

Harmful Alcohol Use and Non-Communicable Diseases (NCDs)

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ABSTRACT

Harmful use of alcohol in relation to non-communicable diseases (NCDs) is a major issue of concern in public health globally. With alcohol being one of the most widely consumed beverages, it is pertinent to examine the relationship between alcohol use and the risk of NCDs. From the findings, there is a strong link between alcohol intake and oral cavity, pharyngeal, oesophageal, colon, liver, laryngeal, rectal, and breast cancers. It also contributes to cardiovascular diseases, diabetes, and digestive diseases. However, its relationship with some cardiovascular outcomes and diabetes is complicated. While some studies suggest that moderate alcohol consumption may have potential protective effects with regards to cardiovascular health and diabetes, it is important to emphasize that the outcomes are not uniform for everyone. The impact of alcohol on health can vary depending on individual factors, including drinking patterns, genetics and health status. This review describes the complex relationship between harmful alcohol use and non-communicable diseases and offers insights into the causes, health consequences, and solutions to the challenges of harmful alcohol use.

KEYWORDS: Alcohol Consumption, Risk factor, Non-Communicable Diseases.

INTRODUCTION

Alcohol is a psychoactive substance that has been an integral part of many cultures for centuries.¹ However, the consumption of alcohol holds a paradoxical position, in that it is consumed as part of rituals and religious occasions, a nutritious and healthy beverage because of its antimicrobial properties but also a toxic substance that is poisonous in high concentrations.² Investigating the association between consumption of alcohol and the risk of NCDs has important public health implications, with alcohol being one of the most widely consumed beverages globally.³

Non-communicable diseases, also known as chronic diseases, are diseases of long duration that are not caused by infectious agents, but rather by a combination of genetic, physiological, environmental, and behavioural factors.⁴ There are different types of NCDs like; cardiovascular diseases (such as myocardial infarction and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma), and diabetes.⁴ Injuries and mental health disorders may also be classified as NCDs.⁵ These NCDs pose a significant threat to public health systems worldwide, affecting people of all age groups, regions and countries.⁴ The risk of NCDs is increased by modifiable behaviours like harmful use of alcohol and metabolic changes like obesity, sedentary lifestyle, nutritional habits, etc.⁴

The harmful use of alcohol is one of the world's leading risk factors for illness, disability, and death, and it is the primary cause of more than 200 diseases globally, resulting in about 3.3 million deaths each year.⁶ Globally, NCDs are the major contributors of mortality and disability, with the mortality rate considerably higher in low-income and middle-income countries.⁷ Each year, NCDs kill 41 million people, which is equivalent to 74% of all deaths globally.⁴

OVERVIEW OF NON-COMMUNICABLE DISEASES

Non-Communicable diseases are sets of chronic and non-contagious diseases which are caused by a combination of physiological, genetic, environmental, and behavioural factors.⁴ They are known as lifestyle diseases because many of them are preventable.⁸ The main types of NCDs are cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes and they account for 74% of all deaths globally.^{4,9} They are collectively responsible for 80% of premature NCD deaths.⁴ NCDs affect people of all age groups, regions, and countries and 17 million NCD deaths occur before the age of 70 years.⁴ NCDs have now been extended to cover other health problems like; hepatic, renal, and gastrointestinal problems; endocrine, haematological, and neurological disorders; skin disorders;

genetic conditions; trauma; mental disorders and disabilities and injuries.¹⁰

Alcohol consumption, smoking, poor nutrition (excessive use of sugar, salt, saturated fats, and trans fatty acids), and physical inactivity are the main causes of NCDs.⁸ Although NCDs often manifest in adulthood, they come from the conditions and adopted behaviours during childhood and adolescence.¹⁰ In actual fact, the risk of NCDs can be established in utero because maternal health before and during pregnancy has an impact on the susceptibility of their children to NCDs later in life.¹⁰ The risk factors of NCDs can be modifiable behaviours as in unhealthy diets, harmful use of alcohol, physical inactivity, and tobacco use, or non-modifiable factors like age, gender, race, and ethnicity, or even metabolic changes like obesity, high blood pressure, hyperlipidaemia, and hyperglycaemia.^{4,11}

HARMFUL ALCOHOL USE

Harmful use of alcohol is the consumption of alcohol that leads to physiological or physical harm.¹² It is described according to WHO's International Classification of Diseases, 10th Revision (ICD-10) as a pattern of psychoactive use of substances that can cause mental or physical damage to health.¹³ This consumption beyond moderation can lead to health and social problems for drinkers.¹

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) has categorized patterns of drinking into moderate, binge and heavy consumption according to the number of drinks where a standard drink is any beverage containing 14 grams of pure alcohol.¹⁴ *Moderate drinking*, as defined by NIAAA, entails the intake of 2 or more drinks or less in a day for men and 1 drink or less per day for women. On the other hand, *binge drinking* is characterized by the intake of 5 or more drinks for men and 4 or more drinks for women in about 2 hours. Meanwhile, *heavy drinking* constitutes the intake of more than 4 drinks per day or more than 14 drinks per week for men and more than 3 drinks per day or more than 7 drinks per week for women. It is important to note that binge drinking and heavy alcohol use increase an individual's risk of alcohol use disorder.¹⁴

Globally, about 237 million men and 46 million women suffer from alcohol-use disorders and it is more common in high-income countries.⁴ Harmful use of alcohol is more common in young adults ages 18-24 and men than in women.⁹ It causes more than 200 diseases and injury conditions and is also responsible for 3 million deaths (5.3% of all deaths) every year.¹⁵

In a study to determine the prevalence of harmful use of alcohol in Nigeria, the crude prevalence was 34.3%, with 43.9%

in men and 23.9% in women. It was also found to be higher in rural settings (40.1%) compared to urban settings (31.2%).¹⁶

INTERACTIONS/RELATIONSHIP BETWEEN NCDs, ALCOHOL USE, DRINKING PATTERNS, AND CONSEQUENCES ASSOCIATED WITH HEAVY CONSUMPTION

Much evidence shows the role of alcohol in the aetiology of NCDs. In 2016, alcohol consumption accounted for 4.3% of all NCD deaths and 4.2% of all NCD DALYs (Disability-adjusted life years).¹⁵ At all doses, alcohol is associated with certain NCDs to varying degrees.¹⁷ In terms of alcohol-attributable burdens of NCDs, alcohol has been linked to cancer, diabetes mellitus, cardiovascular diseases, digestive diseases.^{15,18}

- **Cancer**

In a 2022 WHO report, cancer accounted for 10 million deaths in 2020.¹⁹ Alcohol was implicated as an important risk factor for the development of cancer.¹⁹ Alcohol consumption and eight other leading environmental and behavioural risks like high body mass index, low fruit and vegetable intake, physical inactivity, tobacco use, unsafe sex, urban and indoor air pollution, and unsafe health-care injections account for 35% of deaths globally.²⁰ There are strong links between alcohol consumption and cancer. According to the International Agency for Research on Cancer (IARC), alcohol consumption can be causally linked to eight different cancers: oral cavity, pharyngeal, oesophageal, colon, liver, laryngeal, rectal and breast cancers.^{19,21-23}

- **Cardiovascular Diseases**

Cardiovascular diseases is one of the leading cause of death claiming 17.9 million lives annually according to reports from WHO.²⁴ These diseases range from ischemic heart disease, cardiomyopathies, cerebrovascular disease, rheumatic heart disease, and other conditions.²⁴ In 2016, alcohol accounted for 3.3% of all cardiovascular disease deaths globally.²⁵ Alcohol had a deleterious impact on many cardiovascular outcomes, like hypertensive heart disease, cardiomyopathy, haemorrhagic strokes, and ischemic heart disease but has a protective effect on ischemic strokes,²⁵ although this is still a debate to this day.

- **Diabetes Mellitus**

There has been a consistent rise in the number of people with diabetes with the number increasing by more than 300 million between 1980–2014.²⁶ Mortalities resulting from diabetes in a 2019 study was 1.5 million.²⁶

These values are projected to rise further in the coming years, especially in low-income and middle-income countries.²⁶

Diabetes occurs either due to insufficient or no production of insulin by the pancreas (type I) or decreased tissue sensitivity to insulin (type II).^{17,26,27} Type I is usually due to hereditary or genetic factors while type II is due to a complex relationship between genetic, hereditary, and environmental factors such as lifestyle changes.^{17,26} Alcohol consumption has been implicated in chronic pancreatitis which culminates into diabetes mellitus.²⁷

Compared with lifetime abstainers, the consumption of moderate amounts of alcohol showed a protective function because of improved insulin sensitivity and chronic heavy consumption becomes damaging due to disruption in glucose homeostasis which leads to insulin resistance.^{28,29} However, more recent studies have shown that most lifetime abstainers who participate in these studies were once (chronic) alcohol drinkers who are now quitters often called 'sick quitters'.³⁰ Thus, raising questions about the accuracy of this information. In 2023, the World Health Organization (WHO) published a report that clearly state that no amount of alcohol consumption is safe for consumption.³¹

- **Digestive Diseases**

The digestive system comprises the gastrointestinal tract (GI), liver, pancreas, and gallbladder³² and pathologies affecting any of the organ(s) are grouped under digestive diseases. In 2019, there were 2.86 billion estimated prevalent cases of digestive diseases that resulted in 8 million deaths and 277 million DALYs lost.³³ Alcoholic liver disease, fatty liver disease, and liver cirrhosis are all liver pathologies that have been linked to alcohol.¹⁸ In 2016, alcohol accounted for 607,000 liver cirrhosis deaths and 30,000 pancreatitis deaths globally.²⁵ Breakdown of alcohol in the liver by aldehyde dehydrogenase enzymes leads to the production of reactive oxygen species (ROS) which is known to be pivotal in the development of alcoholic liver disease.³⁴

- **Mental Health.**

The Harmful use of alcohol and its effect on mental health is often bidirectional with people with mental health related stress, depression and suicidal tendencies resorting to harmful alcohol use further worsening their condition and a corresponding increase in the risk of developing mental health related stress, depression and suicidal tendencies on harmful alcohol use.³⁵ Another study conducted in Australia showed a strong correlation between harmful alcohol use and physical inactivity, and

suboptimal sleep, which is shown to be greatly prevalent in people with mental health illnesses.³⁶ This further underscores the risk associated with harmful alcohol use in precipitating mental health conditions or exacerbating an already existing one.

- **Road Traffic Injuries:**

An alarming 1.3 million people die from road traffic injuries annually with over 93% of these fatalities occurring in low and middle-income countries.³⁷ Harmful alcohol use is a risk factor and a common aetiology of workplace injuries and road traffic injuries.³⁷⁻³⁹ Drinking alcohol prior to driving have been shown to account for approximately 21- 30% of road traffic injuries³⁹⁻⁴¹ with alcohol having a decremental effect in brake reaction time, proper coordination and wheel steering all of which contributes to the frequency of traffic injuries.³⁹

CAUSES OF HARMFUL ALCOHOL USE AND ASSOCIATED FACTORS

Harmful alcohol use can be attributed to factors such as family, peer pressure or influence, socioeconomic status, and advertisement of alcoholic beverages:

1. Family and Peer Pressure/Peer Influence

Family and friends have a significant influence on young adults and adolescents use of alcohol. Several studies show that there is a positive correlation among young adults' and adolescents' alcohol use who interact with peer or family members that use alcohol.^{42,43,44} The family forms the first interactions for most children during their formative years and their peers during their developing adolescent life.⁴⁵ Studies have correlated this by showing that parental alcohol use have the greater influence on a child prior to their fifteenth birthday and decreases afterwards⁴⁶ while peer influences spikes following late adolescence.^{47,48}

Although, peer tend to influence the most following late adolescence, studies have shown that adolescent that grow in a family that do not use alcohol or do so very minimally often do not succumbed to peer pressure or heavily drink alcohol. the same is seen a subject whose parents are strongly against alcohol use.^{43,49}

2. Socioeconomic status

Socioeconomic status, which represents ones education level, income and occupation, strongly correlates with the health behaviour and outcomes.⁴⁵ There is also a strong link between socioeconomic status and alcohol consumption with individual with high socioeconomic status consuming alcohol more frequently than others while those in low socioeconomic

status drinking heavy amount of the beverage compare to others.^{45,50,51}

Individual with high socioeconomic status who have higher levels of social support, greater support, better health service and basic health information are less likely to harmfully use alcohol compared to individual with low socioeconomic status.⁵²⁻⁵⁴

3. Advertisement

With the advent of new technologies that usher mankind into a digital world, the media has been among the major contributor to how individuals perceive alcohol consumption through targeted advertisement via movies, television, radios, newspapers, social media, etc.⁴⁵ This has significantly increase the consumption of alcohol among adolescence (who are more frequently exposed to the media) compared to other age group.^{45,55} Studies have shown that advertisement and targeted marketing influences people's perception towards the product with a significant number developing a positive belief and attitude towards drinking, thus creating an environment of individuals who promote and encourage alcohol use as a norm.^{45,56} The long-term effect is an environment that accept and encourage alcohol use which result in the increased frequency, amount, and possible harmful use of alcohol.⁵⁷

Another study, compared youths who are exposed to intense targeted alcohol advertisement to those exposed to minimal amount of advertisement with the former significantly consuming more of the beverage on average.⁵⁸ Social media website like Twitter (now called X), Facebook, Instagram, etc., are also platform that the alcohol industry use in their marketing and advertisement strategies.⁴⁵ Facebook as at 2012 had over 1000 alcohol-related sites.^{45,59}

CURRENT ISSUES/CHALLENGES ABOUT ALCOHOL USE AND NCDs

The current issues/challenges about alcohol use and NCDs are centred around;

1. **Poverty and Poor Regulation of Alcohol Beverages-** The prevalence of harmful alcohol use is higher in low-income and middle-income countries than in high-income countries.⁶⁰ These countries are thriving grounds for alcohol industries, due to their poorly performing economy and unavailability of job opportunities.⁶⁰ There has been a strong bias in government, regulatory, and enforcement bodies for these industries.⁶⁰ This has caused less regulation or zero enforcement of regulatory policies of the activities of the industry as revenue and job opportunities generated by the industry in low-income and middle-income countries often precipitate this.⁶⁰ In Nigeria, the government has not

been strict in implementing policies and enforcing regulations on the production, distribution and consumption of alcohol.^{61,62} There is also the issue of low income and/or lack of insurance for persons with NCDs. There is evidence that correlates low income and poverty as high-risk factors for chronic diseases such as stroke, diabetes, etc.⁶³

The cost of managing NCDs such as cancers, cardiovascular diseases, etc. which are among the leading causes of death and disability, can be very expensive. A study estimates that from 2011 to 2030, NCDs will cost the global economy over 30 trillion dollars.⁶⁴ This issue is common to most countries irrespective of their revenue generation or level of healthcare system pushing many below the poverty line.⁶⁴ Economic problems and the need to resort to harmful alcoholic use as a form of escape is very common. This can result from things like mental stress which can be precipitated by a vast array of things including one's socioeconomic status, emotional trauma and failure etc. These conditions often push individuals into the harmful consumption of alcohol further worsening their condition.^{65,51}

2. **Easy Availability of Alcohol-** The availability of alcoholic beverages in sachets and small bottles ensures its efficient distribution.⁶⁰ This produce can easily be smuggled into areas, for example schools, where it originally would not have been possible. This vis-a-vis government poor regulation especially in low and middle-income countries has led to an increase in the harmful use of alcohol.⁶⁰

3. **Poor Awareness of the harms Associated with Alcohol use among the Populace-** A sizeable number of alcohol abusers are not fully aware of the harm of consuming alcoholic beverages, especially its harmful consumption. The reason for this low level of awareness is simply due to the high advertisement by the industry which is sadly poorly regulated in many countries.⁶⁰ In all of the astronomical volume of alcohol advertisement, there is little or no awareness on the consequences of harmful use of alcoholic beverages. Further contributing to the ignorance and harmful alcohol use by the populace.^{60,45}

4. **Cultural Acceptance of Alcohol as a Beverage for Occasions -** Culture represents the total way of life of a person, it entails their food, drinks, clothing, and values.⁶¹ Alcohol over the years has risen to be an important part of human's culture.^{18,45,61} In Mexico alcohol use forms essentially every part of their culture whether in urban or rural areas^{45,61} and similarly in India.⁶¹ Africa is no different, as in Nigeria, for example, alcohol consumption is an important part of marriages, burials and funerals, naming

ceremony and major accomplishments.⁶¹ And this foretells harmful alcohol use^{67,68} making it very difficult in curbing its harmful use. Many alcohol industries have added some bitter component to their beverage to encourage and even increase the amount of purchase from people as there is the superstition that bitter things are often beneficial to the health as opposed to sweet things which can cause many health complications.⁶¹ This can especially be locally produced alcoholic beverages.⁶¹

5. Poorly Effective Healthcare Services- The importance of health care services is very crucial in the health sector of any country as these services greatly influence health outcomes, especially in emergencies as is common in many cardiovascular diseases emergencies for example, heart attack⁶⁹ where time is of utmost importance. These services which include: physician services, in-patient and out-patient services, emergency health services, etc., are often scarce or almost unavailable in low-income and middle-income countries where there is an existing fundamental problem of a poorly thriving economy.⁶⁰ In high-income countries like the United States, the prevalence of death arising from poor healthcare services, especially the emergency service, is often low, though significant.⁶⁹ This poorly effective health care services which also include paucity of health professionals result in an increase in death from NCDs that is otherwise preventable.⁶⁹

The purpose of the healthcare system is to curb the spread of the disease and to control it which is particularly very important in NCDs. Inadequate healthcare infrastructures, these result in poor control of the diseases causing their rapid spread which eventually reduces the chance of survival of victims with or without alcohol-precipitated NCDs.⁷⁰ This issue is particularly common in low-income and middle-income countries which are common within Africa.^{60,70}

MANAGEMENT OPTIONS OF HARMFUL
ALCOHOL USE DISORDERS AND NCDs:
Prevention, Treatment, and Limitation of
Disabilities

Prevention

According to a recent report (2023) by WHO, it clearly states that no amount of alcohol is safe for consumption.³¹ Thus, the simplest prevention of NCDs associated with alcohol consumption is to abstain from consuming alcoholic beverages. It is also necessary that government agencies, especially in low-income and middle-income countries where the prevalence of harmful alcohol consumption is high,⁶⁰ create policies that guard against the abuse of alcoholic beverages these policies can include increased taxation on these beverages and a ban on

advertisement.⁷¹ An awareness campaign, event, or programme that educates people on the health consequences of the harmful use of alcohol is pivotal in reducing or encouraging abstinence from alcohol consumption.⁷¹

Government, regulatory, and enforcement bodies should avoid any bias and fully enforce policies. There should be policies that bring about a reduction in alcohol distribution channels, informal outlets, and easy availability near schools or areas where young adults gather.⁶⁰

Treatment and Limitation of Disabilities

Alcohol-attributable NCDs are usually treated based on the particular NCDs they cause. These treatment options range from medical treatments in the form of medications, surgical interventions, and rehabilitation services in debilitating cases such as stroke and for individuals struggling to reduce or completely abstain from alcohol consumption. While for harmful alcohol use disorder. The treatment of harmful use of alcohol disorder is often based on these five steps: identification, intervention, detoxification, rehabilitation and prevention of relapses.⁷²

1. Identification and Intervention

Following a thorough history taking and physical examination by a physician an alcohol use disorder is identified which will require the patients to either completely abstain from alcohol use or to moderately consume the beverage via controlled drinking, the former is often preferred by physicians.^{72,73} Intervention is the next step following identification and it involves motivational interviewing and brief interventions. Motivational interviewing usually employs the FRAMES combination.⁷³ This combination is an acronym that stands for: Feedback, Responsibility, Advice, Menu Options, Empathy and Self-Efficacy, which explains the assessment to be done as well imbibed into the patient.⁷²⁻⁷⁴ Brief interventions on the are more broader and employs a wide range of tools to educate patients on the need to abstain from alcohol consumption, the health consequences of harmful alcohol use, effective ways of toning down on heavy drinking and avoidance of situations that can result in such.⁷⁵

Motivational interviewing and brief interventions can either be use separately or together as both approaches aim at decreasing patients' alcohol consumption through changing their perception and helping them understand what needs to be done.⁷²

2. Detoxification

The abstinence from alcohol following periods of huge dependence on these beverages often present with withdrawal symptoms such as insomnia, sweating, increased blood pressure, pulse and respiratory rate and autonomic disorders.⁷⁶ These symptoms range from mild to modest and something

severe so that it requires medical attention as is the case in about 50% of alcohol-dependent patients.^{72,77-78}

Antidepressants drugs particularly benzodiazepines are usually preferred by physicians due to its safety and cost effectiveness relative to other class options.⁷⁹

3. Rehabilitation and Prevention of Relapses:

In Rehabilitation, the physician aims to ensure that the motivation of the patients is not extinguish and to prevent any possible risk of relapse.⁷⁷ This use of medications is indicated in this stage. Disulfiram is a drug that inhibits aldehyde dehydrogenase enzymes which is a fundamental enzyme in alcohol metabolism.⁷² The subsequent inhibition of this enzyme causes an abrupt elevation in acetaldehyde concentration which present with symptoms such as nausea, vomiting, diarrhoea, increased heart and pulse rate.⁸⁰ These symptoms are often very unpleasant to the patients and then to discourage further consumption.⁷² Other medication used are calcium carbimide which acts similarly to disulfiram, naltrexone and acamprosate.⁷² Although, the use of drugs is still explored in preventing relapses, physicians often prepare motivational interviewing or brief interventions have they have proven to be the very effective and fundamental in treating alcohol use disorder.^{59,77}

CONCLUSION

There is an intricate relationship between harmful alcohol use and NCDs. The development of NCDs including cancer, diabetes, cardiovascular diseases, and digestive diseases are often precipitated by the harmful use of alcohol, among other factors. It is evident that heavy drinking has a generally deleterious impact on the outcome of the diseases and no amount of alcohol is safe for consumption. Despite the evidence, it is worth noting that gaps in knowledge persist and there is a need for further research to unravel the specific pathways through which alcohol exerts its baneful effects to come up with effective interventions.

The fast-growing burden of non-communicable diseases (NCDs) attributable to harmful alcohol use calls for effective public health initiatives. The focus of the stakeholders in the reduction of the alcohol-attributable burden of NCDs should be on initiatives like education and awareness campaigns that will enlighten the public about the dangers of harmful alcohol use and the benefits of a healthy lifestyle, policies that regulate and protect the public from harmful alcohol use. Additionally, it is important to strengthen the healthcare systems so that our healthcare facilities are better equipped to prevent, diagnose and treat NCDs and also provide comprehensive rehabilitation services when required.

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