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Short report

Differences in alcohol-related mortality between foreign-born and native-born Spaniards

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ABSTRACT

Background: Alcohol consumption is associated with high rates of mortality. This study aimed to analyse mortality attributable to alcohol consumption in foreign-born and native-born Spaniards in 2004 and to determine whether differences existed between these groups.
Methods: The number of deaths attributable to alcohol consumption was calculated by means of the alcohol-attributable fractions devised by the Center for Disease Control and Prevention for calculating mortality rates in the USA. Alcohol-related mortality rates and age-adjusted mortality rates per 100,000 persons (using European standard population) were calculated by gender.
Results: The mortality rates attributable to alcohol per 100,000 inhabitants were lower among foreign-born Spaniards (7.0) than native-born Spaniards (16.7). Chronic conditions accounted for only 23.6% of all alcohol-related mortality for foreign-born Spaniards, but 60% for native-born Spaniards. The former were much more likely to suffer unintentional injuries, particularly road traffic accidents, while the latter showed high rates of alcohol-related death for digestive diseases, cardiovascular disorders, intentional injuries and malignant neoplasm.
Conclusion: Alcohol consumption is an important cause of death among the native-born Spanish population. The observed differences in alcohol-related mortality between native and foreign-born Spaniards should be considered when developing targeted harm reduction policies.

Introduction

In 2008 Spain's population of 46 million included 5.27 million foreign-born Spaniards (2.1 million from European Union countries). Immigration to Spain is very recent: in 2000, foreign-born Spaniards accounted for 2.3% of the population while in 2008 the figure was 11.4% (Instituto Nacional de Estadística, 2009a, 2009b). European Union citizens can move and work freely within Europe, however, there are a considerable number of individuals from South America and North Africa, some of whom live and work illegally in Spain. To date there are no official estimates of the magnitude of this phenomenon. Of note is that the public health system in Spain is free, even for those illegally resident.

In 2004, the year on which the current study is based, Spain's population was 43.20 million. This included 3.03 million foreign-born Spaniards, of which 1.22 million came from Central and South America, 1.05 million from European countries and 0.58 million from Africa. The age breakdown was as follows: 15.2% of the population were ≤15 years old (15.2% for native-born, 15.5% for foreign-born), 67.9% were 16–64 years old (67.0% for native-born, 79.6% for foreign-born), and 16.9% were ≥65 years of age (17.8% for native-born, 4.9% for foreign-born). Notably, 51.9% of foreign-born Spaniards were 20–39 years of age, compared to 31.4% of native-born Spaniards (Instituto Nacional de Estadística, 2009b).

We have assessed alcohol-related mortality in Spain by replicating the methods devised by the Center for Disease Control and Prevention (CDC, 2004). From 1999 to 2004, alcohol-related mortality adjusted to the European population standard was 2.1% on average, with adjusted mortality rates per 100,000 inhabitants attributable to alcohol decreasing ($R^2 = 0.9602$, $p < 0.005$, Fierro, Ochoa, Yañez, Valderrama, & Alvarez, 2008a) from 19.5 in 1999 to 16.69 in 2004. Based on 2004 mortality data, we have found large differences in adjusted alcohol-attributable mortality rates per 100,000 inhabitants between the regions of Spain. These ranged from 21.5 in Comunidad de Madrid to 8.1 in Melilla (Fierro, Ochoa, Yañez, Valderrama, & Alvarez, 2008b).

Over past decades, ethnicity, migration and substance-use related health issues have been well researched in developed countries, however in Spain information is more limited as this is an emerging phenomenon (Hjern & Allebeck, 2004; Gfroerer & Tan, 2003). Yet as the proportion of foreign-born Spaniards increases, an understanding of their health status and health needs becomes

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relevant for the nation's health (Kandula, Kersey, & Lurie, 2004). Our objective was to assess alcohol-related mortality in foreign-born and native-born Spaniards to determine if differences existed that might warrant a rethinking of health policy development.

Methods

We assessed alcohol-related mortality (Fierro et al., 2008a, 2008b) by replicating the methods devised by the Center for Disease Control and Prevention (CDC) with the Alcohol-Related Disease Impact (ARDI) software used to estimate alcohol-related mortality (CDC, 2004).

We used the Spanish cause of death registries (Instituto Nacional de Estadística, 2006) to classify deaths (ICD-10) according to age, gender and 60 conditions (41 chronic and 19 acute, please see: https://apps.nccd.cdc.gov/ardi/AboutARDICrosswalk.htm). The present study assessed and compared the alcohol-related mortality of foreign-born and the native-born Spaniards based on mortality data for 2004.

Alcohol-attributable fractions were used following CDC (CDC, 2004, 2008) and ARDI criteria (https://apps.nccd.cdc.gov/ardi). A score of 1 was given to conditions that were 100% attributable to alcohol. For deaths that were <100% attributable to alcohol, direct and indirect alcohol-attributable fractions were used. For the majority of chronic conditions these were calculated by using relative risk estimates from meta-analyses (Corrao, Bagnardi, Zambon, & Arico, 1999; English et al., 1995) and prevalence data on alcohol use taken from the 2003 Spanish National Household Survey (Ministerio de Sanidad y Consumo, 2005). For some conditions, direct estimates of alcohol-attributable fractions were based on studies that have assessed the proportion of persons dying from a particular condition at around or above a specific BAC (blood alcohol concentration) (Smith, Branas, & Miller, 1999; Parrish, Dufour, Stinson, & Harford, 1993). For road traffic accidents, a death was alcohol-attributable if the deceased had a BAC $\geq$ 0.10 g/dL (CDC, 2004). However, as this type of information (BAC $\geq$ 0.10 g/dL) is not available in Spain, we used the BAC values > 0.8 g/dL reported by the Instituto Nacional de Toxicología y Ciencias Forenses (2005); (Rivara, Garrison, Ebel, McCarty, & Christakis, 2004). For chronic conditions, alcohol-attributable deaths were calculated for decedents aged $\geq$20 years; for acute conditions, they were calculated for decedents aged $\geq$15 years. For persons who died from road traffic accidents, child maltreatment, or low birth weight all ages were considered (CDC, 2004).

The number of alcohol-attributable deaths was estimated by multiplying the number of deaths from a particular alcohol-related condition by its alcohol-attributable fraction. Alcohol-related mortality rates were calculated by gender and age-group. Age-adjusted mortality rates per 100,000 persons (using European standard population) were calculated by gender. The mean age (±SD) at which alcohol-related deaths occurred was calculated. Analyses were conducted using Epidat version 3.1 and SPSS version 14.0. Chi-square and *t*-tests were used where appropriate. A p value $\leq$0.05 was considered statistically significant.

Ethical approval was obtained from the Ethics Committee at the Faculty of Medicine of University of Valladolid.

Results

Alcohol-related deaths accounted for 8251 of 369,564 deaths among native-born Spaniards and 161 of 2370 deaths among foreign-born Spaniards. The mortality rates attributable to alcohol per 100,000 inhabitants adjusted to the European population standard were significantly lower among foreign-born Spaniards (7.0; 95% CI = 5.7–8.3) than native-born Spaniards (16.7; 95% CI = 16.4–17.1). This was observed for both men and women for foreign-born Spaniards (10.2; 95% CI = 8.2–12.3 for males and 3.4; 95% CI = 1.9–4.8 for females) and native-born Spaniards (24.7; 95% CI = 24.1–25.3 for males and 8.5; 95% CI = 8.2–8.9 for females). For both groups alcohol-related mortality rates were higher among males than females.

The mean age (±SD) at which alcohol-related deaths occurred was also lower for foreign-born (41.62 ± 14.96) than for native-born Spaniards (47.55 ± 14.47; $t = 4.831$, $p < 0.0001$). Chronic conditions accounted for 60% of all alcohol-related mortality for native-born Spaniards and 23.6% for foreign-born Spaniards ($X^2 = 87.67$, $p < 0.0001$). Cause-specific alcohol-related mortality (Table 1) shows that foreign-born Spaniards were much more likely to suffer unintentional injuries ($X^2 = 141.41$, $p < 0.0001$), particularly road traffic accidents (13.5% native-born, 34.8% foreign-born, $X^2 = 59.82$, $p < 0.0001$). Conversely, native-born Spaniards showed higher rates of alcohol-related death for digestive diseases ($X^2 = 51.85$, $p < 0.0001$), particularly liver cirrhosis (9.5% native-born, 1.2% foreign-born, $X^2 = 12.80$, $p < 0.0005$), cardiovascular disorders ($X^2 = 4.82$, $p < 0.05$), intentional injuries ($X^2 = 5.26$, $p < 0.05$) and malignant neoplasm ($X^2 = 7.25$, $p < 0.01$).

Table 1 provides information on age-specific mortality rates. Notably, acute causes of alcohol-related mortality were much more frequent at all three age-ranges for foreign-born Spaniards than for native-born Spaniards, accounting for 85.6% among those aged 0–49 (versus 73.4%), and more than doubling for those aged 50–69 (66.0% versus 24.6%) and $\geq$70 (57.9% versus 25.2%). Differences were observed for unintentional injuries ($X_2^2 = 18.64$, $p < 0.001$) but not for intentional injuries ($X_2^2 = 0.41$, $p < 0.001$).

Discussion

There are marked differences in alcohol-related mortality between native-born and foreign-born Spaniards: of note, more than 2 out of 3 alcohol-related deaths among foreign-born Spaniards were due to unintentional injuries, particularly road traffic accidents. Spain has a comparatively high prevalence of motor-vehicle accidents compared to other developed countries and these are frequently linked to alcohol (Del Río, Gómez, Sancho, & Alvarez, 2002), although this has been decreasing over the last decade. It is however, noteworthy that this problem is particularly high for foreign-born Spaniards and highlights the need for specific action. Other categories of alcohol-related mortality were higher in native-born than foreign-born Spaniards, particularly digestive diseases. We have found that age-adjusted mortality rates per 100,000 persons were lower among foreign-born Spaniards than native-born Spaniards, and that alcohol-related deaths among foreign-born Spaniards occurred on average at an earlier age than for those native-bornds. This could account, partly, for the observed difference that foreign-born Spaniards die much more frequently from acute alcohol-related conditions. Here, it should be taken into account that foreign-born and native-born Spaniards show a somewhat different age-structure, with the former tending to be younger (Instituto Nacional de Estadística, 2009b).

Alcohol consumption is an important cause of death among Spaniards generally (Yañez, Del Río, & Alvarez, 1993). It has been reported that foreign-born Spaniards consume less alcohol and smoke less than their native-born counterparts (Carrasco-Garrido, Gil De Miguel, Hernandez Barrera, & Jimenez-Garcia, 2007) and this correlates with the lower mortality rates observed among foreign-born Spaniards. Studies in the USA have shown lower mortality, higher life expectancy, and better overall health among immigrants compared with the US-born population (Singh & Siahpush, 2001). More recently, when studying changes in immigrants mortality profile over time relative to the US-born population, it has

Table 1
Alcohol-related mortality in 2004 among native-born and foreign-born Spaniards.

	Native-born Spaniards ($N = 8251$) % age-range (years old)				Foreign-born Spaniards ($N = 161$) % age-range (years old)				Total population Spain ($N = 8412$) %
	0–49	50–69	≥70	Total	0–49	50–69	≥70	Total	
Chronic causes									
Malignant neoplasm	1.3	6.9	7.7	5.5	0.0	0.0	0.0	0.6	5.4
Mental disorders	3.0	6.7	2.4	3.9	5.2	8.9	5.3	6.2	3.9
Nervous disorders	0.6	0.6	1.1	0.8	0.0	0.0	0.0	0.0	0.8
Cardiovascular diseases	1.6	6.2	20.4	10.2	2.1	6.7	15.7	5.0	10.1
Digestive diseases	20.1	55.0	43.2	39.6	7.1	17.8	21.1	11.8	39.1
Total chronic causes	26.6	75.4	74.8	60.0	14.4	34.0	42.1	23.6	59.3
Acute causes									
Unintentional injuries	51.0	14.6	17.7	27.1	78.4	62.0	47.4	69.6	27.9
Intentional injuries	22.4	10.0	7.5	12.9	7.2	4.0	10.5	6.8	12.8
Total acute causes	73.4	24.6	25.2	40.0	85.6	66.0	57.9	76.4	40.7

been reported that nativity differentials in mortality, health, and behavioural characteristics varied substantially by ethnicity (Singh & Hiatt, 2006). The lower mortality rates attributable to alcohol among foreign-born Spaniards concurs with these international findings (Singh & Siahpush, 2001; Singh & Hiatt, 2006).

The limitations of this methodology have been reported in detail (CDC, 2004). Six main issues have been identified: the non-inclusion of alcohol-related mortality for some conditions (e.g., tuberculosis) because of limited information; the fact that vital statistics use only the underlying cause of death without considering contributing causes that might be alcohol related; and because in most cases there were no age-specific estimates of alcohol-attributable fractions. Moreover, there is the issue of the possible misclassification of cause of death and the origin of deceased on the death certificate (CDC, 2008). Recently an underestimation of alcohol-related mortality among foreigners in Germany has been reported (Kibele, Scholz, & Shkolnikov, 2008). Finally, the low number of alcohol-related deaths among foreign-born Spaniards (161 cases) should be taken into account when interpreting the results.

Further studies are needed to clarify these findings, especially to address issues arising from the ethnicity and origin of foreign-born Spanish populations. Socioeconomic status and patterns of alcohol consumption when in Spain may differ markedly among immigrant groups from European, Central and South American, or African countries (Room & Mäkelä, 2000; Rehm et al., 2009). Finally, ethnicity may affect access to health services, as confirmed by the "racial" disparity in access and use of alcohol treatment found among Latinos in the USA (Zemore, Mulia, Yu, Borges, & Greenfield, 2009).

This study has revealed high alcohol-related mortality among the native-born Spanish population in 2004. We have observed marked differences in alcohol-related mortality between native and foreign-born Spaniards and this should be considered when developing targeted health policies. Although foreign-born Spaniards showed a lower alcohol-related mortality than the native-born population, the former were much more likely to die from acute alcohol-related conditions.

There is strong evidence for the effectiveness and cost-effectiveness of policies and programmes to reduce alcohol-related harm (Anderson, Chisholm, & Fuhr, 2009). These can be effective in reducing harm through controlling price and availability (very low and easily available in Spain), banning or limiting alcohol advertising (already done to some extent in Spain), introducing drink-driving countermeasures (these have improved during the last few years in Spain), and directed interventions with at-risk individuals (brief intervention have become more common). As foreign-born Spaniards have higher mortality from unintentional injuries (particularly road traffic accidents), drink-driving policies should target this group. These could include both existing countermeasures (random sobriety check points, lower legal blood alcohol concentration for novice drivers) and the consideration of new interventions (alcolocks, mandatory treatment, etc.).

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Conflict of interest

None to declare.

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