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Lifestyles and their Role in the Prevention and Management of Cardiovascular Diseases

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Abstract

Cardiovascular diseases are rampant globally. Coronary artery illness, cardiac attack, stroke, hypertension, and a variety of other disorders are among them. Besides inflicting a huge amount of human pain, they are also responsible for a massive direct and indirect financial cost on the global society. With the widespread attainability of low-cost treatments and the related scarcity of innovative discoveries, increasing research is being focused on the impact of healthy lifestyles on these diseases. Nonsmoking, low consumption of alcohol, a normal BMI, frequently taking exercise, and a wise diet are all examples of healthy lives. Adherence to these helps prevent and attenuate the severity of cardiovascular diseases, decrease their related disabilities, and enhance the health status of life in patients. Cardiovascular diseases are the major cause of mortality worldwide. Healthy lifestyles also help reduce cardiovascular mortality. It is estimated that in 2019, almost 18 million individuals died from cardiovascular diseases all over the world. Over three-quarters of these deaths occurred in low-and average-income countries. Unfortunately, cardiovascular deaths are expected to increase, due to the global growth in population, the continuing Westernization of the developing countries, and the increase in the number of the aged. The World Health Organization estimates that by managing lifestyle risk factors, can stop three-quarters of these deaths. This manuscript will briefly review the influence of these lifestyles on major cardiovascular diseases.

Keywords: Cardiovascular diseases, lifestyles, alcohol, exercise, smoking, obesity, diet

Introduction

Cardiovascular diseases (CVDs) are a heterogeneous group of diseases of the heart and the circulatory system [1]. Hypertension (HTN), coronary heart disease (CHD), stroke, heart failure (HF), cardiac arrhythmias, and valvular disease, cardiomyopathies, endocarditis and myocarditis, congenital heart disease, peripheral artery disease (PAD), vasculogenic erectile dysfunction (ED) in men, and venous thromboembolism (VTE) are examples of these conditions [2]. Men and women are nearly equally affected [3] with the biggest burden being on the elderly [4]. CVDs are associated with extremely high morbidity [5]. The underlying cause for most CVDs is usually atherosclerosis [5, 6], especially in myocardial infarction, ischemic stroke, and peripheral arterial disease. Cardiovascular diseases are also increasingly being responsible for disability [7, 8]. From 17.7 million in 1990 to 34.4 million in 2019, the number of YLDs (years of life lived with disability) for CVDs has two times [9]. CVDs continue to be the dominant cause of premature mortality worldwide [9-11]. The number of people dying from cardiovascular disease has risen from 12.1 million in 1990 to18.6 million in 2019 [9]. One-third of all deaths worldwide are caused by them [10]. Of all the global deaths in 2015, 82% were in low-and average-revenue countries [11]. The WHO predicts that by 2030, 23.6 million individuals would pass away from CVDs every year [12].

Hypertension (HTN) is diagnosed if the systolic blood pressure level is 130mmHg or higher, and/or the diastolic level of BP is 80mmHg or higher [13]. It's a fairly common illness, with a prevalence between 30-50% in adults worldwide [14]. It is responsible for 22.3% of the global CVD burden [15] and accounted for 10.4 million deaths in 2017 [16]. Controlling HTN helps reduce several CVDs [17], including coronary artery disease (CAD) [18, 19], stroke [20], heart failure [21], and cardiac arrhythmias [22]. Ischemic heart disease (IHD) is known as very usual CVD [10]. “It includes acute myocardial infarction, chronic stable angina, chronic IHD, and heart failure due to IHD” [23]. The underlying cause is atherosclerotic disease of the arteries [24]. In the year 2019, Estimates suggest that 197 million prevalent cases of IHD and 9.14 million IHD deaths worldwide [9]. The World Health Organization classifies stroke as ischemic stroke, intracerebral hemorrhage, and subarachnoid hemorrhage [25]. 7.63 million ischemic strokes, 3.41 million intracerebral haemorrhage, and 1.18 million subarachnoid haemorrhage were estimated among the 12.2 million incident stroke cases in 2019 [9]. The numbers of disability-adjusted life years (DALYs) because of stroke and death have also increased steadily over the past few decades [26]. In 2016, there were 116·4 million DALYs and 5·5 million deaths due to stroke [26]. HF is a leading cause of morbidity, by which around 26 million people are affected globally [27, 28]. Its occurrence is growing. It leads to frequent hospitalizations, poor life quality, and is a notable cause of early death [27]. “It is divided into two categories depending on the left ventricular ejection fraction: heart failure with decreased ejection fraction (HFrEF) and heart failure with preserved ejection fraction (HFpEF) (HFpEF)” [29]. Most heart failures are a result of hypertension [30]. Cardiomyopathy is the result of heart failure caused by primary myocardial disease or myocardial damage caused by toxins such as

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alcohol [31]. Alcoholic cardiomyopathy, a non-ischemic dilated cardiomyopathy, resulted in 708,000 cases in 2019 and was responsible for 71,700 deaths [9]. Cardiac arrhythmias may be symptomatic and are usually diagnosed by an electrocardiogram. The most usual arrhythmia to worry about is atrial fibrillation [32], and its incidence is on the rise [33, 34]. It has a high morbidity [35] and mortality rate [36]. Sudden cardiac death occurs when a clinically stable patient, with or without pre-existing heart disease, dies from a cardiac cause within one hour of an abrupt and drastic change in their clinical status [37]. Sudden cardiac deaths are as frequent as deaths from several cancers, such as breast cancer [38]. It is estimated that they are responsible for about 400,000 deaths in the USA, and about 300,000 deaths in Europe, every year [39]. They are predominantly caused by malignant ventricular arrhythmias [40]. PAD is primarily an atherosclerotic disease[41] characterized by claudication [42] and "diagnosed by an ankle-brachial index (ABI) of <0.9)" [43]. "The ABI is calculated by measuring the brachial, dorsalis pedis (DP), and posterior tibial (PT) arteries in both legs and utilizing the higher of the DP/PT in each leg as the numerator" [44, 45]. The lower of these ratios represent the person's ABI. "PAD is also a risk factor for atherosclerotic heart disease" [46, 47] and is accompanied by a poor prognosis [48, 49]. The disability to get or sustain an adequate erection to allow good genital performance is referred to as ED [50]. "It is a prevalent disease that affects 52% of men between the ages of 40 and 70, and >70% of men beyond the age of 70" [51]. Although the causes may be neurogenic, anatomical, hormonal, drug-related, or psychogenic, atherosclerosis also plays an essential role, resulting in arterial insufficiency and causing vasculogenic ED [52]. In men over 50, vasculogenic ED is the most common cause [52]. Although less prevalent, other CVDs have a substantial influence on worldwide morbidity and death.

Discussion

Lifestyles are day-to-day behaviors, and they have a notable effect on human morbidity and mortality [53, 54]. A mega-analysis of 15 international studies (over 500,000 participants) estimated that unhealthy lifestyles (smoking, inactivity, poor diet, obesity, and excessive alcohol intake) were responsible for over half of the global premature deaths [53]. According to more recent study, Yanping *et al*. estimated that when compared to those with zero low-risk lifestyle variables, it is anticipated that adhering to the five healthy lifestyle-related factors described above might extend life expectancy at 50 years by 14.0yrs for females and 12.2yrs for males in the US [54]. The impact of these five lifestyle behaviors on CVDs is discussed in this manuscript. Exercise is described as "any sport or activity that utilizes large groups of muscles, is sustained continuously, and is performed rhythmically" [55]. "Adults should acquire at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of strenuous aerobic activity (or a balance of both) each week, preferably spaced out throughout the week, according to the AHA" [56]. This should be followed by at least two days of muscle-strengthening exercise [56]. A person's body mass index (BMI) indicates his or her body weight category, "which is calculated by dividing a person's weight by the square of his or her height in meters" [57]. "As per the World Health Organization (WHO), a BMI of 20 to 25 kg/m2 is regarded normal, a BMI of 25 to 30 kg/m2 is considered overweight, and a BMI of greater than 30 kg/m2 is considered obese" [58]. Smoking is the pivotal preventable cause of CVDs and several other serious diseases [59]. Tobacco can be smoked using cigarettes, cigars, water pipes, bidis, and kreteks [60]. First-hand smoke directly enters into the smoker's mouth from puffing and is also known as mainstream smoke [61]. Smoke emits from the smoldering ends of a side-stream cigarette. "Second-hand smoke is a combination of side-stream smoke (85%) and the exhaled mainstream smoke" (15%) [62]. "The gas and particle residue from smoked tobacco products that stick to surfaces including hair, skin, clothes, and furniture is known as third-hand smoke" [63]. These pollutants may persist for many days and when airborne, may be inhaled by non-smokers [64]. Diet plays an important role in health [65-67]. Besides caloric restriction to avoid overweight and obesity (maintaining a BMI below 25kg/m2) [65]. "A well-balanced diet includes plenty of non-starchy vegetables, fruits, whole grains, and legumes, as well as restricted to moderate amounts of nuts, seafood, lean meats, low-fat dairy products, and vegetable oil, rich in mono and polyunsaturated fats" [66, 67]. "Trans fats, saturated fats, fried meals, excess salt, red meat, refined carbs, and sugar-sweetened drinks are also restricted or eliminated" [66, 67]. Alcohol is a double-edged sword when it comes to CVDs [68]. "A standard drink in the United States comprises 12-15g of pure ethanol. In the US, a standard drink contains 12-15g of pure ethanol and this is present in 100-125ml of wine, 240-300mL of beer, and 30-37.5mL of spirits" [69]. "Two standard drinks each day for males and one standard drink each day for females is considered moderate alcohol consumption" [70, 71]. Heavy level of drinking is explained as a regular consumption of >60g/day for males and >40g/day for females [72]. "Binge drinking is defined as consuming 4 or more drinks in one sitting for women and 5 or more drinks in one sitting for men" [73, 74]. Excessive alcohol use may result in alcohol use disorder [75]. All these health behaviors, if improperly adhered to, have detrimental effects on CVDs [76].

Exercise: Physical activity and pro-active physical exercise slow down and may even reverse CVD progression [77-81]. Moderate physical activity is linked to a 26% decrease in CVD risk, whereas high-intensity activity imparts a a 42% reduction in risk [80-84]. Patients regularly performing moderate to high-intensity exercise gain 1-3 years of CVD-free life when compared with their sedentary peers [85]. They reduce their mortality and enhance their expected lifespan by 1.3 to 3.7 years [85]. Long-term exercise lowers BP similar in magnitude to those obtained by first-line anti-hypertensive medications [86]. BP is reduced by 5-7 mmHg with aerobic exercise while resistance exercise lowers BP by 2-3 mmHg [87, 88]. Ischemic heart disease is beneficially affected [89] and stroke is reduced [90] with regular exercise. Post-stroke exercise rehabilitation helps improve walking speed and endurance [91]. Its benefits in HF are also significant [92-94]. Exercise, especially through HF rehabilitation, results in reduced hospitalizations [95], improved quality of life [96], and a lower mortality [97]. Benefits have also been noted in atrial fibrillation [98]. Besides its preventive action [99], exercise helps PAD patients walk more100 and improves their quality of life [101, 102]. Exercising patients also notice a reduction in the risk of ED [103], while established ED patients notice an improvement in performance [104]. Exercise also reduces several other CVD risk components such as smoking [105], obesity [106], diabetes mellitus [107], hyperlipidemia [108], alcohol abuse [109], chronic kidney disease [110], depression [111], loneliness [112], psychosomatic stress [112], sleep disturbances [113], and illicit drug use [114]. The beneficial effects of exercise stem from its ability to reduce body

weight, improve lipid profiles [115], and induce reductions in insulin resistance, blood coagulation, and systemic inflammation [116]. "Lowering heartbeat, increment in the supply of myocardial oxygen supply, and improving myocardial contraction and stroke volume are included as the direct impacts on the heart" [117-119]. Individuals with known CVD should, however, seek medical advice before embarking on an exercise program [120, 121].

Obesity

Obesity increases CVD risk [122-124] while weight loss reduces it [125, 126]. It is estimated that obesity is thought to be responsible for 70% of HTN in adults [127, 128]. Obese patients have more incident CAD, complex coronary lesions, poor results to interventions, and higher mortality [129-132]. Obesity also deleteriously affects HF [133, 134]. "These patients have poor outcomes with left ventricular assist device implantation or heart transplantation" [135, 136]. On the other hand, they improve clinically with bariatric surgery-induced weight loss [137]. Patients who are obese are also more likely to having a stroke. [138, 139] and "exhibit a >2-fold increase in risk" [140]. "Patients with BMI of ≥35kg/m2 have a three times increase in the risk of having a stroke" [141]. Obesity also increases the risk of AF [142] and SCD [143]. It negatively impacts several other CVDs, including aortic stenosis [144], peripheral artery disease [145], erectile dysfunction [146], and venous thromboembolism [147]. "It also increases several CVD risk factors, such as sleep apnea, diabetes mellitus, and dyslipidemia" [148]. Obesity induces proinflammatory changes and free radical damage, resulting in endothelium dysfunction and atherosclerosis [149].

Smoking

Tobacco smoking results in an acute rise in systolic and diastolic BP [150]. The long-term effects on HTN are however unclear. Active smoking increases the coronary artery disease risk by about 80%, while passive smoking increases this risk by about 30% [151]. The risk of a stroke and atrial fibrillation is increased by smoking cigarette. A separate risk component for heart failure is smoking also [152]. Smokers also have a higher risk of dying from a heart attack [153]. Smoking is mainly related with PAD and the development of abdominal aortic aneurysms [154, 155]. For the development of ED, it is established as individual risk factor, while also increasing the risk of VTE [156, 157]. When compared to non-smokers, It's been proven that smoking low-tar cigarettes raises the risk of cardiovascular events. "Cigarette smoking enhances atherosclerosis via increased inflammation, pro-thrombotic changes, and oxidation of low-density lipoprotein" [158, 159].

Diet

Improper diet is a strong modulator of CVDs risk [160-162]. A plethora of scientific studies indicates that red and processed meat [163], salt [164], fried foods [165], sugar-sweetened beverages [166], excess alcohol intake [167], and obesity [168] have detrimental effects on CVDs, while fruits and vegetables [169, 170], whole grains [171], fiber [172], tree nuts [173], chocolate [174], and coffee [175] are cardio-protective. Salt restriction of <1500 mg/day [176] reduces BP by about -5/6mmHg systolic and -2/3mmHg diastolic [177]. A healthy diet as mentioned above, the DASH diet [178], or the Mediterranean diet [179] also helps in BP reduction180. Controlling HTN helps reduce several CVDs, including coronary artery disease [181, 182], stroke [183], heart failure [184], and cardiac arrhythmias [185]. 21% risk of CAD is reduced by The DASH diet [186] and is inversely associated with CAD [187]. Mediterranean diet has been reported to induce a reduction in coronary mortality of 65% over a study period of 46 months [188]. Benefits of a healthy diet have also been recorded with stroke [189], HF [190], cardiac arrhythmias [191, 192], PAD [193], and ED [194]. A cardiovascular healthy di*et al*so helps reduce hypercholesterolemia [195], DM [196], and chronic kidney disease [197], both being CVDs risk factors.

Alcohol

The relation between cardiovascular disease and alcohol consumption is J-or U-shaped [198]. Alcohol is beneficial for CVD in low to moderate amounts [199] and harmful in heavy amounts [200]. A detrimental association has also been seen with binge drinking [201] and chronic alcohol abuse, as seen in AUD [202]. BP is strongly related to alcohol intake [203, 204], with an increased incidence of HTN of 50% with an intake of 3-4 drinks per day and a 100% increase with an intake of 6-7 drinks per day [205]. Decreasing alcohol consumption to <2 drinks/day helps reduce BP [206]. Low to moderate alcohol consumption is also cardioprotective for CHD morbidity and mortality [207, 208]. A similar pattern has been noted during alcohol consumption and stroke [209]. "Heavy alcohol consumption (≥5 drinks/day or ≥35 drinks/week) considerably increases the risk of HF" [210, 211]. Alcohol also increases the risk of developing AF [212, 213]. "Koskinen *et al* estimated that "5%-10% of all new episodes of AF were related to alcohol consumption" [214]. Alcohol has also been linked to SCD [215, 216]. "The risk of congenital anomalies such as aberrant great vessels, atrial septal defects, and ventricular septal defects is increased in offspring of pregnant women who drink alcohol" [217, 218]. "Heavy alcohol consumption is related with a higher level of risk of PAD" [219]. According to research, light to moderate alcohol use (<21 drinks/week) reduces the incidence of erectile dysfunction [220]. "Many other CVD risk factors, such as sleep disorders [221], chronic kidney disease [222], weight gain [223], depression [224] and smoking" [225] also associated with consumption of alcohol. Low to moderate alcohol intake helps DM [226], increases HDL-C [227-229], provides atherosclerotic plaque stabilization [230], and improves the hemostatic status [231-234].

Conclusion

CVDs are rampant globally, and they are estimated to increase, due to a high level of population growth and an increase in the aged. Most CVDs can be prevented and progressed by adopting a healthier lifestyle. In addition, healthy behaviors also provide a better life quality and an increment in lifespanmes, on the other side Structured activities involve rules, can be competitive or cooperative, and typically demand the use of one's cerebral abilities rather than physical strength. To excel in sports and games one should have excellent technique, tactics, training, skill and etcetera. Field Handball performance is heavily influenced by sports science. Field handball is a team sport that necessitates a variety of external and internal criteria such as anthropometrical, physical, physiological, and psychological features in order to compete at the highest level.

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