

Healthy Steps for Alcohol Consumption

In most cultures, alcoholic beverages have been consumed since prerecorded history for religious, medicinal, or recreational purposes. Beer was used by the ancient Babylonians and wine by the Hebrews in religious ceremonies. The community drank together to achieve a sense of belonging and good fellowship. Medicinally, alcohol has been used to relieve pain and to increase the appetite, and in many cultures it is still considered an essential ingredient for good health and a well-balanced meal. However, most cultures employing alcohol had rigid guidelines as to what constituted responsible drinking. Drunkenness was frowned upon and anyone displaying outward signs of intoxication was often punished, in some cases even put to death. These cultures, along with most present societies with guidelines for responsible drinking and a cultural opposition to drunkenness, have encountered few problems associated with alcohol abuse. On the other hand, societies which ignore or encourage drunkenness are plagued with behavior problems resulting from drinking.

Research has revealed low incidence of alcoholism or alcohol abuse among cultural groups who use alcohol as part of their daily lives. As a rule these groups have developed attitudes and habits to foster responsible drinking within their culture. Some of these attitudes follow:

1. Children are exposed to alcohol early in life, within an established family or religious context. Whatever the beverage, it is served diluted and in small quantities, with consequent low blood-alcohol levels.
2. The beverages used are commonly those containing large amounts of non-alcoholic components (wines or beers), which help to retain low blood-alcohol levels.
3. The beverage is considered mainly as a food and is usually consumed with meals.
4. Parents present a constant example of moderate drinking.

5. No moral importance is attached to drinking. It is considered neither a virtue nor a sin.
6. Drinking is not viewed as proof of adulthood or virility.
7. Abstinence is socially acceptable. It is no more rude or ungracious to decline a drink than to decline a piece of cake.
8. Excessive drinking or intoxication is not socially acceptable and is not considered stylish, comic, or tolerable.
9. Alcohol is not a prime focus for any activity.
10. Finally, and perhaps most importantly, there is wide and usually complete agreement among members of the group on the ground rules of drinking.

Many of the cultures adopting these attitudes have developed and manufactured a particular alcoholic beverage to be used for recreational or religious purposes. The Germans became known for their beers, southern Europeans for wine, Russians for vodka. Each of these beverages has contributed greatly to the economy of the culture, and in many cases even influenced its politics.

In America, alcohol was enjoyed by puritan settlers. One of the first industries to be established in the New World was a brewery. As Americans began to move west, beer became too bulky to carry and settlers switched to corn liquor and other distilled beverages used both for medicinal and recreational purposes. However, as immigrants of various cultural backgrounds began to arrive in this country, they brought a wide variety of drinking habits and attitudes with them. Over time, these conflicting attitudes caused disagreement about what constituted responsible drinking. This lack of consensus led to confusion about drinking laws, rights, and responsibilities. This in turn produced the social ills associated with problem drinking.

Throughout the 10,000 or so years that humans have been drinking fermented beverages, they've also been arguing about their merits and demerits. The debate still simmers today, with a lively back-and-forth over whether alcohol is good for you or bad for you.

It's safe to say that alcohol is both a tonic and a poison. The difference lies mostly in the dose. Moderate drinking seems to be good for the heart and circulatory system, and probably protects against type 2 diabetes and gallstones. Heavy drinking is a major cause of preventable death in most countries. In the U.S., alcohol is implicated in about half of fatal traffic accidents. Heavy drinking can damage the liver and heart, harm an unborn child, increase the chances of developing breast and some other cancers, contribute to depression and violence, and interfere with relationships.

Alcohol's two-faced nature shouldn't come as a surprise. The active ingredient in alcoholic beverages, a simple molecule called ethanol, affects the body in many different ways. It directly influences the stomach, brain, heart, gallbladder, and liver. It affects levels of lipids (cholesterol and triglycerides) and insulin in the blood, as well as inflammation and coagulation. It also alters mood, concentration, and coordination.

What's "Moderate"? What's "A Drink"?

Loose use of terms has fueled some of the ongoing debate about alcohol's impact on health. In some studies, the term "moderate drinking" refers to less than one drink per day, while in others it means three or four drinks per day. Exactly what constitutes "a drink" is also fairly fluid. In fact, even among alcohol researchers, there's no universally accepted standard drink definition. In the U.S., one drink is usually considered to be 12 ounces of beer, 5 ounces of wine, or 1½ ounces of spirits (hard liquor such as gin or whiskey). Each delivers about 12 to 14 grams of alcohol.

The definition of moderate drinking is something of a balancing act. Moderate drinking sits at the point at which the health benefits of alcohol clearly outweigh the risks. The latest consensus places this point at no more than one to two drinks per day for men, and no more than one drink per day for women. This is the definition used by the U.S. Department of Agriculture and the Dietary Guidelines for Americans, and is widely used in the U.S.

Possible Health Benefits of Alcohol

Cardiovascular Disease

More than 100 prospective studies show an inverse association between moderate drinking and risk of heart attack, ischemic (clot-caused) stroke, peripheral vascular disease, sudden cardiac death, and death from all cardiovascular causes. The effect is fairly consistent, corresponding to a 20-45% reduction in risk.

The connection between moderate drinking and lower risk of cardiovascular disease has been observed in men and women. It applies to people who do not apparently have heart disease. It also applies to those at high risk for having a heart attack or stroke or dying of cardiovascular disease - people with type 2 diabetes and those with angina (chest pain), a prior heart attack, or other forms of cardiovascular disease.

The idea that moderate drinking protects against cardiovascular disease is biologically and scientifically plausible. Moderate amounts of alcohol raise levels of high-density lipoprotein (HDL, or "good" cholesterol), and higher HDL levels are associated with greater protection against heart disease. Moderate alcohol consumption has also been linked with beneficial changes in a variety of factors that influence blood clotting, such as tissue type plasminogen activator, fibrinogen, clotting factor VII, and von Willebrand factor. Such changes would tend to prevent the formation of small blood clots that can block arteries in the heart, neck, and brain, the ultimate cause of many heart attacks and the most common kind of stroke.

Does alcohol cause these benefits?

The most definitive way to investigate the effect of alcohol on cardiovascular disease is with a large trial in which some volunteers are randomly assigned to have one or more alcoholic drinks a day and others have drinks that look, taste, and smell like alcohol but are actually alcohol-free. Such a trial will probably never be done. Nevertheless, the connection between moderate drinking and cardiovascular disease almost certainly represents a cause-and-effect relationship.

People who drink in moderation are different from non-drinkers or heavy drinkers in ways that could influence health and disease. Part of a national 1985 health interview survey showed that moderate drinkers were more likely than non-drinkers or heavy drinkers to be at a healthy weight, to get 7-8 hours of sleep a night, and to exercise regularly. Researchers have statistically accounted for such confounders, and they do not come close to accounting for the relationship between alcohol and heart disease. This, plus the clearly beneficial effects of alcohol on cardiovascular risk factors, makes a compelling case that alcohol itself, when used in moderation, reduces the risk of cardiovascular disease.

Beyond the Heart

The benefits of moderate drinking aren't limited to the heart. In two large studies, gallstones and type 2 diabetes were less likely to occur in moderate drinkers than in nondrinkers.

The social and psychological benefits of alcohol can't be ignored. A drink before a meal can improve digestion or offer a soothing respite at the end of a stressful day; the occasional drink with friends can be a social tonic. These physical and psychic effects may contribute to health and wellbeing.

Alcohol Metabolism

Metabolism is the body's process of converting ingested substances to other compounds. Metabolism results in some substances becoming more, and some less, toxic than those originally ingested. Metabolism involves a number of processes, one of which is referred to as oxidation. Through oxidation, alcohol is detoxified and removed from the blood, preventing the alcohol from accumulating and destroying cells and organs. A minute amount of alcohol escapes metabolism and is excreted unchanged in the breath and in urine. Until all the alcohol consumed has been metabolized, it is distributed throughout the body, affecting the brain and other tissues.

The Metabolic Process

When alcohol is consumed, it passes from the stomach and intestines into the blood, a process referred to as absorption. Alcohol is then metabolized by enzymes, which are body chemicals that break down other chemicals. In the liver, an enzyme called alcohol dehydrogenase (ADH) mediates the conversion of alcohol

to acetaldehyde. Acetaldehyde is rapidly converted to acetate by other enzymes and is eventually metabolized to carbon dioxide and water. Alcohol also is metabolized in the liver by the enzyme cytochrome P450IIE1 (CYP2E1), which may be increased after chronic drinking . Most of the alcohol consumed is metabolized in the liver, but the small quantity that remains unmetabolized permits alcohol concentration to be measured in breath and urine.

The liver can metabolize only a certain amount of alcohol per hour, regardless of the amount that has been consumed. The rate of alcohol metabolism depends, in part, on the amount of metabolizing enzymes in the liver, which varies among individuals and appears to have genetic determinants . In general, after the consumption of one standard drink, the amount of alcohol in the drinker's blood (blood alcohol concentration, or BAC) peaks within 30 to 45 minutes. (A standard drink is defined as 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of 80-proof distilled spirits, all of which contain the same amount of alcohol.) Alcohol is metabolized more slowly than it is absorbed. Since the metabolism of alcohol is slow, consumption needs to be controlled to prevent accumulation in the body and intoxication.

Factors Influencing Alcohol Absorption and Metabolism

Food. A number of factors influence the absorption process, including the presence of food and the type of food in the gastrointestinal tract when alcohol is consumed . The rate at which alcohol is absorbed depends on how quickly the stomach empties its contents into the intestine. The higher the dietary fat content, the more time this emptying will require and the longer the process of absorption will take. One study found that subjects who drank alcohol after a meal that included fat, protein, and carbohydrates absorbed the alcohol about three times more slowly than when they consumed alcohol on an empty stomach .

Gender. Women absorb and metabolize alcohol differently from men. They have higher BAC's after consuming the same amount of alcohol as men and are more susceptible to alcoholic liver disease, heart muscle damage , and brain damage. The difference in BAC's between women and men has been attributed to women's smaller amount of body water, likened to dropping the same amount of alcohol into a smaller pail of water . An additional factor contributing to the difference in BAC's may be that women have lower activity of the alcohol metabolizing enzyme ADH in the stomach, causing a larger proportion of the

ingested alcohol to reach the blood. The combination of these factors may render women more vulnerable than men to alcohol-induced liver and heart damage.

Medications. Chronic heavy drinking appears to activate the enzyme CYP2E1, which may be responsible for transforming the over-the-counter pain reliever acetaminophen (Tylenol™) and many others) into chemicals that can cause liver damage, even when acetaminophen is taken in standard therapeutic doses . A review of studies of liver damage resulting from acetaminophen-alcohol interaction reported that in alcoholics, these effects may occur with as little as 2.6 grams of acetaminophen (four to five "extra-strength" pills) taken over the course of the day in persons consuming varying amounts of alcohol . The damage caused by alcohol-acetaminophen interaction is more likely to occur when acetaminophen is taken after, rather than before, the alcohol has been metabolized. Alcohol consumption affects the metabolism of a wide variety of other medications, increasing the activity of some and diminishing the activity, thereby decreasing the effectiveness, of others .

The Dark Side of Alcohol

If all drinkers limited themselves to a single drink a day, we probably wouldn't need as many cardiologists, liver specialists, mental health professionals, and substance abuse counselors. But not everyone who likes to drink alcohol stops at just one. While most people drink in moderation, some don't. Problem drinking affects not just the drinkers themselves, but may touch their families, friends, and communities. According to the National Institute on Alcohol Abuse and Alcoholism:

- 14 million Americans meet standard criteria for alcohol abuse or alcoholism
- Alcohol plays a role in 1 in 4 cases of violent crime
- More than 16,000 people die each year in automobile accidents in which alcohol was involved
- Alcohol abuse costs more than \$180 billion dollars a year

On the personal level, heavy drinking can take a toll on the body. It can cause inflammation of the liver (alcoholic hepatitis) and lead to scarring of the liver (cirrhosis), a potentially fatal disease. Heavy drinking can increase blood pressure and damage heart muscle (cardiomyopathy). It has also been linked with several cancers, particularly those of the mouth, throat, esophagus, and colon.

Alcohol also increases the risk of developing breast cancer.

Large studies have indicated that two or more drinks a day increased the chances of developing breast cancer by 20%-25%. This doesn't mean that 20% to 25% of women who have two drinks a day will get breast cancer. Instead, it is the difference between about 12 of every 100 women developing breast cancer during their lifetimes - the current average risk in the US - and 14 to 15 of every 100 women developing the disease. This modest increase would translate to significantly more women with breast cancer each year. Adequate daily intake of folic acid, at least 600 milligrams a day, can mitigate this increased risk.

Even moderate drinking carries some risks. Alcohol can disrupt sleep. Its ability to cloud judgment is legendary. Alcohol interacts in potentially dangerous ways with a variety of medications, including acetaminophen, antidepressants, anticonvulsants, painkillers, and sedatives. It is also addictive, especially for people with a family history of alcoholism.

Genes Play a Role

Twin, family, and adoption studies have firmly established that genetics plays an important role in determining an individual's preferences for alcohol and his or her likelihood for developing alcoholism. Alcoholism doesn't follow the simple rules of inheritance set out by Gregor Mendel. Instead, it is influenced by several genes that interact with each other and with environmental factors.

There is also some evidence that genes influence how alcohol affects the cardiovascular system. Alcohol dehydrogenase type 3 (ADH3), comes in two "flavors." One quickly breaks down alcohol, the other does it more slowly. Moderate drinkers who have two copies of the gene for the slow-acting enzyme are at much lower risk for cardiovascular disease than moderate drinkers who have two genes for the fast-acting enzyme. Those with one gene for the slow-acting enzyme and one for the faster enzyme fell in between. It's possible that the fast-acting enzyme breaks down alcohol before it can have a beneficial effect on HDL and clotting factors.

Interestingly, these differences in the ADH3 gene do not influence the risk of heart disease among people who don't drink alcohol. This adds strong indirect evidence that alcohol itself reduces heart disease risk.

Shifting Benefits and Risks

The benefits and risks of moderate drinking change over a lifetime. In general, risks exceed benefits until middle age, when cardiovascular disease begins to account for increasingly large share of the burden of disease and death.

- For a pregnant woman and her unborn child, a recovering alcoholic, a person with liver disease, and people taking one or more medications that interact with alcohol, moderate drinking offers little benefit and potential risks.
- For a 30-year-old man, the increased risk of alcohol-related accidents outweighs the possible heart-related benefits of moderate alcohol consumption.
- For a 60-year-old man, a drink a day may offer protection against heart disease that is likely to outweigh potential harm (assuming he isn't prone to alcoholism).
- For a 60-year-old woman, the benefit/risk calculations are trickier. More than ten times as many women die each year from heart disease than breast cancer - more than 500,000 women a year from cardiovascular disease compared with 41,000 a year from breast cancer.

However, studies show that women are far more afraid of developing breast cancer than heart disease, something that must be factored into the equation.

Balancing Act

Given the complexity of alcohol's effects on the body and the complexity of the people who drink it, blanket recommendations about alcohol should be out of the question. Because each of us has unique personal and family histories, alcohol offers each person a different spectrum of benefits and risks. Whether or not to drink alcohol, especially for "medicinal purposes," requires careful balancing of these benefits and risks. Your health-care provider should be able to help you do this.

Your overall health and risks for alcohol-associated conditions should factor into the equation. If you are thin, physically active, don't smoke, eat a healthy diet, and have no family history of heart disease, drinking alcohol won't add much to decreasing your risk of CVD.

If you don't drink, there's no need to start. You can get similar benefits with exercise (beginning to exercise if you don't already or boosting the intensity and duration of your activity) or healthier eating. If you are a man with no history of alcoholism who is at moderate to high risk for heart disease, a daily alcoholic drink could reduce that risk. Moderate drinking might be especially beneficial if you have low HDL that just won't budge upward with diet and exercise. If you are a woman with no history of alcoholism who is at moderate to high risk for heart disease, the possible benefits of a daily drink must be balanced against the small increase in risk of breast cancer.

If you already drink alcohol or plan to begin, keep it moderate - no more than two drinks a day for men or one drink a day for women. And make sure you get plenty of folic acid, at least 600 micrograms a day.

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