Considerations about population-level alcohol-attributable mortality estimates

Reflexiones sobre las estimaciones de mortalidad atribuida al consumo de alcohol a nivel poblacional

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Population level alcohol-attributable mortality estimates are essential metrics for public health policy makers. Underlying causes of death provide important insights on alcohol-attributable mortality in populations, but are highly underestimating the overall impact of alcohol on mortality (Rehm et al., 2017; Trias-Llimós, Martikainen, Mäkelä & Janssen, 2018). Few causes of death are considered wholly-attributable to alcohol (e.g., alcoholic liver disease, alcohol use disorders), which means that alcohol is necessary and that this death would not have occurred in absence of alcohol use. Yet, for a large group of causes alcohol is contributing to the disease incidence and development, but it is not a necessary component (e.g., ischaemic heart disease, several cancers) (Rehm et al., 2017). Therefore, the impact of alcohol on these diseases cannot be directly obtained from underlying cause of death data, and it is usually indirectly estimated.

The most popular methods to estimate population level alcohol-attributable mortality estimates are comprised within the family of attributable-fraction (AF) approaches. The work done by Rehm and colleagues shed light on these estimates in an international perspective (Rehm et al., 2007), and was followed by the developments from the Global Burden of Disease (Stanaway et al., 2018), and by other publications, including the recent update of estimates for Spain (Donat, Sordo, Belza & Barrio, 2020). In general terms, these approaches require two different data sources, namely: age- and sex-specific alcohol prevalence, and relative risks (RR).

The combination of these different data sources may be problematic as previously discussed elsewhere (Rehm, 2010; Rey & Jougla 2014). For example, the alcohol prevalence is well known to be largely underreported in health surveys, and although corrections are applied the extent of the underreported consumption varies across population groups unpredictably, particularly regarding drinking patterns. Furthermore, the relative risks, retrieved from other analyses, can also be problematic. First, they are often derived

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from studies assessing disease incidence and not cause-specific mortality. Second, RR are uncertain for certain causes and drinking categories. For example, several studies still use cardioprotective RR whereas for cardiovascular diseases these effects are disputed and may be inexistent (Holmes et al., 2014). Third, the RR are not often stratified by age groups, which could play a major role, particularly at old ages. Furthermore, the RR for acute conditions (e.g., external causes) are known to have an inconsistent relationship with alcohol-related outcomes. Despite specific approaches developed for acute causes, the estimation of the impact of alcohol on acute causes of death is complex and uncertain. These main limitations have a substantial impact on age- and cause-specific estimates. For example, estimates based on AF approaches tend to potentially overestimate the impact of alcohol on ischaemic heart disease at old ages due to the rising number of deaths at those ages and to the use of adult age RR for the old population.

One alternative approach that can partly overcome some main limitations of AF approaches is the one that directly estimates alcohol-related mortality using detailed data from death certificates, multiple causes of death (MCOD). This approach assumes that those deaths with a wholly-attributable to alcohol cause in the death certificate, either as underlying or as a contributory cause, are related to alcohol. Finnish studies were pioneers adopting this approach to estimate population level alcohol-attributable mortality, and this approach has been punctually adapted in other countries and regions (Martikainen, Mäkelä, Peltonen & Myrskylä, 2014; Trias-Llimós et al., 2018).

The comparison of AF and MCOD approaches can lead to interesting insights to identify strengths and limitations of both approaches. This comparison is an essential need for most populations, but the scarce related research suggested that AF approaches largely overestimate alcohol-attributable mortality at older ages (Trias-Llimós et al., 2018), particularly for cardiovascular causes (Manthey & Rehm, 2019). Furthermore, alcohol-related estimates derived from MCOD approaches seem to account for a substantial share of deaths at relatively young ages in Finland, which seems to indicate that this approach can capture the often challenging to estimate, external causes of alcohol-related deaths (Martikainen et al., 2014).

Using all information in the death certificate to estimate alcohol-attributable mortality (MCOD approaches) requires facing challenges related to mortality coding practices, but also offers new opportunities for making comparisons and further improving estimates. The main strength of this approach is that it does not require any indirect estimation, and thus the uncertainty and potential biases in the AF-related estimates do not apply in that case. MCOD approaches can offer new insights into mortality related with alcohol at the age groups in which AF approaches are more problematic, as well as shed new light in the cause-specific interrelations. Furthermore, an important number of MCOD data exists in several developed countries, and these are gradually becoming available in other countries, including Spain.

In conclusion, AF approaches have important well-known limitations that particularly apply to alcohol-related estimates. Alternative methods using all the information in the death certificate offer new opportunities to partly overcome those limitations when estimating alcohol-related deaths. Further studies should specifically assess the strengths and limitations of MCOD approaches for estimating cause-specific alcohol-attributable mortality.

Conflict of interests

None.

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