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A Review on the effect of fruit juice on Cardiovascular Disease

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Abstract

The United States continues to experience a high rate of morbidity and mortality due to cardiovascular disease (CVD). In this review, the complex link between drinking fruit juice and cardiovascular health is examined. Fruit juices may include important vitamins, antioxidants, and possibly heart-healthy substances, but excessive consumption, particularly of those with a lot of added sugars, may be harmful to cardiovascular health. The research highlights the value of selecting pure, barely processed fruit juices with little to no added sugar.

Fruit juices contain antioxidants including vitamin C and polyphenols that help prevent oxidative stress and atherosclerosis, which adds to their beneficial health effects. The article stresses the importance of fruit juice kind and quality, with freshly squeezed and lightly processed juices being preferred.

Fruit juices can be included in a heart-healthy diet, but the research advises against consuming them in excess due to their high level of sugar, which might increase CVD risk and cause weight gain. In conclusion, the basis of maintaining cardiovascular health is a balanced diet high in fresh vegetables and fruits, particularly fruit juices consumed sparingly. To fully comprehend the long-term impact of fruit juice ingestion on the cardiovascular system in different dietary circumstances and individual profiles, more research is required.

Keywords: Fruit juices , Heart-healthy diet , CVD , Antioxidant , Fibre.

Introduction:

According to the National Vital Statistics Report (2008) as well as the "Morbidity and Mortality Weekly Report" (2007) by the Centre for Disease Control and Prevention (CDC), cardiovascular disease (CVD) is still one of the leading causes of morbidity and death in adults in the United States (Kung et.al., 2005; Burrows et al., 2008). Cardiovascular disease refers to a group of conditions that affect the heart and blood vessels, including high blood pressure, stroke, peripheral arterial disease, cardiovascular disease, rheumatic heart failure, coronary artery disease, and congenital heart disease. Cardiovascular disease is one of the major causes of long-term noncommunicable deaths and is commonly linked to metabolic conditions like obesity and diabetes (Eriksen et al.,2015; Okuda et al.,2015; Sikand et al.,2015; Trude et al., 2015).

Natural fruit juice is described as being made only from fruit juice and having no additional sugars, sugar substitutes, or other components like synthetic colours or preservatives. Both freshly squeezed juice and fruit juice from concentrate can be found in packages of pure fruit juice. The 2015-2020 Dietary Guidelines for Americans state that pure fruit juice can replace up to half of the daily required fruit intake because it has a similar nutritional profile to fruit in its entirety (Services & Agriculture, 2017b). Pure fruit juice provides a higher concentration of polyphenols despite having less fibre in it and vitamin C as well than whole fruits (Vinson et al.,2002; Lugasi et al.,2003), which could potentially reduce the incidence of CVD (Jiang et al.,2015; Mink et al.,2007). Pure fruit juice has undergone little research outside of cardiometabolic CVD risk variables including blood pressure and serum cholesterol. A systematic review and meta-analysis of 19 randomised controlled studies found that drinking fresh fruit juice significantly lowered diastolic pressure by a mean of 2 mmHg (Liu et al., 2013). Juice consumption was connected to a lower chance of hypertension even while measurements of LDL cholesterol, high-density lipids (HDL), and triglyceride were unaffected (Lynn et al., 2012). Vasodilator nitric oxide (NO), a widely recognised chemical, has a vital role in heart disease and was found to significantly increase in the current study to be associated with juice consumption. (Cutler et al., 2016)

According to a recent meta-analysis, eating more fruit each day decreased the chance of cardiovascular heart disease by 7%, which was linked to a lower risk of the condition (Dauchet et al., 2006). Since fruit liquids have less fibre than entire fruits, they are often less appealing. However, both of them have comparable amounts of additional crucial and advantageous elements including polyphenols, antioxidants, and folate to entire fruits (Lugasi et al., 2003). Juice consumption was connected to a lower chance of hypertension even while measurements of LDL, high-density lipids (HDL) , as well as triglycerides were unaffected (Lynn et al., 2012)

Fibre:

Fruits mostly consist of carbohydrates and fibers like pectin, which the large intestine extensively ferments. Some fruits, particularly apples and pears, are high in fructose (Southgate et al., 1978). Consequently, the removal of fiber from juice is for some people a significant issue with its ingestion. The pulp and skin, which are both excellent sources of fibre when juiced, are frequently left out. On the other hand, fibre is added when juice is prepared by pulping the entire fruit (Stephen et al., 2017)

Dietary fiber, a key component of plant meals, passes through varying amounts of fermentation in the colon, leading to either resistance to full destruction (insoluble fiber) or partial or complete absorption of solubilized products (soluble fiber). Pectins, gums, cellulose, and resistant starch are examples of insoluble fiber (Chuang et al., 2012)

Flavonoids:

According to studies, eating fruits high in flavonoid can reduce blood pressure and prevent CVD and stroke (Moline et al., 2000). An investigation that revealed that eating foods high in flavonoids negatively correlated with women's systolic blood pressure (SBP) lends credence to this (Mennen et al., 2004). Vegetables, fruits, and other plant foods are rich in flavonoids, which may help prevent significant chronic diseases like cardiovascular disease, malignancy, diabetes, strokes, Alzheimer's condition, cataracts, and age-related decline in function (Liu, 2004).

Nitric oxide:

Juice drinking was found to significantly increase both urine and plasma nitric oxide in the current study. Nitric oxide (NO), a widely recognised chemical and vasodilator, is important in cardiovascular disease. Endothelial dysfunction occurs and advances as a result of decreased eNOS activity and a lack of bioavailable NO, which results in arterial stiffness and an increase in blood pressure (Cutler et al., 2016).

Antioxidant:

The beneficial health effects of consuming fruits are in part due to the antioxidant properties of fruits, particularly is found in fruit juices. For example, pomegranate juice's phenolic content and the vitamin C concentration in citrus beverages are both regarded to be preventive against atherogenesis and oxidative stress (Aviram et al., 2002, Vinson et al., 2002). Because grapes contain a lot of the antioxidants flavonoids, drinking red wine has been recommended as a preventative measure (Vislocky et al., 2010). Vitamin C has been shown to lower the level of C reactive protein, which is a marker of inflammation, as well as to protect against infections, cancer, the adverse effects of contaminants, and the risk of cardiovascular disease (Macias-Matos

et al.,1996; Cadet et al., 1997). Citrus juices are well-known for having a high vitamin C concentration, which may help guard against oxidative stress and atherosclerosis. Other polyphenolic compounds present in juices from citrus fruits are being studied for their potential role in preventing the development of peroxidation of lipids and atherosclerosis (Vison et al., 2002)

Polyphenols:

An extensive body of research has demonstrated that polyphenols can prevent LDL from being oxidised in vitro, which is thought to be a crucial factor in atherosclerosis. Due to these antioxidant actions, LDL lipids and -tocopherol are less likely to oxidise (Zhu et al., 1999). Stimulating novel proteins that inhibit cell senescence, lowering blood pressure, improving endothelial function, preventing the oxidation of LDL and platelet aggregation, and promoting endothelial function are just some of the ways that grapes polyphenol reduce atherosclerosis (Dohadwala et al., 2009). Grapes are a phenol-rich plant because their outermost layer, root, leaf, and seed contain more phenolic chemicals than their juicy centre (Pastrana-Bonilla et al., 2003; Makris et al., 2008). In seed, skin, meat, and leaf, respectively, the total content of phenolic compounds was about 2178.8, 374.6, 23.8, and 351.6 mg/g GAE (gallic acid equivalent) (Pastrana-Bonilla et al., 2003).

Previously, health-conscious people would eat fruits raw, but in today's world of evolving lifestyles, different eating habits, and consideration for seasonal availability, customers have shifted towards nutrient-dense ready-to-eat or to-serve foods like fruit juices (Farid et al., 2000b). Fruit juice's main methods of action could involve one or more of the following: An increase in serum antioxidant capacity, decreased levels of plasma lipids and lipid peroxidation, decreased oxidized-LDL uptake by macrophages, decreased intima-media width, atherosclerosis lesion areas, irritation, increased angiotensin-converting enzyme activity, and increased biological effects of nitric oxide all work together to slow the progression of atherosclerosis and the subsequent onset of heart disease (Joshipura et al., 2001). Fresh citrus concentrates have allegedly been demonstrated to have beneficial antibacterial effects as a result of the presence of several compounds with antioxidant properties (Oikeh et al., 2016)

Numerous research have demonstrated a link among drinking juice from fruits and low blood pressure. The juice from the sweetie fruit, which is a hybrid of a grape and a pummelo, for example, has a hypotensive effect. When comparing to the low-flavonoid sweet juice, the high-flavonoid sweet juice significantly reduced diastolic blood pressure ($p = 0.04$). The flavonoids such as naringin and naritutin found in sweetie juice may be the main factors contributing to the anti-hypertensive effect (Reshef et al., 2005). When compared to people who only eat fruits once or less per day, those who consume fruits at least three times per day have lower rates of stroke, strokes mortality, ischemic cardiac disease, and cardiovascular disease (Bazzano et al., 2002).

Conclusion:

This review paper focused on the complex link between consumption of fruit juice and cardiovascular disease (CVD). Fruit juices include important vitamins, antioxidants, and perhaps heart-healthy substances, but when drunk in excess, their high sugar level might be harmful to cardiovascular health. According to the research, regular intake of entirely natural fruit juices, particularly those with little to no added sugar, may have some positive effects on the heart. But caution must be employed because excessive consumption can result in weight gain and an increased risk of cardiovascular disease.

To fully comprehend the long-term impact of fruit juice ingestion on the cardiovascular system in different dietary circumstances and individual profiles, more research is required.

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