EFFECT OF THE ONIONS ON CARDIOVASCULAR RISK FACTORS

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Keywords:

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Abstract:

Background: Cardiovascular disease (CVD) risk factors cause high morbidity and mortality incidence among people worldwide .

The study's aim was to review the effect of onion consumption on cardiovascular disease risk factors.

Methodology: Health datasets were revised through Up-To-Date, Medline, Web of Science, Cochrane, CDC, WHO, Google Scholar, Scopus, and PubMed. To search for evidence, based on the benefit of Onion used for reduction of cardiovascular risk factors such as hypertension, hyperlipidemia, diabetes, smoking, obesity especially abdominal obesity among participants. The data analyzed before and post-intervention for these parameters was based on their objectives of daily consumption of different types of onions for a specific period.

The result: Several meta-analysis studies revealed that consumption of onions 60 grams or 300 mg daily for three months significantly reduced body cholesterol, waist circumference, body mass index, and increased fibrinolytic activity. Also, the consumption of different forms of onions fresh yellow, cooked onion, peel extract, juice, aqueous extract, powder, or oil for eight weeks significantly led to a reduction in fasting blood glucose among both types of diabetes participants that can be reflected in antidiabetic effects of onions. Some phytochemicals effect for prehypertensive participants consumed 2.5g of fresh onion immersed in olive oil significantly decreased systolic and diastolic blood pressure after 5 hours by 10 and 8 mm/ Hg, respectively, and consumption of 100 mg/kg body weight of onion oil for 21 days by rats who injected with nicotine reflected an antioxidant effect of onions' oil against the oxidative damage caused by nicotine .

Conclusion :

	Finally, consumption 60 -100 g/kg/body wt. /daily from different forms of onions for minimum period two weeks up to twelve weeks led to reduction of cardiovascular risk factors.

Introduction:

Revision of literature that onion (Allium cepa) consumption reduced and prevented several health problems; so, the study concentrated on the benefits of onion and the prevention of cardiovascular disease. Onion is rich in vitamins, minerals, and antioxidants. The onion has various benefits for health; such as reduction of risk of cancer, obesity, and cardiovascular disease. Also, improves mood, and maintains the health of skin and hair. The potential risk of onion consumption is allergy. [1]

Cardiovascular disease (CVD) remains a major contributor to morbidity and mortality in people worldwide. This review highlights on effect of Onion ac complementary medicine in reducing risk factors of cardiovascular disease. There are several modifiable factors such as hypertension, hyperlipidemia, diabetes, smoking, obesity especially abdominal obesity which link unhealthy lifestyle dietary patterns, alcohol, and smoking .[1,2]

Dyslipidemia is known as an elevated serum lipid profile including total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), triglycerides (TG); buildup of coronary arteries plague which leads to myocardial attack due to reduction of blood and oxygen flow and high-density lipoprotein (HDL) which provide some protection against cardiovascular disease [3 4,5 6,7]

Obesity is excess body fat related to elevation of low-density lipoprotein and triglyceride levels. The body mass index (BMI) ≥30 kg/m2. Obesity can lead to cardiovascular disease; hypertension, type 2 diabetes atherosclerosis, veinous thrombosis, pulmonary hypertension, kidney disease, chronic respiratory disease, and multiple types of cancers. [3,8,9,10,11,12,13]

Cardiovascular diseases rank globally first cause of death, 17.5 million people equal to 31% die annually of all deaths in the world and 7.4 million people die from coronary heart disease according to the WHO report.[14]

The aim of this study is to review the effect of Onions on the reduction of risk factors for cardiovascular disease.

Onions are part of the allium family of vegetables and herbs including chives, garlic, scallions, and leeks. Onions vary in shape, size, flavor, and color. The most common types of onions are red, yellow, and white.[15]

Onions rich with vitamins A, C, E, folates, niacin, thiamin, riboflavin, and, minerals calcium, copper, iron, magnesium, phosphorus, zinc, and manganese. Also consists of macronutrients such as carbohydrates, protein and fiber, electrolytes; sodium, potassium, and Phyto-nutrients such as carotene-beta lutein-zeaxanthin .[16] Also, onions consist of quercetin is a flavanol-based polyphenol that has a broad range of beneficial health effects, including anti-hypertensive, anti-diabetic, anti-asthmatic, anti-carcinogenic, anti-viral, antioxidant activities and prevent plaque buildup in the arteries and reduction of the risk of cardiovascular disease and stroke, (according to the University of Maryland Medical Center and Jarzembowski. [17,18] Red onions are rich in sulfur and chromium that, help trigger and increase insulin production and lower glucose levels in most focused animal studies. [19-20] Eating onion daily cleans and detoxifies the body and can keep the doctor away.[21]

Many modern studies on animals and humans reported that onions act as an antioxidant, anti-inflammatory, anti-chole-lithogenic, antibacterial, and antifungal and have protective actions against cancer, skin scar, thrombosis, as well as protected liver, immune system, nervous system, regulated blood lipids, improved endothelial function, and decreasing waistline. Also useful in the management of allergy, asthma, renal, psychiatric disorders, and reduced cardiovascular risk factors. No reported toxicity or adverse effects for onion used at a low dose of 50 mg/kg/day, orally, but heartburn was reported in some human studies.[6]

Methodology:
The searcher conducted a literature review for health datasets through the following organizations Up-To-Date, Medline, Web of Science, Cochrane, CDC, WHO, Google Scholar, Scopus, and PubMed. Searching evidence, based on the benefit of onion for reduction of modifiable risk factors of cardiovascular disease; hypertension, hyperlipidemia, diabetes, obesity especially abdominal obesity.
Most of the studies that were revised are randomized controlled trials. Most of the studies used interventional groups; some participants were animals (rats) and others were humans using onion and control groups used placebo treatment. Onion was administered as onion extract, onion peel extract, onion juice, onion peel extract powder steamed onion and row onion which was best beneficial within the intervention period varies between 2 weeks up to 12 weeks. Most common procedures were followed as onion types red, white, or yellow. Most of the studies sat the statistical significance level as p-values <0.05. Compare outcomes after calculating the difference between baseline and final amounts of each following parameters; body weight, body mass index, waist circumference total cholesterol, low-density lipoprotein-cholesterol, high-density lipoprotein-cholesterol, triglyceride, systolic and diastolic blood pressures (SBP and fasting blood sugar.

Results and Discussion:
These results show the effect of onion consumption on the lipid profile of the human body. Hypercholesterolemia plays a pivotal role in the development and progression of cardiovascular diseases. More than 7.5 (mmol/L) level of total blood cholesterol or 4.9 mmol/L LDL is considered risk in people with other cardiovascular disease risk factors22. Half a medium-sized raw onion or equivalent juice per day dramatically raises HDL cholesterol in cooked onion.[21] Chemicals within the onions prevent platelets from sticking and help dissolve clots. Both British and Indian scientists studied, they first fed men a very high fat meal, with butter and cream, and documented that their clot-dissolving activity plunged. Then they gave them the same fatty meal and added two oz. Equal 60 grams of onions, raw, boiled, or fried then a blood sample was drawn after two and four hours the result showed that the onions had blocked the fat's detrimental blood-clotting tendencies. [21-22]. Intakes of tea onions, and apples reduce mortality related to coronary heart disease as well as regularly consumed flavonoids foods may reduce cardiovascular mortality among elderly men.[23]
A study carried out on twenty-two convalescent patients at rest who were given a fat-enriched breakfast with an addition of 60 g of onions increased fibrinolytic activity. [24]
Randomized controlled Meta-analysis trials among 446 participants were conducted using the fixed-effects model in 2020. Post evaluation of participants' lipid profile after consumption of onion the result showed that there was significantly elevated high-density lipoprotein cholesterol (HDL), reduced total cholesterol (TC), and low-density lipoprotein cholesterol (LDL); but non significantly lowered triglycerides (TG).[25,26,27]
Consumption of a diet rich in 2.5% to 5% onion (Allium cepa) and powder of Curcuma significantly improved Lipid profile levels.[28] Other interventional studies consumption of 300

mg/day of onion for more than twelve weeks significantly reduced body cholesterol, body mass index, body weight, and waist circumference.[29]

Blood glucose: Onion supplementation is effective in lowering blood glucose. In this meta-analysis study, diabetic rats with 1% and 3% onion peel extract and 7% onion powder for eight weeks compared with the control group significantly reduced blood glucose levels, improved antioxidant enzymes, and reduced body weight for both groups. [30] Onion is used for the treatment of diabetes in traditional Chinese practices. A clinical trial was conducted on diabetic patients who consumed fresh yellow onion. Participants consumed onion dependent on their BMI- (BMI < 24.9 consumed 100-120 g/d and BMI > 25 consumed 140-160 g/d) and the placebo group took 30 to 40 g/d of onion in addition to meals for 8 weeks then follow-up participants. The results showed significant reductions in fasting blood glucose (FBG) levels in both insulin-dependent and noninsulin-dependent diabetes. Also, similar results of clinical trials administered juice, aqueous extract, onion oil, and cooked onion for participants to evaluate the effect of antihyperglycemic of onion. The result showed the antidiabetic effects of various types of onions in addition to modification of low-density lipoprotein cholesterol.[31]

Obesity and Body Mass Index: There were five robust randomized controlled trial studies conducted in Korea about the effect of onion peel as anti-obesity. Pre- and post-evaluation for blood lipid levels, body mass index, waist circumference, body fat, body weight, and, obesity-related hormones were done. After analysis, there were statistically significantly decreased blood triglycerides and anthropometric parameters compared to control group. Also, there were no statistically significant differences related to obesity-related hormones adiponectin and leptin.[28,32,33,34,35]

Hypertension: is a risk factor that leads to the development of life-threatening problems such as ischemic heart disease, atrial fibrillation, stroke, and heart failure. A decrease of 10 mm /Hg of systolic blood pressure results in significant risk reduction. Antihypertensive drugs are beneficial but may be associated with unpleasant aftereffects. Several studies confirmed that Some phytochemicals such as onion and quercetin have preventive and curative effects, mainly for prehypertensive patients.[6]

In one study among hypertensive participants consumed 2.5g of fresh onion immersed in olive oil the result after 5 hours was a significant decrease of systolic and diastolic blood pressure by 10 and 8 mm/ Hg, respectively.[36,37]

Cigarette smoke and Alcohol: Nicotine, is a major toxic component of cigarette smoke and plays a big role in the development of cardiovascular ischemic disease and lung cancer. Nicotine elevated lipid and lipid peroxidation products in the rats' tissues and serum; if used alone or in combination with alcohol or a high-fat diet. The beneficial effects of onion oil as an antioxidant have been assessed in nicotine-administered rats compared to vitamin E; The rats were injected with nicotine (0.6 mg/kg body wt.) and coincidentally given onion oil (100 mg/kg body wt.) or vitamin E (100 mg/kg body wt.) for 21 days. Then lipid peroxidation products and antioxidant defense systems were studied in the liver, lungs, and heart of nicotine-treated rats. The results showed that the concentration of antioxidants significantly raised in the tissues studied. These indicators reflected the effectiveness of onion oil as an antioxidant against the oxidative damage caused by nicotine when compared with vitamin E [38,39]. In other studies, the administration of nicotine to male rats increased their weight gain and lung protein. Post-used onion extract administration led to attenuated all the alterations that happened due to nicotine.[40] This study was designed to investigate whether the consumption of onion wine can reduce serum biomarkers of ethanol-induced fatty liver in rats. The researchers' group was fed a daily ethanol liquid diet for 6 weeks the same addition of onion wine extract 1 mL/d/ for the other group, then blood samples were collected at the starting period and then after each three sequences weeks; the results showed that blood lipids and transaminase activities significantly increased in the ethanol-fed group, but significantly reversed in the onion wine-fed group.41

Conclusion:
The benefits of onion as complementary medicine are prevented and reduced modifiable cardiovascular risk factors. Several meta-analysis studies revealed that consumption of onions 60 grams or 300 mg daily for three months significantly reduced body cholesterol, body weight, waist circumference, and body mass index, as well as prevented platelets sticking and increased fibrinolytic activity. Also, clinical trials studies conducted among diabetic human and animal patients who consumed different forms of onions fresh yellow, cooked onion, peel extract, juice, aqueous extract, powder, or oil for eight weeks led to a reduction of low-density lipoprotein cholesterol and fasting blood glucose (FBG) among both types of diabetes patients. These results reflected antidiabetic onion effects. Some phytochemicals such as onion and quercetin have preventive and curative effects for prehypertensive patients. 2.5g of fresh onion immersed in olive oil significantly decreased systolic and diastolic blood pressure after 5 hours by 10 and 8 mm/ Hg, respectively. On the other hand consumption of 100 mg/kg body weight of onions' oil for 21 days among rats injected with nicotine reflected an antioxidant effect of onions' oil against the oxidative damage caused by nicotine and reduced serum biomarkers of ethanol-induced fatty liver in rats by lowering hepatic and blood lipid levels.

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Conflict of interest:
The author declares no conflict of interest.

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Annexes:

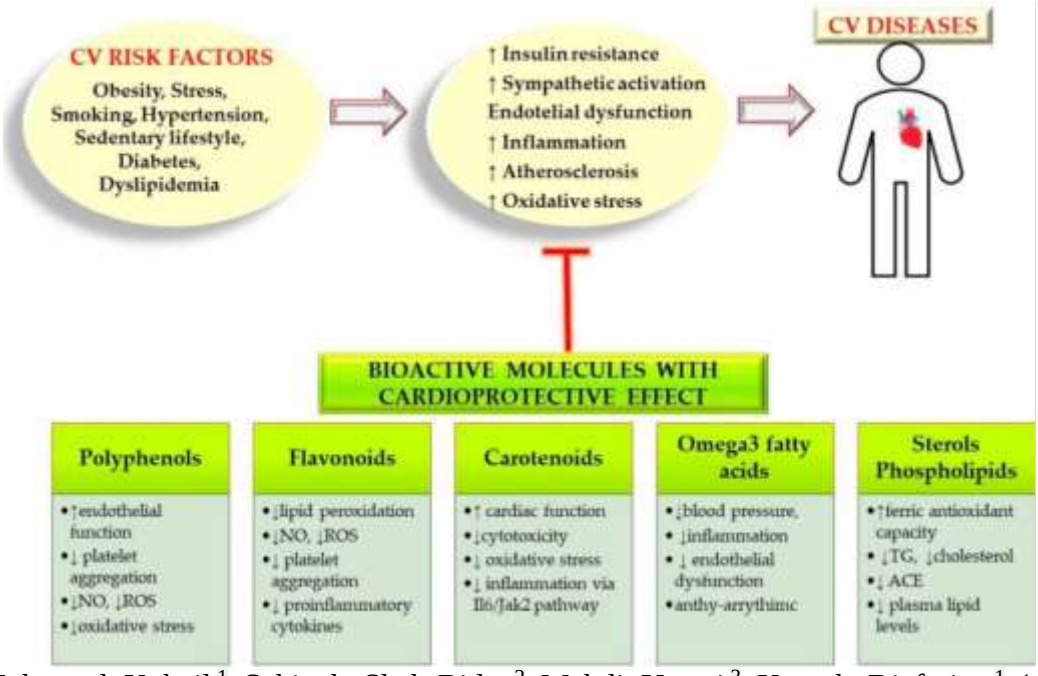

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Table 1.

Updated National Cholesterol Education Program (NCEP) criteria for metabolic syndrome (4)

Waist circumference	≥102 cm (men), ≥88 cm (women)
Fasting plasma glucose	≥100 mg/dl or pharmacologic therapy
Serum triglycerides	≥150 mg/dl or pharmacologic therapy
Serum HDL-C	<40 mg/dl (men), <50 mg/dl (women) or pharmacologic therapy
Blood pressure	≥130 mm Hg (systolic) or ≥85 mm Hg (diastolic) or pharmacologic therapy

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