

The Effects of Moderate Beer Consumption.

A digest of the current
scientific literature

4th

Fourth Edition
2008



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Introduction

This booklet summarises the current state of knowledge on the beneficial effects associated with moderate consumption of alcoholic drinks, in particular beer. It reflects the results of research published by the scientific community up until 2008. Although some diverse opinions exist, the content of the booklet reflects the majority of scientific opinions which have been gathered at this time on the subject. The peer reviewed publications from which the information has been drawn are listed at the end.

The previous editions of this booklet were inspired by one-day seminars on the health benefits of moderate alcohol consumption and the healthful properties of beer held in November 1999, October 2001 and October 2003.

This, the fourth edition, follows a further symposium held in May 2006 during which experts from across Europe examined the latest scientific evidence on this subject. The booklet also includes references to research and findings from as recently as 2007 and 2008. The symposium was chaired by Professor Jonathan Powell, MRC Centre for Human Nutrition

Research, Cambridge, UK. Other speakers included: Dr. Jean-Michel Lecerf, France; Dr. Norbert Frank, Germany; Professor Dr. Med. Arne Astrup, Denmark; Mrs Jane Staniforth, UK; Dr. Henk Hendriks, The Netherlands; Dr Ramón Estruch, Spain; Dr. Ascensión Marcos, Spain; and Professor Manfred Walzl, Austria. A keynote speech was also given by Mrs. Maria Rauch-Kallat, then Austrian Federal Minister for Health and Women. Their presentations, and their emphasis on the importance of lifestyle, are the main reasons for The Brewers of Europe being inspired to produce a new edition.

This edition has been compiled by The Brewers of Europe to explain in non-scientific terms the evidence that beer, a wholesome beverage and a staple part of our diets for thousands of years, is not only good to drink but may also, when consumed moderately, fit perfectly into (and even benefit) an adult's healthy diet and lifestyle. The hundreds of different types of beer that are brewed across Europe share the established beneficial effect associated with alcohol content and the potential benefits derived from the natural raw materials from which beer is brewed.

At the first Beer and Health Symposium the Chairman concluded that beer played a part, along with wine and spirits, in reducing the risk of heart disease and there was also preliminary evidence of benefits specific to the consumption of beer, which may be different from those of other drinks, which warranted more detailed investigation. Since then research has progressed and some new results and ideas about the health benefits of beer consumption in particular have now been published.

This edition provides an overview of the published research on the proven and potential benefits of moderate beer consumption. All sections have been reviewed and updated, in particular those concerning the reductions in risk of heart disease and a growing list of other conditions. New areas covered include: the significance for older drinkers; the importance of lifestyle; drinking patterns and diet; and an explanation of beer and the Glycaemic Index and Glycaemic Load.

The information is not intended to encourage people who do not drink at all, for whatever reason, to start to consume beer on health grounds. The intention though is to inform and reassure those who enjoy drinking beer that, when consumed moderately, it is not a health risk and there may be a net benefit.

It is not intended as nutritional advice for individuals.

It must be stressed that the health risks associated with inappropriate alcohol consumption are well established. These have been well documented elsewhere and are not covered in this booklet.

Janet Witheridge

The Brewers of Europe
Editors.



Key messages

Beer is a **refreshing enjoyable beverage** with relatively **low alcoholic** strength which brings pleasure and social interaction to many people.

It is reassuring for those who do consume beer regularly to know that it can also be a part of an adult's **healthy lifestyle**.

Beer contains essential **vitamins, minerals** and **antioxidants** from the raw materials which can all contribute to a **healthy diet**.

Beer is the only significant dietary source of hops so any beneficial effects they have are unique to beer.

Research shows that drinking beer in moderation has **beneficial effects on many aspects of health** including **reducing the risk of cardiovascular disease** (the leading cause of death and disability among European adults), **diabetes, osteoporosis**, etc.

Moderate beer consumption also plays a vital part in most consumers' quality of life.

The **health benefits described are the result of light to moderate, or responsible, consumption of beer** and the effects on health are quite the opposite when consumption levels rise.

Adverse effects are mainly associated with immoderate drinking but for some individuals, and in some situations even moderate consumption may be too much (misuse).

The research described in this booklet sums up the current state of **knowledge on the positive effects of moderate beer consumption**. More studies are underway to examine whether some of the potentially beneficial components of foods and beverages, such as beer, can be used by the body for the prevention of disease.

Moderation

Moderation and responsibility
are the key words

and responsibility
are the key words.

“To drink moderately is to drink within the limits set by your health, the society in which you live and your obligations towards your family and friends.”



The Effects of
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This booklet concentrates on the effects of responsible or moderate consumption of beer. It must be stressed that the beneficial effects reported apply **only** to moderate consumption by healthy adults. Heavy drinking, whether in binges or on a regular basis, can be harmful and is associated with many chronic health problems. Likewise underage drinking, even in moderation, may have particularly harmful effects.

Dr. Skovenborg, speaking at the second beer & health symposium in 2001, defined moderation in the following terms. “To drink moderately is to drink within the limits set by your health, the society in which you live and your obligations towards your family and friends: 1 to 3 drinks a day for most men”.

“Women are more sensitive to alcohol so they are advised to drink less than men: 1 to 2 drinks a day.”

The amount of alcohol in “a drink” of beer can vary considerably depending on the size of the glass and the strength and will differ across Europe according to historic traditions and customs. “A drink” here, and when referred to in other parts of this booklet, is defined as a 0.25 litre glass (approximately half a pint of beer in the UK or Ireland) with a strength of approximately 4.5 per cent alcohol by volume (% abv). This would have an alcohol content of about 10g.

It should also be noted that “saving up” the daily intake guidelines, for a binge at the weekend for example, is not healthy at all.

While these are useful guidelines there are also some situations where even moderate drinking means misuse. Examples of situations where it may not be appropriate to drink at all include: during pregnancy or when trying to conceive; before driving or operating machinery; or when taking certain medication or suffering from certain conditions.

The medical profession is understandably reluctant to advocate moderate drinking to abstainers in order to gain the associated health benefits, because of the fear that this might lead to over-indulgence or be interpreted as an excuse for some people to drink too much. There are also problems in transferring results from population studies to medical advice. What is true for the population may not be true for a particular individual who may have a family history or lifestyle which counters the general trend. **For personal, individually-tailored advice, the best course of action is to consult a doctor.**

The brewing sector is mindful of the dangers of alcohol misuse. To this end it has supported numerous educational programmes and campaigns to avoid misuse such as those to prevent drinking and driving and discourage drinking by people under the legal drinking age. A recent publication by the Worldwide Brewing Alliance details over 300 initiatives funded by brewers in Europe. It is available on the website of The Brewers of Europe www.brewersofeurope.org.

Moderate consumption of beer can be good for your heart.

Moderate consumption of beer can be good for your heart.

“Compared with teetotallers and heavy drinkers moderate drinkers have a substantially reduced risk of cardiovascular disease, the leading cause of death among Europeans.”



FIGURE 1 :
ALCOHOL AND MORTALITY IN WOMEN *

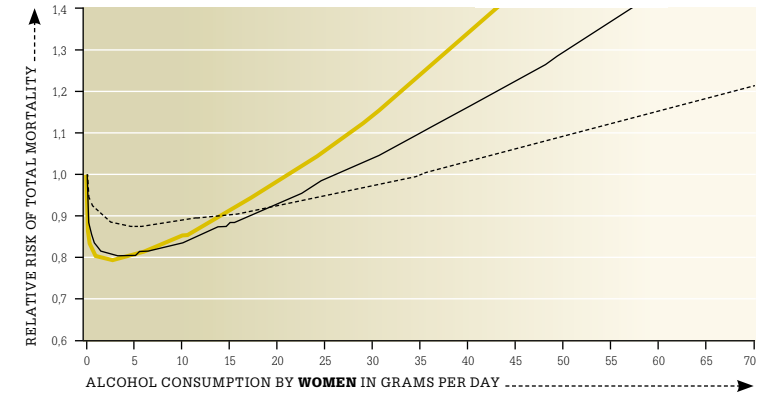
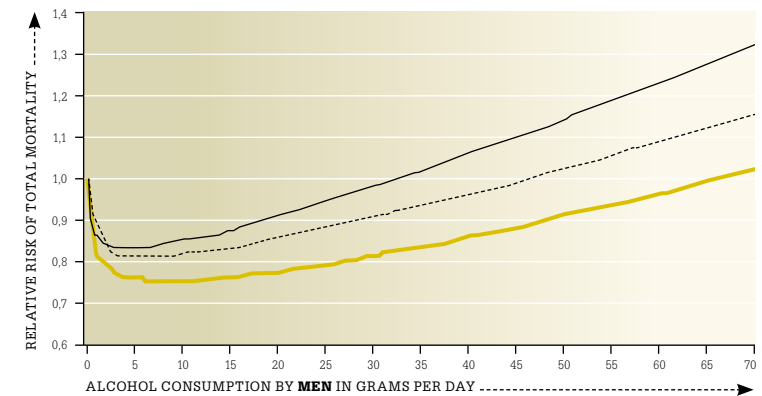


FIGURE 2 :
ALCOHOL AND MORTALITY IN MEN *



* Source:
“Alcohol Dosing and Total Mortality in Men and Women: An Updated Meta-analysis of 34 Prospective Studies”³.

Many epidemiological studies report on the overall balance of risks and benefits of alcohol consumption. They show a U or J shaped relationship with a decreased risk of premature death (mortality) in moderate drinkers compared to heavy drinkers and non drinkers of all ages¹. It is also clear that men and women differ – the beneficial effect being seen at lower consumption levels in women than in men².

A recent statistical analysis (meta-analysis) of 34 studies from all over the world found that consumption of alcohol (up to 4 drinks (40g) per day in men and 2 (20g) in women) leads to a reduction of premature mortality of up to 18% compared to abstainers and heavy drinkers³. Figures 1 and 2 illustrate the J shaped relationship between alcohol consumption and the risk of deaths from all causes for men and women in

Europe, the United States, and other countries. At moderate levels of consumption, in all places and in both men and women, the risk of early death is reduced relative to the risk in abstainers and heavy drinkers. The conclusion from this meta-analysis was that “people who already regularly consume low to moderate amounts of alcohol should be encouraged to continue”.

Coronary Heart Disease (heart attack)

*Cardiovascular disease (CVD) that includes cerebrovascular stroke and coronary heart disease (CHD) (heart attack) is the leading cause of death and disability among adults. It kills 4 million Europeans each year and is responsible for nearly a half of all deaths occurring in the population. About a half of all deaths from CVD are from CHD and nearly one third - from stroke. Preventive measures include modification of lifestyle factors such as adopting a healthy diet and taking exercise. Moderate consumption of beers, wines and spirits can be part of that healthy lifestyle.*⁴

There is strong evidence that people who are moderate consumers of beers, wines or spirits have a substantially (30–40%)¹ reduced risk of coronary heart disease when compared to teetotalers and heavy drinkers. Similar results have been shown by many studies throughout the world. The WHO Global Status Report on Alcohol (2004) describes this as the “most important health benefit of alcohol”⁵.

This reduction in risk (associated with approximately 3 drinks a day) is on a par with preventive measures such as the use of aspirin, weight control, and exercise⁶.

Additionally a comparison of moderate alcohol consumption and exercise showed that both were important in the reduction of risk⁷.

The benefit applies to a broad range of individuals including those considered to be of higher risk of cardiovascular disease, for example with high blood pressure⁸, diabetes⁹ or metabolic syndrome¹⁰ and those with a lower risk (have a healthy lifestyle)¹¹.

There are several well-established explanations for this observed reduction in risk of coronary heart disease. The mechanisms below have been shown to account for almost all of the association in men and approximately 75% in women¹².



Blood Cholesterol levels

The mechanism which has been shown to be responsible for the majority of the effect is that the amount of ‘good cholesterol’ (HDL cholesterol) in the blood increases when alcohol is consumed. Higher levels of ‘good cholesterol’ have been shown to be associated with lower risk of coronary heart disease. Research has shown that one glass of beer a day can significantly increase HDL cholesterol levels¹³.

Clotting

Scientists have also shown that alcohol has a beneficial blood thinning effect and reduces the tendency of blood to form clots¹⁴, with moderate beer consumption being associated with favourable changes on the blood lipid profile¹⁵.

Inflammation

Atherosclerosis, which leads to heart attacks, is an inflammatory disease and local inflammation in the vessel wall contributes to the increased risk of constriction and blockage. There is growing evidence that alcohol also has an anti-inflammatory effect and that this may contribute to the reduction in cardiovascular risk^{16, 17}.

Insulin resistance

Insulin is the hormone which controls blood sugar. One of the first steps in developing diabetes mellitus is when the body becomes resistant to insulin. Moderate alcohol consumption may help in the prevention of insulin resistance and may reduce the risk of diabetes (see page 17). Insulin resistance is also linked to cardiovascular disease, so this may be an additional mechanism by which alcohol consumption reduces risk of cardiovascular disease¹⁸.

Beer is just as good at protecting the heart as wine

It is the alcohol that is having the major protective effect and no individual type of drink can claim the monopoly.

There have been many studies that have attempted to compare the effect of beer, wine and spirits to see whether they have the same risk reduction properties against cardiovascular disease but when the evidence is examined it is clear that the major protective agent is alcohol itself¹⁹. The protective effects of moderate alcohol consumption are seen in many different countries with different cultures and drinking habits and this, combined with the established mechanisms described above, confirms that it is the alcohol that is having the major protective effect and no individual type of drink can claim the monopoly²⁰ in relation to cardiovascular disease.

Population studies usually show that the beverage most widely consumed in the population being studied shows the greatest benefit²¹. For example, in Germany and the Czech Republic, where beer is the favourite drink, research has confirmed the beneficial effect of beer^{22, 23, 24}.

Other Vascular Diseases

There is also evidence that regular, light to moderate drinking may reduce the risk of other vascular diseases.

Ischemic stroke, the most common form of stroke, has been the subject of a statistical review showing consistently reduced risk²⁵ and since then studies have shown the risk reduced by 50% at consumption levels of up to two drinks per day²⁶. Moderate alcohol consumption has also been shown to be associated with a slight decrease in cardiovascular and total mortality in people who have already had a heart attack²⁷ or who have had heart surgery²⁸ and can reduce the risk of lower extremity arterial disease in older adults²⁹.

Complicating factors

It is vital that lifestyle factors are taken into account in any research into the effects of alcohol on health.

There are many other factors, apart from what people drink, that influence their health. These factors include: lifestyle; diet; health; behaviour; social status; and pre-existing disease, all of which, to some extent, are determined by familial, social, cultural and even geographical environments. Some researchers have suggested that these factors may be entirely responsible for the apparent protective effect of moderate consumption³⁰. Research has shown that moderate drinkers generally have healthier lifestyles than those who abstain or drink heavily³¹ but a recent study examined exclusively subjects with a healthy

lifestyle and also observed reduced risk of heart disease with moderate alcohol consumption¹¹.

Several publications have suggested that wine confers more health benefits than beer³² but it now seems that dietary habits, other lifestyle differences connected with wine preference and even personality may explain this apparent difference^{33,34,35}. For example, wine drinkers are more likely to have a better diet^{36,31,34}. In general, they may also take more exercise, smoke less, have a better education, and a higher income and social status, all of which are independently associated with better health³⁷. It is therefore vital that these factors are taken into account in any research into the effects of alcohol on health.

Lifestyle

The growth in non-communicable diseases is a major health burden in industrialised countries and research has shown that many of these illnesses have their roots in unhealthy lifestyles³⁸. It is clear that good health is affected by everything we do, including eating a balanced diet, exercising regularly, drinking moderately etc. Generally lifestyle habits are characteristic of an individual's way of life and reflect a lifelong pattern. For many people moderate alcohol consumption is an integral part of this way of life³⁹, an important part of their social life and provides a significant measure of enjoyment. Pleasure and happiness are essential parts of a healthy lifestyle!

Drinking Patterns

The manner or pattern in which people are drinking is also the subject of research. It is undisputed that drinking too much is unhealthy but it is not just 'how much' - 'how often' is important too^{40,41}. These types of data are difficult to interpret and there is no consensus on the best ways to collect the information or analyse its significance^{42,43}. Researchers have to dissect the effects of total



alcohol consumption away from the influence of drinking patterns in order to establish how each of these variables affect the risk of disease, as it is likely that they are independent risk factors⁴⁴.

Generally there is scientific agreement that a higher frequency of drinking is better for health, in particular lower risk of heart attack, than drinking a similar amount on only a few occasions per week⁴⁴. People who occasionally "binge" (in academic literature "binge drinking" is usually defined as 5 or more drinks consumed in one sitting) show an increased risk of coronary heart disease even when their consumption over a week is moderate^{45,46} and may not benefit from the reduced risk of type II diabetes seen in moderate consumers⁴⁷. Plausible explanations for this include an increased risk of high blood pressure

in binge drinkers. It has also been reported that in addition to increasing the risk of personal harm binge drinking carries a substantial (three times greater) increase in risk of developing cognitive decline or dementia later in life possibly by directly killing brain cells⁴⁸. It should be emphasised that reduction of consumption level could improve the chance of survival of heavy drinkers⁴⁹.

It is also thought that consuming beer, wine or spirits with a meal is better than drinking on an empty stomach as this has been shown to increase the risk of high blood pressure⁵⁰ although the researchers are not unanimous on this subject.

Diet

The type of diet eaten is another important part of lifestyle and certain diets, such as the "Mediterranean diet", are associated with longer life expectancy⁵¹. As well as higher consumption of fruits, vegetables and fish and lower consumption of saturated fat and meat this diet includes a modest intake of alcohol. An analysis of many studies showed that Mediterranean habits were associated with lower risk of disease when similar levels of alcohol consumption were compared². Combined with other aspects of a healthy lifestyle, including taking physical activity and not smoking, the Mediterranean diet has been shown to be associated with a more than 50% lower rate of premature mortality in older Europeans⁵².

A combination of four healthy behaviours, (not smoking, not physically inactive, moderate alcohol consumption (up to 14 drinks per week) and intake of at least five fruit and vegetable servings per day), has been recently shown to be equivalent to being 14 years younger in chronological age⁵³ and to prevent 3 out of 4 heart attacks⁵⁴.

Moderate beer

Moderate beer consumption can have a role in reducing risk in other conditions

consumption can have a role in reducing risk in other conditions.

“Evidence is also growing that regular moderate consumption of alcoholic drinks may be protective against many other conditions.”



Evidence is growing that a lifestyle which includes regular light or moderate consumption of alcoholic drinks may be protective against many other conditions, such as diabetes mellitus, osteoporosis and dementia. The reasons for these beneficial effects are not yet clearly understood and more research is needed to explain the mechanisms. As with cardiovascular disease a little seems to be protective whereas heavy consumption is harmful⁵⁵. Neither can the benefits usually be tied convincingly to one particular type of drink.

Diabetes Mellitus

Late onset diabetes (type II diabetes mellitus) is a growing health problem in the Western world affecting about 8% of the population (over 60 million people are estimated to have the condition). It is associated with many life-threatening complications including cardiovascular disease.

Several studies have shown that moderate alcohol consumption is associated with a reduced risk of type II diabetes compared to both abstaining and heavy drinking. The present evidence suggests a 30% reduced risk⁵⁶ and the reduction in risk is also seen in older women⁵⁷. The way in which moderate alcohol consumption reduces risk is not fully understood but several possibilities are being studied⁵⁸ for example it may change how the body produces insulin⁵⁹.

Obesity

Obesity is a significant health problem because it is associated with many other types of ill health including type II diabetes, cardiovascular disease, osteoarthritis and liver cirrhosis and is thought to reduce overall life expectancy on average by approximately 10 years. It is strongly influenced by lifestyle and many factors can account for a change in body weight such as calorie intake, fat intake and activity level, themselves often linked to socio-economic status.

The prevalence of obesity and overweight in the EU has trebled in the last 20 years and continues to rise. A conservative estimate is that it will reach 20.1% in 2020⁶⁰ and more than 31 million people across Europe will need treatment for diabetes and related complications. In the long term, this will result in a negative impact on life expectancy in the EU, and a reduced quality of life for many”.⁶¹

Moderate alcohol consumption (10 – 30g per day) represents about 10% of total energy intake in developed countries so it has been assumed until recently that this consumption, with beer receiving a disproportionate amount of the blame, has been contributing to the obesity epidemic. This has now been shown to be unjust where low to moderate consumption is concerned and indeed there may even be a beneficial effect i.e. reduced risk of obesity, at such levels⁶². It is important to note that any benefit disappears at consumption levels above three drinks per day and studies confirm that heavy alcohol consumption (whatever the drink) is associated with increased weight and abdominal obesity (a higher risk factor for cardiovascular disease)⁶³.

The way in which people consume alcohol influences weight and it is now clear that to understand the effect of alcohol consumption on weight it is the drinking pattern, rather than the average volume, which needs to be evaluated. Alcohol may contribute to excess body weight in certain individuals, those who drink infrequently or to excess, by serving as an energy source and facilitating food consumption but several studies have indicated that drinkers who consume small amounts of alcohol on a regular basis (daily) are shown to be slimmer than those whose consumption pattern is to only binge occasionally^{64, 65}. One of these studies shows that at a fixed level of alcohol consumption, the risk of obesity is almost 30% lower for those consuming the alcohol over 7 days per week compared to 2-4 days per week⁶⁶.

The reason for this continues to be a matter of debate. One possible reason is that alcohol consumption, including beer, with meals may stimulate energy expenditure by increasing temperature but that this is only efficient when consumption is small quantities at regular intervals^{67, 68}. It is, however, difficult to recognise and statistically account for all the lifestyle factors such as level of physical activity and it is probable that several factors are involved.



Metabolic Syndrome

The diagnosis of Metabolic Syndrome is given to people with a cluster of conditions including: high abdominal obesity; insulin resistance; high blood triglyceride; low blood HDL (good cholesterol); and high blood pressure. It is associated with an increased risk of developing type II diabetes mellitus, cardiovascular disease and cirrhosis. The number of people with this condition is increasing in the population and one in six Europeans is affected.

Although unhealthy lifestyles may contribute to the risk of Metabolic Syndrome researchers are looking at the part played by light alcohol consumption⁶⁹. There is growing evidence that light to moderate alcohol consumption is associated with a lower risk of the metabolic syndrome⁷⁰.

Weakening of bones

*Osteoporosis (weakening of bones) is common in elderly people, especially women after the menopause. Weak bones are at greater risk of fracture. Fractures due to osteoporosis affect one woman in three and one man in five over the age of 50 years. They are a major cause of suffering and death in the elderly population and cost an estimated €30 billion each year in Europe. Because of the demographic changes occurring in the population, the number of fractures and their cost will double over the next few decades unless effective preventive strategies are developed.*⁷¹

A growing body of evidence suggests that alcohol consumption is also associated with osteoporosis in a U shaped relationship i.e. that light to moderate consumption has a beneficial effect on bones⁷², which could reduce the risk of osteoporosis and fractures. One study estimated that moderate drinkers were 38% less likely to have osteoporosis than non drinkers⁷³, another showed a 20% lower risk of hip fracture⁷⁴. This protective effect can be explained in part by moderate alcohol consumption suppressing the gradual bone loss that increases with age (resorption), but this does not fully account for it. There is mounting evidence to support a biological role for silicon in bone health and it is suggested that the silicon component of beer (see page 26) may explain or contribute to some of these positive effects⁷⁵. Research is ongoing to confirm this.

Dementias

More than 3 million elderly people (65+) in the EU have dementia (cognitive decline associated with ageing) and as life expectancy increases, dementia is becoming more prevalent and of increasing concern.

There is now growing evidence that suggests a J or U shaped relationship between alcohol consumption and cognitive functioning such that light to moderate drinking in middle to late life is associated with better cognitive performance and lesser cognitive decline than either abstention or heavy drinking⁷⁶. Some studies show a considerable (about a quarter) reduction in risk^{77, 78}. There are several possible explanations for this beneficial effect which include: the prevention of narrowing of blood vessels in the brain⁷⁹; the psychological benefits of moderate alcohol consumption; or possibly the decreased risk of diabetes. More research is needed before this apparent effect can be fully understood.

Researchers do not yet agree on whether moderate alcohol consumption affects Alzheimer's disease, and both increased and decreased risks have been reported. Reduced risk of Alzheimer's disease has also been shown to be associated with the Mediterranean diet⁸⁰ so it is possible that other lifestyle factors are important in determining risk for this condition⁸¹.

There is also evidence that participation in social leisure activities, such as going to pubs and bars, visiting friends or involvement in clubs helps delay cognitive decline associated with ageing⁸².

Parkinson's disease

Parkinson's disease is a common neurodegenerative disease mainly affecting people over the age of 50.

Several studies have found that moderate alcohol consumption, including moderate beer drinking⁸³ and some additional lifestyle factors are associated with a lower risk of developing Parkinson's disease⁸⁴.

Gallstones

Development of stones in the gall-bladder is one of the most common and costly digestive diseases in Western populations. By the age of 60 almost 30% of men and women will have had gallstones.

Several studies have shown an association between moderate alcohol consumption and a decreased risk of developing gallstones⁸⁵. This has been reported with consumption of all drinks and the risk is lowest in those who consume small quantities at regular intervals. There are several plausible explanations for this finding which include the effect of alcohol on cholesterol levels and reduced bile concentration.

“Well-being” (Psychotherapeutic value)

“One of the main reasons why the moderate drinking of beer, wine and spirits is a common practice is that many people enjoy the relaxing, pleasant effect produced by one or two drinks” and “the psychotherapeutic value of this should be regarded as a potential health benefit⁸⁶”.

Positive psychological benefits associated with moderate intake are acknowledged by many experts but are more difficult to measure scientifically. A review of several studies confirmed earlier findings that alcohol in moderate amounts is effective in reducing stress and tension and increasing feelings of well being⁸⁷. The review found that, “to a greater degree than either abstainers or heavy drinkers, moderate drinkers have been found to experience a variety of psychological benefits”. Studies are now trying to assess subjective health, the way individuals perceive / report their own health, and alcohol consumption in terms of mental health and one showed that regular moderate daily drinking was associated with better mental health in women compared to the non-drinkers⁸⁸.

Many studies have reported increased sociability, friendliness and helpfulness immediately following moderate alcohol consumption and these findings have been enhanced by recent research which has also shown an alcohol induced increase in agreeableness and decrease in quarrelsome behaviours⁸⁹. However more research is needed to explain mechanisms to account for the improved functioning and the part, if any, played by the social setting.

Well-being (Physical health)

Subjective health has been shown to be a good predictor of total mortality⁹⁰ and there is increasing interest in understanding the relationship between this and alcohol consumption.

Several researchers report that people who drink moderately report above average “good health”,^{91,99,88} and believe they are more healthy⁹². This results in them feeling better about and having more positive attitudes to their health. This is an area which needs further investigation.



Ageing

Life expectancy is increasing and the number of older people is growing rapidly worldwide. More than 580 million people are older than 60 years and the number is projected to rise to 1.2 billion by 2025⁹³.

As a result, conditions such as diabetes, dementia and osteoporosis are becoming more prevalent in society, causing an increasing economic burden on health services and decreasing the quality of life. Consequently research is focusing on risk factors, including lifestyle and dietary factors, and strategies to prevent such conditions.

The last few years have also seen the publication of a number of papers examining the health and well being of elderly people. Older people have different biological reactions to alcohol, they are more susceptible to falls and are often taking medicine so they may question whether it is safe to continue to consume alcohol as they grow old.

The evidence suggests that the same U shaped curve is seen in older people and moderate drinkers survive longer and are in better health than abstainers or heavy drinkers⁹⁴. While the alcohol is clearly continuing to produce the main benefit, other factors, such as the social and pleasurable benefits of drinking and improved appetite and nutrition that accompanies modest alcohol intake, may also play a part. This seems to indicate that a healthy lifestyle does not mean giving up drinking beer or other drinks, provided consumption is moderate⁹⁵.

Potential adverse effects of moderate alcohol consumption.

Potential adverse effects of moderate alcohol consumption

“For some individuals the risk of alcohol consumption, even in moderation, may outweigh any potential benefits.”



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The large body of scientific evidence associating moderate alcohol consumption with reduced mortality among middle-aged and older people in industrialised societies is due mainly to the reduced risk of death from coronary heart disease (heart attack).

Alcohol has though been shown to cause a number of cancers and, while these are mainly associated with heavy drinking, current evidence does not identify a generally “safe” threshold below which there is no risk⁹⁶. This means that for some individuals the risk of alcohol consumption, even in moderation, may outweigh any potential benefits. In particular, alcohol consumption has been associated with a slightly elevated risk of breast cancer⁹⁷ and appears to be a risk factor in the onset of gout⁹⁸.

Some authors note that on a population basis, total avoidance of alcohol is not recommended as this may increase cardiovascular disease⁹⁹. Indeed the European Cancer Code¹⁰⁰ recommends moderate alcohol consumption, though stating that factors such as age, physiological condition and dietary intake will modify an individual’s threshold. On an individual basis, general practitioners will be able to assess their patient’s risk more precisely in the light of their health and family history of conditions such as cancer, certain types of stroke and high blood pressure.

Other individual situations where even moderate alcohol consumption may be inadvisable include, among others, when driving, pregnant, taking medication or operating machinery.



Beer-specific contributions to a healthy diet.

“Beer contains essential vitamins and minerals and can contribute to a healthy balanced diet.”

Beer-specific contributions to a healthy diet

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Beer is made from wholesome raw materials, malted barley, cereals, hops, yeast and water. All of these contribute to a healthy, balanced diet. As with any natural food, thousands of components can be identified in beer including antioxidants, vitamins (particularly B vitamins), minerals such as silicon and fibre.

Beer is 93% water and is a thirst quenching long drink which is relatively low in alcohol.

While moderate consumption of beer can provide many essential vitamins and minerals¹⁰¹ it is important to remember that no single source can provide the full range of elements essential for life so beer must always be consumed in moderation as part of a balanced diet.

Potential benefits from the raw materials from which beer is brewed

Vitamins and antioxidants could also be protective.

Scientists who have studied the reduced risk of coronary heart disease in beer drinkers report that the reduction in risk is greater than would be expected from the alcohol alone and speculate that other factors in beer such as vitamins and antioxidants could also be protective¹⁰².

The other components in beer continue to be studied and beneficial effects, such as anti-inflammatory activity have been recorded in the laboratory¹⁰³. Research which has looked at the properties of alcohol-free beer indicates that the potential beneficial effects from the natural ingredients are likely to apply equally to this type of beer¹⁰⁴. One small study compared the effects

of de-alcoholised and regular beer and showed that the beer without alcohol could have a significant positive effect on the blood (blood thinning) immediately after consumption¹⁰⁵.

Beer is also a source of soluble fibre which is derived from the cell walls of barley. Two glasses of beer contains an average of 10% of the recommended daily intake of soluble fibre and some beers can provide up to 30%¹⁰⁶. Other than keeping you regular, fibre has a further benefit by slowing down the digestion and absorption of food and reducing cholesterol levels which may help to reduce the risk of heart disease¹⁰⁷ and metabolic syndrome¹⁰⁸.

Some research has shown that people who drink beer moderately have a degree of protection from the bacterium *Helicobacter pylori*¹⁰⁹ which is known to cause the majority of stomach ulcers and may be a risk factor for stomach cancer. Beer (and wine) consumption is thought to facilitate eradication of the organism possibly due to an antibacterial effect.

Antioxidants

Beer contains natural antioxidants which may have a positive health effect.

Natural antioxidants are found in fruits, vegetables and cereals. They are present in beer, where they come from both the malt (barley) and hops from which beer is brewed¹¹⁰. The total amount of antioxidants in beer will depend on the style of beer and therefore the raw materials and the brewing process used.

Per drink (of equivalent alcohol content), beer contains more than twice as many antioxidants as white wine, although only half the amount in red wine¹¹¹. However, many of the antioxidants in red wine are large molecules and may be less readily absorbed by the body than the smaller



molecules found in beer. Research has shown that the antioxidant content of blood is raised following beer consumption suggesting that the antioxidants in beer are readily absorbed¹¹² and perhaps more readily than that from solid foods¹⁰⁴. Researchers working on animals have suggested a direct effect of antioxidants in beer reducing the risk of cardiovascular disease¹¹³.

The health significance of antioxidants is that they are thought to reduce the risk of heart attacks by inhibiting blood clotting¹¹⁴. They may also play a role in the protection against cancer through their action against free radicals¹¹⁵. Thus the anti-oxidants in beer may have a positive health effect on the consumer.

Vitamins

Beer provides a rich source of dietary folate and other B vitamins.

Like bread, which is also made from cereal, beer is a good source of many vitamins which are essential for life. To make beer the barley is sprouted first (malted), which actually increases the nutritional value of the cereals used. Beer is particularly rich in most of the B type vitamins for example niacin, riboflavin (B2), pyridoxine (B6), folate (B9) and cobalamin (B12). Particularly important for those vegetarians who enjoy drinking beer is the fact that it is a natural source of B12. Bioavailability of these vitamins has been confirmed by research that has shown an increased absorption level of B vitamins when moderate beer consumption is introduced into the diet¹¹⁶.

As well as adding to a healthy diet, the vitamins and minerals in beer may confer additional health benefits. Recent research suggests that the B vitamins (B6, B9 and B12) may give beer drinkers additional protection against cardiovascular disease compared to drinkers of wine or spirits¹¹⁷. High homocysteine levels, like “bad cholesterol”

(LDL), are associated with a higher risk of heart attacks. Population studies in USA, UK, France, the Czech Republic and Denmark all confirm that moderate beer consumption, in contrast to wine and spirits, reduces homocysteine levels and suggest that this may be due to beer's high B vitamin content^{118, 119, 120, 121, 122}. Clinical research is underway to examine whether the folate (vitamin B9) in beer could be active in reducing homocysteine levels.

Minerals

Beer provides a rich source of dietary silicon.

Beer has a favourable balance of some essential minerals. It is relatively high in potassium and low in sodium¹⁰⁶. It is low in calcium and rich in magnesium which may help to protect against gall stones and kidney stone formation. This may be one reason why daily consumption of a glass of beer was reported to reduce the risk of kidney stones¹²³. The increased intake of water and increased formation and excretion of urine (diuresis) may also play a part here.

Moderate alcohol consumption is also associated with higher bone mineral density (see page 19) but few studies have looked specifically at the effect of different drinks. Beer is a rich source of dietary silicon¹²⁴ which is readily absorbed by the body¹²⁵ and has been shown to be the major contributor of silicon in men's diet¹²⁶. This silicon comes from two natural sources - water and especially barley¹²⁷.

There is mounting evidence to support the importance of silicon for healthy bones¹²⁸ and, in laboratory experiments, it has been shown to improve several aspects of human bone formation¹²⁹ and increase bone mineral density in animals when taken orally¹³⁰. It has also been shown to improve bone mineral density in women given dietary silicon supplements¹³¹.

Research is underway to investigate whether the dietary silicon provided by moderate beer consumption actually reduces the risks of developing osteoporosis. This may explain in part the protective effect described above.

Silicon in beer may also help reduce the risk of developing Alzheimer's disease¹³².

Hops

Potential health benefits totally unique to beer.

Hops have been used in herbal medicine for many years.

Small quantities of the “flowers” from hops are used to preserve and flavour beer. Beer is the only significant dietary source of hops so, although their effect on human health is not yet fully understood, any potential health benefits they have are unique to beer.

Every year the number of publications on the potential therapeutic effects of compounds derived from hops grows. Many studies have shown that the flavonoids in hops may have the potential to protect against some diseases. For example, they may help to reduce the risk of developing cancer^{133, 134}, have a positive effect on bone⁷², reduce the risk of diabetes¹³⁵, improve the levels of good cholesterol¹³⁶, or help fight obesity¹³⁷. Most of this research has been done in the laboratory and does not indicate whether moderate beer consumption provides sufficient concentrations of these compounds to affect the health of humans. Additional research is planned to investigate these potential effects and whether the flavonoids can be absorbed well in people^{138, 139}.

Drinking beer in moderation does not make you fat

There is a link between beer consumers and poor dietary choices.

Beer does not contain fat or cholesterol and is low in simple sugars. The calories in beer come largely from the alcohol content.

Beer is lower in calories than other drinks but tends to be drunk in larger quantities (see Table 1).

The term “beer belly” is associated with obesity in beer drinkers in several parts of Europe. The section on page 17 showed that this is unlikely to be the result of moderate beer consumption so it may be due to excessive consumption or often other behavioural characteristics of beer drinkers. For example, several studies have shown a link between beer consumers and poor dietary choices^{140, 31, 34} and it may be that often the “belly” results from consumption of food high in calories and rich in fats (See table on page 29).

One recent study set out specifically to test the notion that “beer drinkers are on average, more obese than either non drinkers or drinkers of wine or spirits” and concluded that it is unlikely that beer intake is associated with measures of obesity such as body mass index (BMI) or waist hip ratio (WHR)¹⁴¹. This study also showed that, in women, moderate beer consumption was in fact associated with a lower BMI.

Beer and the Glycaemic Index (GI) and Glycaemic Load (GL)

Beer can be part of a healthy “weight reduction” diet and the evidence argues against promoting complete abstinence in those who regularly consume beer in moderation.

The GI and the GL rank foods according to how much they raise blood sugar after consumption. Foods with a high GI or GL release glucose into the blood stream rapidly while low GI or GL foods break down more slowly gradually releasing glucose. Some nutritionists advocate low GI or GL food consumption to lose weight and stay healthy.



The GI compares foods on the basis of an equal amount of carbohydrate. GL is calculated from the GI and the available carbohydrate content of the food and provides a measurement which takes serving size into consideration so may be more relevant in many instances.

Beer has been shown to have a high GI but because the carbohydrate in a serving of beer is so low it has a low to medium GL¹⁴². Table 1 compares the GI and GL in beer, other drinks and some foods.

Based on this information and the fact that it has been shown that a serving of alcohol before a meal may help reduce the glycaemic load of the meal⁵⁸ the evidence argues against promoting complete abstinence in those who consume beer regularly with moderation⁶².

TABLE 1:

APPROXIMATE CALORIE CONTENT, GLYCAEMIC INDEX AND GLYCAEMIC LOAD IN BEER AND OTHER DRINKS AND IN FOODS OFTEN EATEN WITH BEER.

Beverages	Calories per 100 ml	Standard serving ml*	Calories per standard serving	Glycaemic Index GI	Glycaemic Load GL based on standard serving
Beer - lager (5.0% abv)	43	250	108	100	6**
Beer (de-alcoholised)	18	250	45		
Table wine (12% abv)	84	150	126		
Spirits (40% abv)	250	25	62		
Liqueurs (40% abv)	320	25	80		
Milk (whole)	62	258	160	31	3.8
Regular Cola/soda	40	261	105	63	17.1
Apple juice (unsweetened)	50	263	131	44	11.6
Orange juice (unsweetened)	47	263	124	53	9.9
Tomato juice	21	354	75	33	3.6
Energy drink	64	270	173	95	40.6
Food	Calories per 100 g	Standard serving g*	Calories per standard serving	Glycaemic Index GI	Glycaemic Load GL based on standard serving
Crisps	547	50	274	51	12.1
Nuts (salted/roasted)	585	50	293	24	4
Hamburger (regular)	250	110	275		
Hamburger (large)	309	176	543		
Pizza (medium)	264	150	396	60	20.8
Potato Fries	335	150	503	75	50.1
Sausage	340	100	340	28	1.5
Sandwich	250	140	350		
Bagel	275	100	275		

Sources: www.calorieking.com / www.glycemicindex.com

* The size of standard servings varies across Europe.

** Based on an average carbohydrate content of 2.5g/100ml. Some beers will be higher/lower.

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