Relationship Between the High Blood Pressure and Cholesterol in the Women

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Abstract:

Blood pressure that is higher than customer is point out to as high blood pressure, or hypertension. Women in their 20s, 30s, 40s, and 50s can have high blood pressure; however, the risk increases with age. Exercise on a regular basis has been suggested as a key behavior in blood pressure control. When controlling blood pressure regulation, it aids in preventing harm to the kidneys, eyes, brain, blood vessels, and heart. Usually the patients unable to feel elevated blood pressure, the warning indicators are fluid retention, headaches, impaired vision, low energy, fatigue, and chest pain are a few of them.

Objective: The purpose of this study was to compare the blood pressure levels of women with high cholesterol of those women to the women has normal cholesterol and blood pressure.

Methods: The women patients hospitalized to the hospital over a three-month period (December 2023 to February 2024) were 60 women have high level of cholesterol and 30 healthy women. The case data for every patient was gathered and documented. Samples for the lab were collected following a 12-hour fast. The measured Total Cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL-c), low density lipoprotein (LDL), systolic and diastolic blood pressure (SBP and DBP). To examine how blood pressure is impacted on the levels of triglycerides and total cholesterol.

Results: This result suggests that the women’s age had a substantial and powerful impact on their blood pressure, blood cholesterol, low levels of physical activity, and hormonal changes, in that order. According to this study, women patients had higher blood pressure and LDL cholesterol levels than healthy controls, but their HDL cholesterol levels were lower. These findings put the patients at higher risk of coronary heart disease (CHD).

Keywords: Blood pressure (BP), Low-density lipoprotein cholesterol (LDL), High-density lipoprotein cholesterol (HDL-c), Triglycerides (TG).

Introduction

Arterial blood pressure, or blood pressure (BP), is a continuous variable whose physiology is marked by considerable variability, resulting from the intricate interplay between neural reflexes, hemodynamic parameters, and environmental, behavioral, and hormonal cues. The physiologic fluctuation in blood pressure in normotensive persons is explained by the homoeostatic response, that is additional pronounced in patients with hypertension. Blood pressure variability is a multifaceted phenomenon that can be categorized in five types: long term (<5 years), very long term (>5 years), midterm (day by day), short term (within 24 hours) and very short term (beat to beat). Has
a significant impact and redefines the hypertensive patient’s cardiovascular risk beyond simple blood pressure readings (Rosei et al., 2020).

Women's blood pressure increases much more slowly as they age, reaching peak levels in the fourth or fifth decade, or around menopause. Next, the pressure started to grow increases so that more women than men have hypertension by the time they are 65 or 70 years old, and the prevalence of hypertension in women keeps rising as they become older and the low levels of physical activity, high levels of social stress, and high salt intake. Depending on age, these variations change. From a physiological standpoint, this includes the menstrual cycle, getting pregnant, and using oral contraceptives (Joyner et al., 2016).

The main risk factors for myocardial infarction, stroke, and death were smoking, high blood pressure, and high cholesterol. Blood pressure as we age? There are several possible contributing factors: Genetic alterations, lengthening life spans, the obesity pandemic, sedentary lifestyles, and dietary composition are all factors. The significant increase in systolic blood pressure in the very elderly, but not in the general population, may be explained by the rising life expectancy (Lüscher, 2018).

It has been demonstrated that the incidence of significant cardiovascular diseases (CVD) (hemorrhagic stroke, ischemic stroke, myocardial infarction, sudden death, heart failure, and peripheral artery disease) as well as end-stage renal disease is connected with office blood pressure monitoring and out-of-office blood pressure monitoring. Additionally, a growing body of research indicates a connection between hypertension and an increased risk of atrial fibrillation, dementia, and cognitive decline. (Haba et al., 2019).

The World Health Organization estimates that 9.4 million people worldwide pass away from cardiovascular illnesses, and another 17 million people die from other causes from high blood pressure. It is anticipated that the global prevalence of hypertension will rise from 26% in 2000 to 29.2% in 2025, or almost 29% (10). Women are more at risk for triglycerides than men are. Research comparing the risk of coronary heart disease caused by elevated triglycerides in men and women revealed that the risk was about fifteen times higher in women and over six times higher in men. Additionally, they proposed that elevated TG levels had various metabolic consequences on fats (Yeasmin et al., 2019).

According to the 2018 treatment guidelines of the Korean Society of Hypertension, hypertension was defined. 1) SBP ≥140 mm Hg, 2) DBP ≥90 mm Hg, or 3) Currently receiving hypertension therapy (Go et al., 2021).

![Image](https://via.placeholder.com/150)

Figure 1. Connections Between Women’s Mean Arterial Pressure (MAP) and Muscle Sympathetic Nerve Activity (MSNA)

**Cholesterol**

A fatty material with a waxy appearance, cholesterol is present in both human and animal cells, especially in the liver, kidney, and brain. The body requires cholesterol to synthesize bile acids, which are substances required for the digestion of fat, to produce hormones like estrogen and testosterone, to maintain cellular structure, and to act as a substrate for the active form of vitamin D (Ueda et al., 2018).

Blood pressure and low-density lipoprotein (LDL) cholesterol are known causative risk factors for coronary heart disease (CHD). The Levels of Exposure, at which the risk increase and treatment benefit are deemed sufficiently
high, are the basis for treatment recommendations for these risk factors. Therefore, compared to individuals with low levels of these risk factors, patients with moderately raised blood pressure or LDL-cholesterol are at greater risk for CHD, and this enhanced risk is likely to grow with continued exposure to risk factors (Hadi et al., 2019).

Low-density lipoprotein (LDL) was absorbed by endothelial cells through the bloodstream, where it was oxidized by reactive oxygen species. This resulted in the formation of atherosclerotic plaque in the blood channel walls, and this was the first cause of the pathophysiology of human hypertension (Zeron, and Albuquerque, 2019).

On the other hand High blood triglycerides, low HDL, and high LDL are just a few of the structural and functional alterations in the plasma membrane that define arterial hypertension and are closely linked to shifts in metabolism. Changes in the content of lipids are evident in the elevation of viscosity in the plasmalemma that takes place in high-pressure carriers. There is a significant transition between the lipids in the blood and those in the plasma membranes in situations when there are high amounts of triglycerides and cholesterol. This causes the membranes to become less fluid and alter how ions are transported. Reduced sodium efflux, increased intracellular calcium, and diminished potassium and sodium pump activity were all linked to an increase in the amount of cholesterol supplied to plasma membranes (Song et al., 2021).

Excess cholesterol can alter the function of membrane proteins, harm membrane microdomains, reduce membrane fluidity, and eventually result in cell dysfunction and death. This implies that having too much cholesterol is dangerous as well. It has long been believed that elevated systemic cholesterol is largely indicative of atherosclerosis; this view is supported by the clear correlation between high cholesterol and the formation of harmful macrophage foam cells inside the artery walls. (Kasahar et al., 2013).

Method

The Study design, setting, and sample size. Samples were taken from 60 women’s with high blood pressure and high cholesterol, whose ages ranged from (35 to 55) years. and 15 samples for 30 women are healthy, they have same ages. the period of work 3 months period (December 2023 to February 2024). The samples were collected with the assistance of medical personnel from a laboratory in waist governorate in Iraq. The article aimed to compare individuals who were healthy with those who were patients. A specialist physician conducted medical examinations to confirm the eligibility of women who provided the sample. Before breakfast, fasting blood was drawn to assess triglycerides, HDL cholesterol, and glucose. Using a venipuncture, eight milliliters of blood were drawn and divided into two tubes with EDTA. Samples were centrifuged to separate the plasma. Women under the age of 33, expectant mothers, and women diagnosed with infectious or communicable diseases were among the exclusion criteria. The study also evaluated the participants’ smoking habits, level of activity, usage of medication, and personal and family medical histories. The measurements of blood pressure were made using morning
records. Samples for the lab were collected following a 12-hour fast.

Result

Based on the results of research conducted on 60 hypertension patients and the 30 subjects in this study.

The average triglyceride level of the patient was above the normal triglyceride level and triglyceride levels can rise due to a number of variables, including obesity, inactivity, a diet heavy in carbohydrates, smoking, the presence of chronic illness, medications, and genetics. the mean blood pressure of the patient was high blood pressure.

Compared to controls, subjects with hypertension exhibited significantly higher fasting serum total colostrum (TC) levels. In hypertensive patients, there was a positive correlation between the systolic and diastolic blood pressure and the higher levels of fasting serum TG and TC.

The present study discovered a positive relationship between both systolic and diastolic blood pressure and fasting serum levels of triglycerides (TG) and cholesterol (TC).

A standard method was used to test the systolic and diastolic blood pressure of each participant. Women's fasting blood levels (LDL) were found to be higher and their HDL levels to be lower than those of healthy individuals, based only on the available data.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Healthy Women Age (35-60) n=60</th>
<th>Women with Hypertension Age (35-60) n=30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cholesterol (mg/dL)</td>
<td>10.17±3.0</td>
<td>187.6±3.0</td>
</tr>
<tr>
<td>Triglycerides (mg/dL)</td>
<td>99.4±50.5</td>
<td>123.1±79.2</td>
</tr>
<tr>
<td>LDL-cholesterol (mg/dL)</td>
<td>32.8±2.2</td>
<td>62.1±4.2</td>
</tr>
<tr>
<td>HDL-cholesterol (mg/dL)</td>
<td>509.6±11.0</td>
<td>42.6±6.6</td>
</tr>
<tr>
<td>Systolic blood pressure SBP (mmHg)</td>
<td>113.16±12.27</td>
<td>136.40±8.64</td>
</tr>
<tr>
<td>Diastolic blood pressure DBP (mmHg)</td>
<td>72.56±9.34</td>
<td>89.17±7.3</td>
</tr>
<tr>
<td>Glucose (mg/dL/dL)</td>
<td>82.9±42.1</td>
<td>90.1±55.2</td>
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Discussion

This study shows that baseline lipid levels, especially those of LDL and HDL, are linked to elevated levels of arterial hypertension, which is manifested as elevated blood pressure or hypertension. Despite a wealth of studies on the subject, the specific biological process by which lipids.

We did not incorporate food and physical activity data in our analysis because it is readily available to the public. This finding was consistent with earlier studies that found a strong link between increasing age and high blood pressure.

An unhealthy lifestyle that involves consuming large amounts of sugar and salt can lead to hypertension. An excessive intake of salt in the diet can alter the smooth muscle cells in the arteries, causing collagen to build up in the artery walls and making the arteries more stiff. Men are not as likely to experience elevated blood pressure as women are when they approach menopause. Reduced estrogen levels, oxidative stress, endothelial dysfunction, the renin-angiotensin system, and sympathetic activation are some of the causes contributing to the rise in blood pressure (Fikriana and Devy, 2018).

There was yet another notable correlation between the women's. In this investigation, a significant correlation was also seen between the amount of cholesterol in the blood and the age of the women. Aging brings about alterations. in the blood's metabolism of cholesterol. The amount of Low density Lipoprotein (LDL) cholesterol rises as a result of these
modifications. The equilibrium among intake, synthesis, absorption, and excretion impacts the body's metabolism of cholesterol (Silva et al., 2020).

Some contend that hypertension is a terminal symptom of a metabolic. Additionally, a recent study revealed a close correlation between elevated levels of oxidized low-density lipoprotein (LDL) and increases in lysoPC (C14:0) and decanoyl carnitine, two important metabolites for predicting the likelihood of developing diabetes.

The rising incidence of metabolic illnesses, including overweight, obesity, and hypertension, has made blood pressure, fasting glucose, HDL-cholesterol, and triglyceride levels crucial clinical partners. Metabolic syndrome (MS) is characterized by the presence of all these risk factors and has drawn the attention of numerous health organizations. As to the World Health Organization's (WHO) guidelines, however, the hazards were greater for women who were overweight, class I obese, and of normal weight (Sukmana, 2020).

Based on the findings, not all individuals with high cholesterol also experience hypertension, and vice versa. People who already have high cholesterol are more likely to experience elevated blood pressure. is that eating a diet heavy in saturated fats—such as those found in butter, cheese, seafood, and cream—can raise LDL-cholesterol levels.

Based on this study, blood pressure and triglyceride levels are strongly correlated since triglycerides are blood lipoproteins that are parts of HDL, VLDL, and LDL cholesterol. Triglyceride levels can therefore rise as a result of high blood levels of these lipoproteins. Triglycerides also have an impact on blood viscosity; the higher the levels of triglycerides in the blood, the higher the viscosity. The heart has a harder time pumping blood as a result, which increases blood pressure and decreases blood flow. Many factors affect blood pressure, including eating habits and a sedentary lifestyle (high-fat foods typically have a somewhat unfavorable (Hwang et al., 2019).

The study indicates that hypertriglyceridemia is a critical factor in the development of oxidative stress. Oxidative stress has a major impact on both the pathogenesis of atherosclerosis and endothelial dysfunction. Endothelial dysfunction is associated with nitric oxide (NO) generation, adhesion molecule synthesis, and endothelium-dependent vasodilation. Each of these has a major role in the emergence of hypertension. Furthermore, oxidative stress raises the levels of renin-angiotensin, Therefore, obesity, insulin resistance, hyperinsulinemia, and hyperglycemia—all of which are associated with the onset of hypertension—are significantly influenced by high triglyceride and total cholesterol levels. Additionally, a higher baseline HDL cholesterol level is independently linked to a lower risk of incident hypertension (Chen et al., 2022).

In patients with hypertension, arterial stiffness as determined by pulse-wave velocity was linked to low-density lipoprotein cholesterol (LDL-C), triglycerides (TG), and total cholesterol (TC). Arterial stiffness is a sign of subclinical vascular damage. According to a recent cross-lagged path analysis, arterial stiffness may rise before blood pressure does, suggesting that hypertension is caused by vascular damage rather than the other way around. Dyslipidemia can mechanically damage blood vessels by impairing the activation of endothelial nitric oxide synthase, inflaming blood vessels, and raising oxidative stress.

Increased insulin concentration appears to predispose people to developing hypertension, according to several research. Hyperinsulinemia inhibits renal salt secretion, which results in hypertension, and activates the sympathetic nervous system via acting on the brain (17).

Conclusions

The effects of aging on blood pressure and cholesterol are substantial. Women are more likely to have greater blood pressure and cholesterol as they get older. Cutting down on risk factors is crucial. Although aging is unavoidable, it can be managed. by embracing a healthy lifestyle that encourages physical activity,
keeps them within a reasonable weight range, and restricts their intake of sugar, fat, and salt. To maintain these connections and assess the most effective patient care for each patient category in order to avert CVD and early mortality, more research is required. One of the best ways to prevent dyslipidemia is to consume a well-balanced diet that is high in foods strong in antioxidants. Free radicals, which can lead to dyslipidemia and cardiovascular disease, can be neutralized by antioxidant qualities.

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Disclaimer
None.

Conflict of Interest
None.

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References


