

Adverse Health Effects due to Alcohol Use

Background

Alcohol (ethanol) is cytotoxic and, after absorption into the bloodstream, rapidly spreads throughout the body. It is absorbed from the stomach and – much more easily and therefore predominantly – from the small intestine and other parts of the intestine. Within minutes it reaches the organs with the greatest blood supply, such as the brain, and then is distributed evenly in the body water.⁷

Alcohol is a toxin to cells because itself and substances produced during alcohol breakdown in the body damage or even kill cells. Alcohol and its metabolites – especially acetaldehyde – alter the acid-base balance, which is essential for normal functioning of all metabolic processes, promote the formation of highly reactive free radicals, disrupt lipid metabolism and activate cells of the immune system, which

causes inflammation and can ultimately lead to cell death. In the brain in particular, alcohol acts on receptors and ion channels that are important for cell communication, thereby affecting signal transmission between nerve cells.⁷

Due to its effects on the brain and the nervous system as well as other organs, alcohol consumption is implicated in the development of more than 200 diseases and injuries³.

Diseases caused by alcohol use

Some diseases are caused exclusively by alcohol consumption, including mental and behavioral disorders caused by alcohol (including alcohol intoxication, alcohol dependence, and withdrawal syndrome), digestive system diseases such as

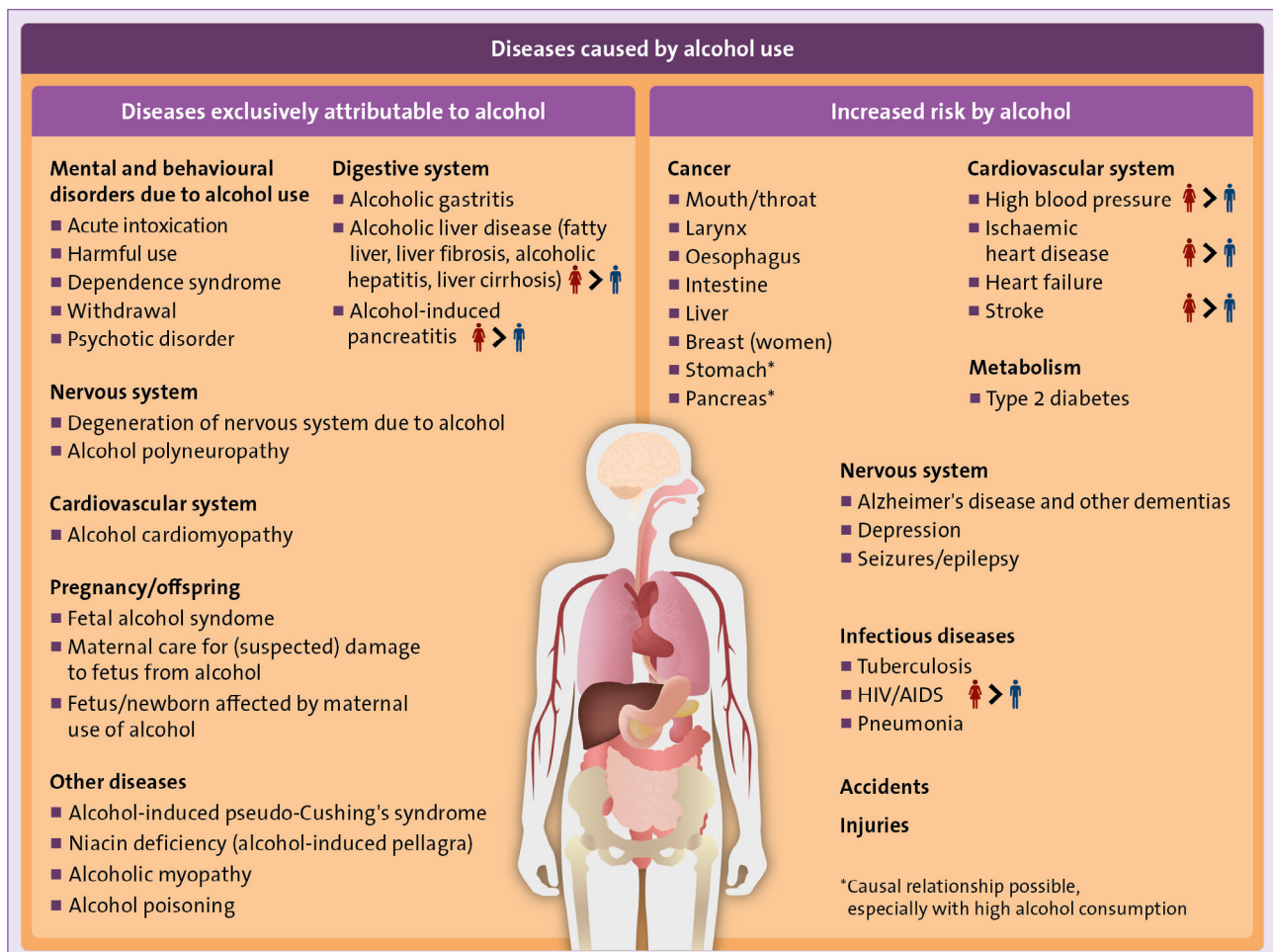


Figure 1: Diseases caused by alcohol use. References: Rehm 2017², Rehm 2021³, Rungay 2021⁴, Shield 2020⁵. Illustration: German Cancer Research Center, Cancer Prevention Unit, 2023

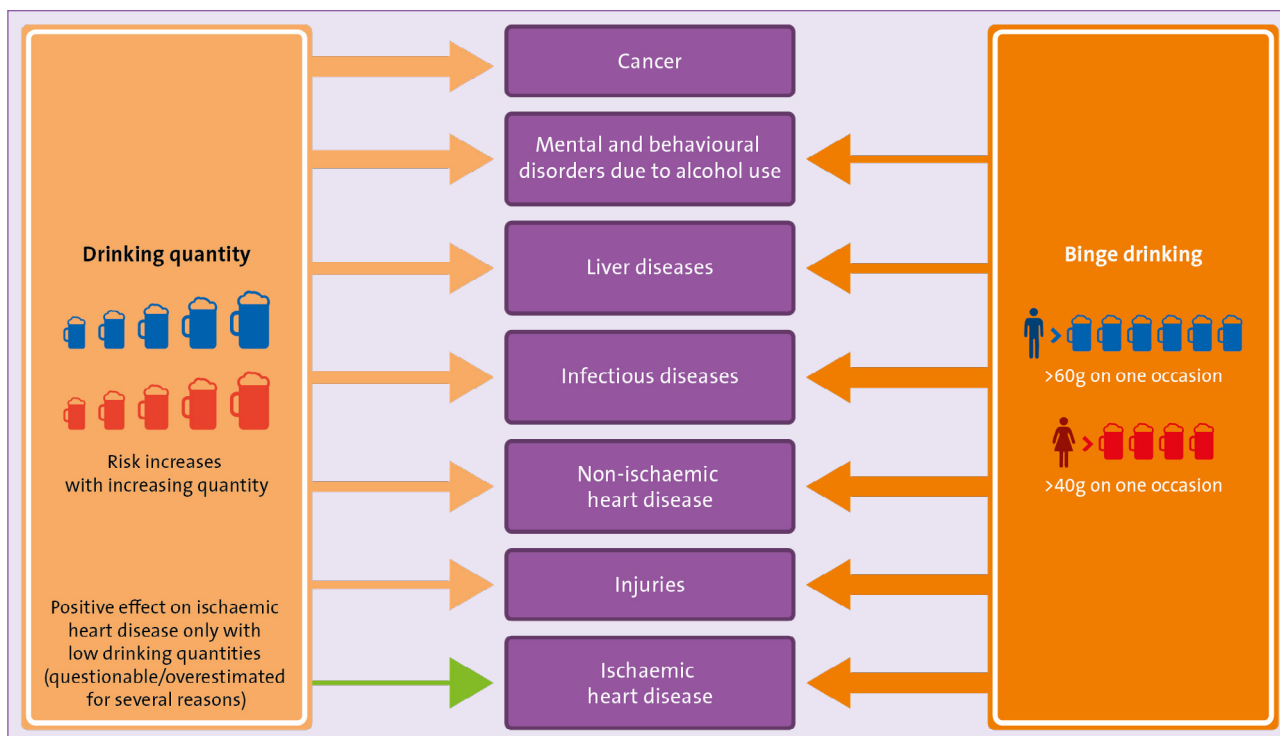


Figure 2: Influence of drinking quantity and binge drinking on the risk for various diseases and injuries. The thickness of the arrow indicates the strength of the association. Source: Rehm 2017². Illustration: German Cancer Research Center, Cancer Prevention Unit, 2023

alcohol gastritis, alcoholic liver disease, and alcohol-induced pancreatitis, and nervous system diseases such as alcohol polyneuropathy⁶.

In addition, alcohol is a significant risk factor for a range of cancers, cardiovascular diseases, infectious diseases, as well as other digestive diseases, neuropsychiatric diseases, and injuries⁶ (Fig. 1). Even small amounts of alcohol are harmful to health.

The health risk increases with increasing alcohol consumption, especially for cancer and liver diseases as well as alcohol dependence. Heavy episodic drinking (binge drinking) in particular increases the risk for cardiovascular diseases, infectious diseases and injuries² (Fig. 2).

Depending on the amount consumed, alcohol can exert both positive and negative effects on ischemic heart disease,

ischemic stroke and diabetes^{2,5,6}: Low to moderate amounts of alcohol (up to 30 to 60 grams of alcohol per day, depending on the disease) appear to be protective in persons who do not episodically drink large amounts of alcohol; however, higher levels of consumption also increase the risk for these diseases^{3,5}.

While for some diseases the risk is mainly determined by drinking quantity and frequency, for other diseases other factors are predominant, such as gender, age, smoking and genetic predisposition⁷.

Conclusion

Alcohol causes and promotes a high number of diseases and injuries that often lead to premature death. Even a low level of alcohol use increases the risk for several diseases, especially cancer. Therefore, no level of alcohol consumption is safe or even beneficial to health¹.

Imprint

© 2023 German Cancer Research Center (DKFZ), Heidelberg

Authors: Dipl.-Biol. Sarah Kahnert, Dr. Katrin Schaller

Layout, illustration, typesetting: Dipl.-Biol. Sarah Kahnert

Suggested citation: German Cancer Research Center (2023) Adverse Health Effects due to Alcohol Consumption. Facts on Alcohol, Heidelberg

Responsible for the content:

Dr. Katrin Schaller

German Cancer Research Center (DKFZ)

Cancer Prevention Unit and

WHO Collaborating Centre for Tobacco Control

Im Neuenheimer Feld 280

D-69120 Heidelberg

Phone: +49 (0)6221 42 30 07 | E-Mail: who-cc@dkfz.de

Translated from German with the assistance of DeepL.

This publication is available online at:

https://www.dkfz.de/en/krebspraevention/Downloads/1_Books-Reports-Brochures-Factsheets.html.

References

- 1 Burton R & Sheron N (2018) No level of alcohol consumption improves health. *Lancet* 392: 987–988
- 2 Rehm J, Gmel GE, Sr., Gmel G, Hasan OSM, Imtiaz S, Popova S, Probst C, Roerecke M, Room R, Samokhvalov AV, Shield KD & Shuper PA (2017) The relationship between different dimensions of alcohol use and the burden of disease-an update. *Addiction* 112: 968–1001
- 3 Rehm J, Rovira P, Llamosas-Falcón L & Shield KD (2021) Dose-response relationships between levels of alcohol use and risks of mortality or disease, for all people, by age, sex, and specific risk factors. *Nutrients* 13: 2652
- 4 Runggay H, Murphy N, Ferrari P & Soerjomataram I (2021) Alcohol and cancer: epidemiology and biological mechanisms. *Nutrients* 13: 3173
- 5 Shield K, Manthey J, Rylett M, Probst C, Wettlaufer A, Parry CDH & Rehm J (2020) National, regional, and global burdens of disease from 2000 to 2016 attributable to alcohol use: a comparative risk assessment study. *Lancet Public Health* 5: e51–e61
- 6 Shield KD, Parry C & Rehm J (2013) Chronic diseases and conditions related to alcohol use. *Alcohol Res* 35: 155–173
- 7 Singer M, Batra A & Mann K (2011) *Alkohol und Tabak. Grundlagen und Folgeerkrankungen*. Georg Thieme Verlag, Stuttgart, New York