



Review Article



Nutritional Knowledge and Health Behaviour Related to CVD, Narrative Review

Anam Saeed¹¹Department of Human Nutrition and Dietetics, Riphah International University, Lahore, Pakistan

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Department of Human Nutrition and Dietetics,
Riphah International University, Lahore, Pakistan
anamsaheed6@gmail.comReceived Date: 8th February, 2025Revised Date: 20th July, 2025Acceptance Date: 26th July, 2025Published Date: 31st July, 2025

ABSTRACT

Cardiovascular disease is the leading cause of death worldwide. A person's diet plays a critical role in their cardiovascular health and is linked to the progression of heart-related diseases. Several scientific researchers have demonstrated an association between dietary habits, lifestyle, and Cardiac diseases. This narrative review aims to demonstrate the present state of scientific evidence on nutritional knowledge and health behaviour related to CVD (Cardiovascular Diseases). The review focuses on the impact of dietary patterns and lifestyle on the risk factors of CVD, summarizing facts from surveys, population-related scientific trials, observational research, and meta-analyses. Unhealthy dietary behaviours and lifestyle, for instance, high consumption of saturated fatty acids, red and processed meat, refined carbohydrates, sugar-sweetened beverages and excessive salt, have been related to an amplified possibility of CVD. On the contrary, increasing consumption of a plant-centred diet, such as food fiber, fruits, vegetables, and nuts, has been shown to reduce CVD risk-related factors. The Mediterranean diet is considered to be a well-supported dietary pattern for prevention. This review offers novel understandings into diet-related factors that are either harmful or beneficial in the context of CVD and suggests potential strategies for improving cardiovascular health. The implications of these findings put forward a need for healthcare providers to enhance their discussions with female patients about CHD, providing targeted education on its prevention.

INTRODUCTION

The most common kind of heart illness is coronary heart disease, and it is the consequence of atherosclerosis or the deposition of fatty plaques in arteries, leading to the arteries becoming narrow because of the thickening of artery walls. Atherosclerosis, coronary syndrome and other kinds of chronic ischemic diseases are included in the broad term coronary heart disease. These are responsible for a tremendous number of deaths. Shortness of breath, chest pain, and heart attack can happen because of the narrowed arteries due to the formation of blood clots or plaque, leading to a heart attack. The cardiovascular disease term comprises stroke, coronary heart disease, peripheral vascular disease and heart failure [1-3]. In a large population-based scientific research focusing on patients with cardiovascular ailments, researchers found that health knowledge is closely related to health

behaviour. This proposes that people with advanced levels of health knowledge may be more likely to engage in positive health behaviours and account for better overall health consequences [4]. Moreover, there is growing scientific evidence to suggest that socio-demographic features show a significant role in shaping how people perceive healthcare, make health-related choices, and adhere to medical recommendations. It is vital to understand women's understanding of heart ailments, their knowledge and awareness of risk features, and their knowledge of health-promoting strategies [5]. This understanding can offer valuable insights needed to create gender-specific health messages and is vital in the inhibition and treatment of heart ailments among women [6, 7]. Consequently, the purpose of this inclusive review was to analyze recently collected literature on women's



awareness and knowledge of threat-related factors associated with coronary heart disease (CHD), and to investigate how this awareness and knowledge influences their adoption of healthy lifestyle behaviours [2]. It is significant to understand that cardiac restoration programs, which conventionally have focused on secondary treatment and prevention, likewise emphasize the significance of constructing inclusive HL behaviour changes.

This study aims to discuss the significance of nutrition knowledge and health behaviours regarding CVD

The current study was based on a narrative review, which focused on demonstrating the nutrition knowledge and health behaviour regarding CVD. Different studies were evaluated using different sources, such as PubMed, Scopus, and Google Scholar. Different keywords were searched, such as healthy lifestyle, cardiovascular, risk factors, Mediterranean diet, balanced diet, and diseases, in different combinations. The studies that were included in elaborating the effect were mainly cross-sectional, descriptive, prospective, cohort, experimental, meta-analysis and case studies. Only studies published between 2015 and 2024 were included to ensure a comprehensive analysis of recent and relevant literature related to cardiovascular diseases. Studies from all geographical regions were considered to enhance the generalizability of findings across diverse populations and healthcare settings.

Prevalence of Coronary Heart Disease

There are 86% of cardiovascular patients in underdeveloped countries, and an 80% mortality rate because of this disease [2]. Women often believe that conditions such as osteoarthritis, arthritis, and cancer are more prevalent in women than coronary artery disorders (CAD). In reality, however, the foremost cause of death for women is heart disease. In Pakistan, 15.9% of the population has at minimum one risk factor for heart ailments, and women are found to have more risk factors than men. Notably, men commonly exhibit higher LDL and cholesterol levels, while women often experience lower HDL and higher triglyceride levels. Metabolic syndrome affects 49% of Pakistani women according to modified ATP criteria, and 30% of women with metabolic syndrome are also affected by coronary artery disease. The worldwide foremost cause of death is CHD. Although this is a disease of advanced age but it also attacks the people of middle-aged and a few young people too. The CHD occurred in all ages, and it was a renowned disease of the eighteenth and nineteenth centuries [3].

Cardiovascular Diseases

Cardiovascular diseases (CVD) include a variety of conditions that involve the cardiac system and blood vessels. This includes common types, for instance stroke,

cardiac failure, and coronary heart disease, in addition to less common types like congenital and rheumatic heart disease. The primary cause of CVD is a process called atherosclerosis, in which fatty deposits build up in the arteries, leading to narrowing and blockages [3]. This can result in various serious conditions, including heart attack, peripheral arterial disease, and stroke. There are numerous risk factors related to heart disease, several of which can be mitigated through the adoption of a healthy lifestyle. These risk factors include smoking, unhealthy eating habits, advancing age, diabetes, high blood cholesterol, kidney disease, high blood pressure, stress, depression, physical inactivity, family history of heart disease, and being overweight. To reduce the probabilities of cardiovascular disease healthy attitude should be adopted [4].

Risk Factors of Heart Disease

Despite advancements in treatment and diagnosis, cardiovascular disease has emerged as the predominant cause of illness and mortality globally. While the mortality rate associated with cardiovascular disease has demonstrated a downward trend, the incidence of CVD has shown an alarming increase. Notwithstanding the abundance of information available regarding the risk-related factors for coronary heart ailments, a significant proportion of women fail to perceive these risks as life-threatening. Remarkably, cardiovascular disease is viewed as the principal cause of death in women across numerous countries. Studies reveal that cardiovascular disease is responsible for over five hundred deaths annually, equating to an average of thirty women succumbing to heart disease each day. Regrettably, women's awareness of these issues is lacking, leading to an underestimation of the risks involved [5]. The risk factors of CVD are classified into two groups: modifiable (changeable) and non-modifiable risk-related factors. Risk factors that can be improved are the following: hypertension, diabetes, lack of exercise, elevated cholesterol level, obesity and smoking. Non-modifiable risk-related factors are family history, age and gender. The major possibilities of risk factors are as follows: elevated serum cholesterol, hypertension, reduced level of high-density lipoprotein, diabetes, smoking and high level of low-density [6].

Health Behaviors

The lifestyle behaviours that have placed the women at an increased risk of heart disease are as follows: sedentary lifestyle, obesity, diet and smoking. In light of the theoretical framework, notably the Health Belief Model, the study has been done on the perceived risk of heart disease by Rosen stock. According to the Health Belief Model, the suggested health action is taken by the individual if the individual perceives herself or himself susceptible to getting the disease, and the individual perceives that

getting heart disease is serious. The benefits of a suggested health action are more than the barriers. Firstly, the person must perceive themselves at risk of health threat, then they would take actions to decrease health risk behaviours or to engage in healthy behaviours [5]. In many studies, perception about vulnerability was considered as an indicator that shows the person's willingness to participate in behaviours that are risk-reducing of heart-

related diseases. The relationships between behaviours of adolescents and health beliefs have shown a correlation with the awakening of beliefs related to health, according to a ten-year study. The factors that lead to perception about health risk are very important to know to engage women in behaviour that decreases heart diseases [7] (Table 1).

Table 1: Displayed Studies Regarding CVD Risk Factors

Nutrients	Study	Research Object	Main Finding	References
Polyunsaturated and saturated fat	Meta-analysis research (RCT)	Research studied that randomized adults to amplified PUFA intake for at least 1 year and stated the occurrence of CHD	Taking PUFA instead of SFA can decrease the incidence of CHD risk factors	[8]
Saturated fat	Meta-analysis related to prospective (cohort studies)	Studied stroke and CHD risk factors in randomly selected patients	No substantial evidence supported the association between the ingestion of dietary saturated fat and the threat of CHD	[9]
Saturated fat	The Multi-Ethnic research	Selected randomly, Contributors who were 45-84 years old for CVD risk assessment	Saturated fats are certainly related to CHD risk-related factors; nevertheless dairy dairy-related fats are inversely related to risk factors	[10]
Dietary fat	PREDIMED study investigators	Selected randomly 7038 members with men and women (aged at high CVD risk	Saturated fatty acid and trans fat ingestion are associated with an increased hazard of cardiac problems; nevertheless, MUFA and PUFA ingestion are, contrarily, linked with CVD death	[11]
A Mediterranean dietary regime added with extra-virgin olive oil or nuts	The PREDIMED research	A multicenter experiment in Spain with 7447 members (55 to 80 years old, 57% female) at increased cardiac risk.	The Mediterranean diet efficiently inhibits the possibility of major cardiovascular events.	[12]
Diet with increased glycemic load and index	The study was a Meta-analysis of forthcoming cohort research	Studies displayed relations of glycemic index and load with the occurrence of CHD involving 240,936 participants.	Diet with increased glycemic index and load is ominously related to CVD in female mostly	[13]
Carbohydrate and saturated fat	Prospective- cohort study	9899 women (aged 50-55 years) were enrolled on the Longitudinal Study related to Women's Health.	A reasonable carbohydrate intake is related to reduced risk of heart disease and stroke.	[14]
Animal and plant protein	A prospective cohort study	The research encompassed 70,696 members in the Japan Public Health Centre-centred Prospective Cohort aged 45 to 74 years.	Higher plant protein consumption It is related to decreased CVD-related death, but animal-related protein ingestion is not related to death consequences.	[15]
Carbohydrate	A forthcoming (cohort research meta-analysis)	15,428 adults aged 45-64	Both an upsurge and a decrease in carbohydrate consumption are related to increased mortality rate.	[16]

CVD Risk Factors

In Pakistan, the incidence of CVD is more common among female compared to male. The ratio of male to female patients is 1:3. This is the misconception that CVD is more common among male compared to female and that arteriosclerosis is the least common problem to be worried about. The assertion that women are shielded from heart disease is not accurate, particularly in the case of post-menopausal women. After menopause, women experience a decrease in estrogen production, which in turn increases their susceptibility to heart attacks. However, arteriosclerosis manifests differently in women, leading to a higher propensity for blood clot formation due to increased coagulability in women's blood. In many women, endothelial dysfunction, diffuse arteriosclerosis, and smaller vessel size are the primary causes of ischemia even in the absence of significant blockage in the heart arteries. Furthermore, arteriosclerotic plaques in women are described by a lesser presence of fibrotic cells and an advanced density of foam cells filled with lipids, indicating an increased risk of thrombosis and plaque rupture [17]. Women have the same magnitude of arteriosclerosis, but it looks different because of genetic reasons and estrogen. In clinical manifestation of symptoms, women mostly have atypical angina as compared to classical angina. They experience symptoms like shortness of breath, non-coronary chest pain syndrome, fainting and weakness [18]. Physical inactivity is very common among Pakistani women because of our culture of keeping women in houses, especially during the menopausal age. This causes hypertension, obesity and diabetes mellitus, which are the major causes of heart ailments.

Women's Awareness About Heart Disease

Women's decision-making process is influenced by their perception of the risk factors of heart disease as compared to their decision-making regarding health care. Women do not understand the severity of heart disease, and they do not understand the importance of decreasing the risk factors to prevent heart disease [19]. Heart diseases are the main cause of mortality in women, specifically smoking, diabetes mellitus, hypertension, obesity and dyslipidemia. As most women do not have the perception of the risk factors of heart disease, they do not take any preventive measures, and their behaviours related to the reduction of risk are low. Even women with heart disease do not have any idea about the heart disease risk factors [20]. Those who want to have a healthy lifestyle respond positively to awareness programs about heart diseases. It is very significant to comprehend the association between the patient's attitudes, knowledge and behaviour. This should be taken into consideration when evolving any approach to decrease the chances of heart disease. People

lack information about the influence of CHD on women's health. More education about coronary heart disease is needed to increase knowledge about the disease, to reduce the mortality and morbidity of the disease [21].

Women's Knowledge regarding Risk Factors

Menopause and breast cancer were considered the most common health issues of women, which is why women now consider that heart disease is not a problem for them. Because of this, women are not aware of heart disease [22]. According to a study, even 45% patients had average knowledge about risk factors of disease, 35% of patients had below average knowledge, and only 20% had beyond average information about the risk-related factors of heart disease. The study shows that women know the overall harmful effects of smoking, but they fail to know that smoking is related to female illnesses, specifically among uneducated people and low levels of education [23]. According to the study, 68% population has poor awareness about cardiovascular disease and preventive methods. Most commonly mentioned by people, preventive methods are relaxing or decreasing stress, according to 52.1% of participants in the study. Poor knowledge about CVD prevention is low among people with elementary education, low income, poor self-health and people living in rural areas. There is a dire need for education in rural areas about CVD. The one explanation for the worst cardiovascular outcomes in women is the knowledge gap between actual disease risk and women's perceived risk. Historically, cardiovascular disease was considered a man's disease, and because of this perception, women were not incorporated into research programs related to cardiovascular disease [24].

Nutritional Knowledge

Many studies show that people with better nutrition knowledge have better nutrition intake. Adequate nutrition knowledge shows a vigorous role in decreasing the risk of heart disease and in improvement of nutritional status. Nutrition knowledge plays a very significant part in the promotion of health, and it has potential for improving dietary quality. Dietary fiber is the plant component that is not digestible by gastrointestinal enzymes. Functional fiber is the non-digestible kind of carbohydrate that has been extracted from or manufactured from sugars or starches. They have some benefits of natural fiber. Both of these fibers are beneficial in reducing risk factors of most diseases. Less soluble kinds of fibers are lignin and cellulose, and these are mostly in fruits, whole wheat and vegetables [25]. More soluble fiber is pectin, which is present in apples, carrots, strawberries, legumes and oats. Insoluble fiber modifies the concentration of serum lipid, and soluble fibers bind with the bile acid and increase the bile excretion. Fiber lowers the blood cholesterol level,

which is why it is considered beneficial for health. An increasing amount of vegetables, fruits and whole wheat products is beneficial in decreasing the possibility of heart ailments. Consumption of high fiber foods increases satiety, reduces cholesterol, and decreases the risk factors of heart disease and type 2 diabetes [26]. Antioxidants play a vital part in inhibiting oxidation, a chemical reaction that generates free radicals and initiates a chain of reactions, causing cellular damage. Notably, antioxidant vitamins, containing Vitamin C, E, and beta-carotene, elevate the plasma antioxidant level. Vitamin C, a water-soluble antioxidant, helps in the rejuvenation of oxidized vitamin E. These vital antioxidants are abundantly present in various foods such as carrots, blueberries, red kidney beans, strawberries, apples, oranges, plums, red grapes, spinach, beets, onions, corn, eggplants, and cabbage. Encouraging the ingestion of a diet rich in antioxidants is advised to decrease the risk factors related to heart ailments [27].

Impact of Various Dietary Components on CHD

Numerous management related to dietary habits can decrease the risk factors of heart disease. Intake of fat should be less than 30% of overall calorie consumption, ingestion of saturated fat and foods which contain trans-fat must be fewer and substituted with monounsaturated fat. Ingestion of salt ought to be less, and consumption of fruits and vegetables should be increased. Fish is good for the heart, so its consumption should be increased. Animal foods are the merely basis of saturated fat and cholesterol in the diet; nonetheless, they are high in protein. To get benefits from zinc, iron and vitamins B in meat, thin cuts of meat should be designated and skinless poultry because they are lower in saturated fat. Low-fat milk and its foodstuffs give protein of high quality, and they are low in saturated fat [28]. Oils of fish have anti-inflammatory potentials, preserve the nervous system, decrease clotting, decrease cholesterol level and triglycerides [29].

Healthy Food Consumption

The best preventive measure of cardio diseases is a healthy modified diet. Many types of foods have a direct effect on the contributors to cardio diseases such as atherosclerosis and hypertension. Without proper lifestyle and dietary habits, cardiovascular diseases are unavoidable. Canola oil, olive oil, tree nuts and peanut oil have monounsaturated fatty acids. According to healthy American dietary guidelines, saturated fatty acids must be substituted with polyunsaturated fatty acids and monounsaturated fatty acids, which leads to a decrease in the risk factors of cardiovascular diseases. Polyunsaturated fatty acids have more than two double bonds. The most important polysaturated fatty acids are linolenic acids (omega-3) and linoleic acids (omega-6). Omega-6 is present in canola oil, flaxseed, pumpkin seeds,

and sunflower seeds. Omega-3 is mostly present in nuts, oils and fish. Both omega-3 and omega-6 help in decreasing risk factors of heart disease. There is an inverse relationship between blood pressure and omega-3 [30]. Fiber also helps in decreasing the risk factors of heart diseases because of its action on lipoproteins, lipid, and glucose metabolism. Dietary fiber is found in vegetables, legumes, fruits and whole grains. Fiber also decreases insulin and glucose levels in patients. Fiber also lowers the cholesterol level in the body by binding with the bile acid. Bacteria ferment the fiber in the colon and produce the butyrate, acetate and propionate. In this way, it inhibits the synthesis of cholesterol [31].

Vegetables and Fruits

The food patterns which are high in vegetables and fruits are related to the reduction in the risk factors of the cardio ailments, which include high blood pressure, high lipid levels, weight control, endothelial function, insulin resistance, and inflammatory biomarkers. Plant-based diet gives us these benefits because of the following factors: a) fiber, micronutrients and phytochemicals existent in fruits and vegetables; b) increases the availability of these nutrients if they are consumed in their fresh state; c) the substitution of unhealthy foods in the diet by fruits and vegetables. There is the opposite relationship between fruits and vegetables and the possibility of heart disease [30].

Dietary Fiber and Whole Grain Consumption

Dietary fiber consumption has an inverse relationship to the risk factors of CVD. The American Heart Association (AHA) has established the description of whole grains centered on the fiber component of the whole grain. The whole grain term is mostly used for the germ, bran and endosperm. Whole grain products lower the absorption in the gastrointestinal tract and produce lower insulinemic and glycemic responses than refined grains. Bran is mostly high in the fiber, tocopherol, flavonoids, minerals and vitamins. These components of bran are important for health. Whole-grain consumption decreases the chances of heart disease. The dietary fiber component of the grains is mostly involved in lowering the risk factors of cardio diseases. The other characteristics of whole grains, including high minerals, fatty acids and phytochemicals, also have beneficial effects on health. The elimination of bran and germ, which mostly occur in refining processes, decreases the amount of dietary fiber, and that is why some of the significant benefits are gone, including a reduction in blood pressure and blood cholesterol level. Whole grains are important in reducing weight; improving homeostasis of insulin and glucose, and in biomarkers of inflammation [32].

Dairy Products

Dairy products are an important source of some nutrients

like potassium, magnesium, bioactive peptides and calcium. But the saturated fat is present in the dairy products, mostly palmitic acid is present which has bad effects on the lipid profile of blood. Low-fat dairy items are mostly recommended because they are low in calories, cholesterol and saturated fatty acids. Consumption of low-fat dairy items decreases blood pressure and reduces hypertension. The intake of little fat dairy products has an inverse relationship with blood pressure and hypertension [18]

Meat and Processed Meat

The patterns of foods which decrease the risk factors of heart diseases are the Mediterranean diet, the DASH diet, or the vegetarian diet. All of these diets include little consumption of red meat, especially processed red meat, because these components, saturated fatty acids, cholesterol, and heme iron, increase the risk of cardiovascular diseases. High levels of salt and preservatives present in treated meat also increase the risk factors of heart disease. Ingestion of red meat is connected with an increased risk of heart disease. Adverse preservative effects (eg phosphate, sodium and nitrites) present in meat which is processed and different methods of cooking like frying and high temperature cooking have bad effects on health [33].

Salt Ingestion

There is convincing proof that advanced consumption of sodium chloride (salt) is related to raised levels of BP. Over its impact on BP, a lessening in salt consumption will decrease stroke and CHD, as a meta-analysis of forthcoming observational studies has reinforced. Long-term follow-up of salt-reduction trials is also reliable, with a reduction in CVD rates after salt reduction. Foods in restaurants account for an extra 50% of sodium ingestion in Western countries. The rest is derived from naturally arising sources or added at home [34].

Prevention, Education and Treatments

Laws, treaties, policies and regulations have displayed significant roles in the avoidance and control of illnesses. Only governments can authorize health warnings on cigarettes, present obligatory food standards and labelling, set a "pro-health tax policy", or implement a national transport policy. Frequently, governments are the chief suppliers of health care; they choose how funding is apportioned, from prevention programs to treatment, research, and training [35].

Dietary Recommendation

Dietary reference for acute cardiovascular disease comprises caloric constraint, soft-texture foods, and small, recurrent meals to decrease the metabolic strains of digestion, absorption, and metabolism of foods and to attain ideal body weight; limit of fat and cholesterol

ingestion; and sodium. Chronic coronary heart disease and hypertension profit from sodium constraint to overcome oedema instigated by insufficient cardiac output and to aid in controlling the raised blood pressure [36].

CONCLUSIONS

The content of this review points out that the solution to lowering the global epidemic burden of cardiovascular disease lies in enhancing health literacy and dietary health. Nevertheless, even with such limitations, a more plant-based, nutrient-dense diet, which is affordable and accessible, with equitable policies and evidence-based healthcare advice can make a world of difference in cardiovascular outcomes. It is imperative that the disparities in knowledge as well as access should be addressed. Education, an integrated approach of the healthcare systems, and policy will need to support the efforts of empowered individuals to realize enduring transformations to mitigate the risk of CVD.

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All the authors declare no conflict of interest.

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