of the region, but this is not reflected in the data on the prevalence of alcohol from the different surveys carried out in the country (INDEC. 2011; Ferrante. and others. 2011; SEDRONAR. 2010). With this, and in the case of mortality, it could be said that this would be a deficiency in the attendance of people with risk consumption in these provinces.

It is expected that since the enactment of the Comprehensive Plan to Address Problematic Consumption (National Law 26.934/2014), whose objectives include preventive, welfare and integration aspects and the protection of subjects with some type of problematic consumption. this problem will be addressed in these jurisdictions.

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