Drinking and NCDs

KEY POINTS

- Noncommunicable diseases (NCDs) are a leading cause of death worldwide, and their prevalence varies by country and income level.
- The growing prominence of NCDs and the total disease burden attributed to them have led to an intensified global focus on prevention and the reduction of individual risk factors, including harmful drinking.
- The relationship between alcohol consumption and NCDs is complex; while harmful drinking patterns are a risk factor for several NCDs, drinking in moderation has been identified as a protective factor for others.
- In addition to harmful drinking patterns, a mix of individual, societal, and environmental factors are associated with, and can further contribute to, an individual's risk for developing NCDs.
- Global efforts such as the UN Global Action Plan for the Prevention and Control of NCDs and the Sustainable Development Goals (SDGs) include targets for reducing harmful drinking.
- A coordinated and consistent effort among various stakeholders, including governments, civil society, and the private sector to create more equitable and healthier communities is a necessary approach that reflects shared responsibility and can bring together needed resources.

TERMS AND CONCEPTS

Noncommunicable diseases (NCDs), also called chronic diseases, are not transmitted from one person to another and are characterized by a slow progression and long duration of illness [2]. They include cancers, cardiovascular diseases, diabetes, liver diseases, and chronic respiratory disease.

Cancers involve rapid and abnormal cell division, which can spread throughout the body and invade various tissue. Cancers include over 100 diseases that are individually classified according to tissue type and location of origin.

Cardiovascular disease (CVD) encompasses a number of distinct conditions involving the circulatory system (heart and blood vessels), of which ischemic heart disease is the most common. Other types of CVD include heart failure, cardiomyopathy, and stroke.

Alcohol-related liver disease, also called alcoholic liver disease, is an umbrella term used to identify three liver conditions associated with heavy drinking: alcoholic fatty liver disease, alcoholic hepatitis, and alcoholic cirrhosis.

TERMS AND CONCEPTS

Type 2 diabetes mellitus, formerly called non-insulin dependent diabetes, occurs when cells become resistant to insulin and is often accompanied by reduced insulin secretion by the pancreas. Type 2 diabetes is also referred to as adult-onset diabetes, usually manifesting itself in adulthood.

Harmful drinking, as used in this *Health Review*, describes two different patterns of drinking that have a detrimental impact on health and increase the risk for several NCDs:

- high volume drinking that occurs regularly or on most drinking occasions (often referred to as heavy drinking or chronic heavy drinking); and
- high volume drinking that occurs less often than regularly (often referred to as heavy episodic drinking, acute heavy drinking, or binge drinking).

Moderate drinking as used in this *Health Review*, describes regular lower volume consumption. In some studies, moderate drinking may also include very low volume drinking, and findings from these studies included in this briefing will use the term light-to-moderate drinking. Moderate drinking is generally consistent with the range of consumption levels recommended for those who choose to drink in drinking guidelines issued by governments around the world.

BACKGROUND

Over recent decades, there has been considerable progress in the reduction of deaths worldwide from infectious diseases and other conditions associated with extreme poverty, such as undernutrition, unclean water, and poor sanitation [3].

As a result, the global health focus has shifted in line with the burden of disease to the impact of NCDs on morbidity and mortality. NCDs have been identified by the World Health Organization (WHO) as among the key barriers to poverty alleviation and sustainable development [2].

According to the WHO Global Status Report on Noncommunicable Diseases 2014, NCDs are now the leading cause of death worldwide [2].

- In 2012, 38 million (68%) of all global deaths were attributable to NCDs, mainly from CVD, cancers, chronic respiratory diseases, and diabetes.
- 52% of all premature deaths (defined as occurring before the age of 70 years) are attributed to an NCD.
- Like some infectious diseases, many NCDs are preventable.
- Unlike many infectious diseases, NCDs are generally long-term illnesses. Prolonged care and treatment of these diseases have a considerable social and economic impact on individuals, their families, and society.

Many factors play a role in the development of NCDs and their prevalence, and the relationship is complex.

- Social determinants of health (e.g., poverty, nutritional status, access to health care, and physical and social environments) remain the most important structural drivers of NCD deaths [2].
- Aging of the population plays an important role in the distribution of NCDs across countries as declining fertility rates and increasing life expectancy around the world have contributed to the shift in the leading causes of morbidity and mortality toward chronic diseases [4].
- The interplay between genetic risk and environmental risk factors can also exacerbate disease severity once an NCD has developed [5].
- Individual behavioral factors also contribute to risk for NCDs and include: smoking, an unhealthy diet, not maintaining an optimal body weight, inadequate physical activity, and harmful drinking.

DRINKING PATTERNS AND NCDS

According to WHO some 3% of all deaths worldwide are the result of NCDs "attributable to *harmful drinking*" [2].

- This emphasis on harmful drinking underscores the importance of drinking patterns in this relationship — while harmful drinking has been identified as a risk factor for some NCDs, the moderate consumption of alcohol can be a protective factor, reducing risk for certain individuals.

The relationship with drinking patterns is summarized for some of the main NCDs.

Cardiovascular disease

An extensive and well-substantiated body of evidence supports a J-shaped relationship between drinking and CVD (reviewed in *IARD Health Review: Drinking and Cardiovascular Health*).

- In general, heavy drinking, including both heavy chronic and episodic drinking, is associated with increased risk for heart attacks [6], hemorrhagic stroke [7], total stroke [8, 9], abnormal cardiac rhythm [10, 11]; and hypertension [12, 13].
- At the same time, light-to-moderate drinking is associated with cardiovascular benefits, such as reduced risk for nonfatal heart attacks [14, 15], ischemic stroke [7, 10, 16], ischemic heart disease [17, 18] or coronary heart disease [8, 19-21], peripheral arterial disease [10, 19, 22], heart failure [23-26], and hypertension [12, 13, 27].
- The protective effects of moderate drinking for CVD apply to both men and women, and have been linked with the ethanol in all types of alcohol beverages.

Cancer

A dose-response relationship has been described between drinking and some cancers (reviewed in IARD *Health Review: Drinking and Cancer*).

- In general, more frequent and heavier drinking is associated with greater risk of developing cancers of the oral cavity, larynx, pharynx, and esophagus [28-31]; cancer of the female breast [32, 33]; liver cancer [34, 35]; and colorectal cancer [36, 37].
- At the same time, low-to-moderate alcohol consumption may be a protective factor against kidney cancer [28, 38-41]; non-Hodgkin's [33, 42] and some cases of Hodgkin's lymphoma [32, 33, 43, 44]; and some evidence points to a protective effect against multiple myeloma [45, 46].

Metabolic disorders

The relationship between drinking and metabolic disorders has been well established (reviewed in *IARD Health Review: Drinking and Metabolic Disorders*).

- Harmful drinking patterns are associated with increased risk for Type 2 diabetes [19, 47-51] and metabolic syndrome (MetS) [19, 52, 53].
- Moderate drinking, on the other hand, is associated with decreased risk for Type 2 diabetes [54-56] and MetS [19, 57-60]. This relationship has been observed in both men and women [61, 62] and holds true across cultures and ethnic groups [53, 63, 64].

Liver Disease

Harmful drinking patterns have been linked with increased risk for liver diseases, including fatty liver disease, alcoholic hepatitis, and alcoholic cirrhosis [63, 64] (reviewed in *IARD Health Review: Drinking and Liver Disease*).

In addition to harmful drinking patterns, a complicated mix of individual factors are associated with, and can further contribute to, an individual's risk for developing NCDs.

- Other individual behaviors (diet, smoking, weight maintenance, exercise) also contribute to the risk for developing NCDs; these factors tend to cluster together in individuals [67, 68], regardless of health status [69].
- Weight / obesity status, as indicated by BMI, is associated with various NCDs [70], [63, 71], [72] [73], and also with drinking frequency [74-77].

- Smoking is associated with heavier drinking patterns [69] and is also independently associated with increased risk for NCDs [78, 79].
- Further complicating the matter, these behaviors are observed to different degrees among men and women.
  - On average, globally, women are less physically active and have a higher prevalence of obesity, while men have a higher prevalence of harmful drinking patterns and smoking [2].
- Genetic factors also play an important role in alcohol consumption and NCD risk, as they underlie differences in alcohol metabolism and some consumption patterns [80-82].

Social and economic factors also play an important role in the shaping drinking patterns, NCDs, and the relationship between drinking and NCDs.

- Moderate drinkers generally enjoy higher socioeconomic status (SES) than abstainers and heavy drinkers, and suffer fewer alcohol-related problems [83].
- Conversely, poverty and long-term unemployment are associated with increased alcohol consumption [84] and alcohol-related problems [85]. Similarly, economically and socially vulnerable populations (e.g., homeless and indigenous peoples), often have higher rates of alcohol abuse [86] or problem drinking [87-89] than the general population, although there is variation across countries.
- Recent findings suggest a "multiplicative interaction" of SES and alcohol in all-cause mortality risk; low SES individuals have higher mortality risk compared with higher SES individuals for the same level of alcohol consumption [90].
  - For example, despite increasing affluence in many countries, among the poor and marginalized, health outcomes are worse at all levels of consumption than they are for drinkers of higher socioeconomic status [91].
- However, there is evidence that healthy behaviors appear to substantially attenuate the impact of socioeconomic factors on disease risk [92].

ALCOHOL CONSUMPTION, NCD PREVALENCE, AND MORTALITY

At the global level, the relationship between drinking and NCDs is complex and difficult to disaggregate.

- Mortality from NCDs is closely linked with income level, with highest rates in low- and middle-income countries where 75% of all CVD and diabetes deaths, and 90% of all respiratory disease deaths occur [2]
- However, according to the WHO Global Status Report on NCDs, the prevalence of NCDs is higher in countries that are better off, and where survival rates among those afflicted are also higher [2].
- There is no consistent correlation between per capita consumption of alcohol by WHO region and NCDs. For example:
  - While both per capita consumption of alcohol and NCD mortality rates are highest in South-East Asia (SEAR) and Africa (AFR), there is no correlation with the prevalence of diabetes or the incidence of total cancers (Table 1).
- At the same time, the prevalence of heavy episodic drinking (HED) corresponds well to the incidence of cancers across the WHO regions.
  - Rates of both are highest in EUR, followed by AMR; NCD death rates are lowest in these two regions.

These inconsistent patterns point to the role of broader factors in the development of NCDs, which extend beyond just an association with alcohol consumption or harmful drinking patterns. Social and economic issues, as well as development, globalization, urbanization, and access to treatments and medicines are closely linked with rates of NCDs, mortality and morbidity, as well as with changing patterns of alcohol consumption and other lifestyle factors.

The disease burden from NCDs, as well as that attributable to alcohol consumption also varies across regions.

- According to the Global Burden of Disease study 2010, the saliency of particular risk factors varies across regions of the world [3].
- The study includes an assessment of alcohol consumption as a risk factor, but without separating harmful from non-harmful drinking. According to this analysis:
  - Alcohol consumption is the third global risk factor for men, and the eighth global risk factor for women;
  - It is also the leading risk factor for disease and disability for those between the ages of 15 and 49 years
- However, the relative burden from NCDs and other causes varies widely across regions.
  - For example, in Sub-Saharan Africa the burden of disease related to alcohol consumption is due primarily to road traffic and other unintentional injuries; while in Eastern Europe the burden attributable to alcohol has increased since 1990, but due to increases in CVD [3].

Table 1. Ranking of total NCD death rates, prevalence and incidence of individual diseases, and alcohol consumption by WHO region

Ranking	NCD death rates (2012)	Prevalence of adult diabetes (2010)	Incidence of all cancers (2010)	Adult per capita consumption (drinkers ages 15+) (2010)	Prevalence of HED (drinkers ages 15+) (2010)
1	SEAR	EMR	EUR	SEAR	EUR
2	AFR / EMR	AMR	AMR	AFR	AMR
3	WPR	SEAR	WPR	EUR	AFR / WPR
4	EUR	AFR	AFR	WPR	SEAR
5	AMR	EUR / WPR	SEAR	AMR	EMR
6			EMR	EMR	

Regions:
AFR – Africa; AMR – Americas; SEAR – South-East Asia; EUR – Europe;
EMR – Eastern Mediterranean; WPR – Western Pacific

Sources: WHO Global Status Report on NCDs (2014), WHO Global Health Observatory Data Reportory

Again, it should be noted that these assessments of the disease burden attributable to alcohol do not differentiate between harmful and non-harmful drinking.

It is difficult to correlate alcohol consumption and NCDs at the regional, and particularly at the global level without considering the complexity of the relationship and the involvement of a range of broader factors.

- There is a strong correlation between country-level economic resources and health care infrastructure, and NCD death rates [2].
- One of the most important factors affecting the prevalence of NCDs is increasing life expectancy that generally follows socioeconomic development [93]. This is true for most regions of the world with the exception of Sub-Saharan Africa, and to a lesser extent India, Russia, and some former Soviet republics [94].
- Globalization, industrialization, and economic development have simultaneously contributed to public health improvements and the rising incidence and prevalence of NCDs [93].
    - However, globalization has also brought with it a lifestyle of physical inactivity and access to more food for more people, further increasing the incidence of some NCDs, notably those linked with obesity.

REDUCING THE HARMFUL USE OF ALCOHOL AND ALCOHOL-RELATED NCD MORBIDITY AND MORTALITY

The growing prominence of NCDs and the related disease burden have led to an intensified focus at the global level on the prevention and reduction of NCDs and their risk factors.

Two important and large-scale global policy initiatives focus on the reduction of NCDs.

- The first is the Global Action Plan for the Prevention and Control of NCDs 2013-2020, which calls for a 25% reduction of NCD deaths [95]. This initiative also includes the specific target of a 10% reduction in harmful drinking, focusing on three clear indicators (within the national context):
    - Total recorded and unrecorded alcohol consumption per capita (15+ years old);
    - Age-standardized prevalence of HED among adolescents and adults; and
    - Alcohol-related morbidity and mortality.

- The second is the United Nations SDGs, a much broader initiative that also addresses the economy, energy, climate, and human wellbeing, in addition to including the reduction of NCDs among their health targets.

The NCD Action Plan includes the goal of a 10% relative reduction in the harmful use of alcohol; The SDGs also include a target to prevent and treat harmful drinking and substance abuse, as well as a separate target for reducing premature NCD mortality.

However, the challenge is in identifying appropriate indicators that correlate with NCDs and other harmful outcomes, and those policy measures to achieve targets.

The NCD Action Plan requires a coordinated and consistent effort among a range of collaborators working to create more equitable and healthier communities. Large-scale and sustainable results, such as those called for in the WHO Global Action Plan or the UN SDGs, depend on the promotion of health by governments; health care institutions and providers; community-based organizations; businesses; and individuals.

These goals may be achieved by pursuing combinations of health-promotion, disease prevention, and risk-reduction approaches through multi-stakeholder engagement and increasing access to treatment and essential NCD medicines.

FINAL REMARKS

The relationship between drinking and NCDs is complex. Not only are different drinking patterns associated with health benefits and risks, but these associations can also be influenced by social determinants such as poverty and nutrition, and genetic and physiological factors.

As a result, any effort to meet goals in reducing NCDs and its risk factors requires an equally comprehensive and complex mix of interventions. While addressing single risk factors like harmful use of alcohol can contribute to reaching global goals, a concomitant effort is needed for reducing other individual-level risk factors.

There is a limit to what such measures can achieve in light of the clear association between NCDs and broader social and economic factors that underlie the development of NCDs and survival rates. Strengthening health care systems and universal health coverage will be critical to reducing both risk and harm.

Large-scale and sustainable results, such as those called for in the WHO Global Action Plan or the UN SDGs, depend on the promotion of health by governments; health care institutions and providers; community-based organizations; businesses; and individuals. A multi-stakeholder approach reflects the shared responsibility by society as a whole for the wellbeing of citizens. It also brings a wider range of resources that can assist in alleviating NCDs, risk factors like harmful drinking, and some of the underlying issues that are the fundamental drivers of poor health and social disparities across populations, nations, and regions.

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Reviews

IARD Health & Policy Reviews cover the effects of alcohol consumption on health. They offer an overview of the relationship between drinking patterns and health outcomes, compile the key literature, and provide the reader with an extensive bibliography that refers to original research on each topic. The *Reviews* attempt to present the balance of the available evidence. They do not necessarily reflect the views of IARD or its sponsoring companies.

IARD is a not-for-profit organization dedicated to addressing the global public health issue of harmful drinking. Our mission is to contribute to the reduction of harmful drinking and promote responsible drinking worldwide. This is a problem that requires new insights, urgent action, and open dialogue. Central to IARD's work is our role as Secretariat of the Beer, Wine and Spirits Producers' Commitments to Reduce Harmful Drinking.

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