

**The Republic Of Iraq
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**University Of Babylon
College Of Pharmacy**



Heart Disease And Lipid Profile

A Project Submitted to
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as Partial Fulfillment of the Requirements for The Degree
of Bachelor of pharmacy

Submitted By

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Chapter One)Introduction)

1. Introduction**1.1.background:**

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality worldwide, accounting for nearly 30% of the total deaths based on the World Health Organization (WHO) statistics.

The WHO reported that about 17.3 million people have died of CVD in 2016 and that this number will reach up to 23.3 million by 2030 [1].

1.2. pharmacological therapies

Pharmacological therapies including antiplatelet agents, angiotensin-converting enzyme inhibitors/angiotensin receptor blockers, beta-blockers and lipid-lowering drugs play a crucial role in the secondary prevention of CVD [2,3,4].

However, a residual CVD risk remains, for which further management needs to be identified.

1.3. Studies and guidelines

Numerous studies have demonstrated the role of the lipid profile in the progression of CVD.

Increases in triglyceride (TG) and total cholesterol (TC) levels could affect the constriction and abstraction of vessels in the heart, which are significantly correlated with the risk of CVD [5].

Moreover, increases in the low-density lipoprotein cholesterol (LDL-C) level could induce arteriosclerosis owing to accumulation of LDL-C in the intima-media of the artery, which could then promote thrombocytopoiesis [6].

However, the CVD risk might be reduced in persons with increased high-density lipoprotein cholesterol (HDL-C) levels.

Therefore, individuals with high HDL-C and low non-HDL-C may be protected against the risk of CVD.

The ACC/AHA guideline used the intensity of statin therapy as the goal of treatment and recommend the maximum appropriate intensity of statin without adverse effects should be applied [7].

The ESC/EAS Guidelines suggested the treatment targets and goals for CVD prevention and the secondary targets of LDL-C were < 70 mg/dL, < 100 mg/dL, and < 115 mg/dL for very high-risk, high-risk, and low to moderate risk population, respectively [8].

Chapter Two
(Literature review)

2. Literature Review**2.1. Normal function of heart**

The heart is a muscular pump that distributes blood throughout the body. A healthy heart functions in a highly efficient manner.

It provides the peripheral tissues with the oxygen and nutrients necessary to meet local metabolic demands and can adjust its output to meet a range of needs from sleep to extreme exercise.

In some cardiovascular diseases, such as hypertension, the heart may remodel in order to maintain adequate function, but these changes can be maladaptive in the longer term. [9]

2.2. An overview of cardiovascular disease.

Cardiovascular disease is a group of diseases affecting heart and blood vessels.

These diseases can affect one or many parts of heart and/or blood vessels.

A person may be symptomatic (physically experiencing the disease) or asymptomatic (not feeling anything at all).

Cardiovascular disease includes heart or blood vessel issues, including:

- Narrowing of the blood vessels in your heart, other organs or throughout your body.
- Heart and blood vessel problems present at birth.
- Heart valves that aren't working right.
- Irregular heart rhythms. [9]

2.3. cardiovascular disease risk factors

- High blood pressure (hypertension).
- High cholesterol (hyperlipidemia).
- Tobacco use (including vaping).
- Type 2 diabetes.
- Family history of heart disease.
- Lack of physical activity.
- Having excess weight or obesity.
- Diet high in sodium, sugar and fat.
- Overuse of alcohol.
- Misuse of prescription or recreational drugs.
- Gestational diabetes.

- Chronic inflammatory or autoimmune conditions.
- Chronic kidney disease. [10]

2.4. Causes of heart diseases

Over 200 risk factors for cardiovascular disease (CVD) have now been identified.

Among these, the three most important are :

(1) abnormal lipids, including the fact that there are more than 15 types of cholesterol-containing lipoproteins and four different types of triglyceride-rich particles, some of which are very atherogenic.

(2) high blood pressure

(3) cigarette smoking.

In addition, many other factors including diabetes, haemostatic factors such as fibrinogen, factor VII, plasminogen activator inhibitors, and new factors such as apolipoprotein E4 and homocysteine, are known to increase the risk of developing clinical CVD.

A low risk for CVD requires that these various factors are present in the circulation in the correct proportions.

Two simple tests for determining plasma lipid levels can be used to identify those individuals with an atherogenic lipid profile and who are, therefore, at increased risk for CVD.

Firstly, the ratio of total cholesterol to high density lipoprotein cholesterol (HDL cholesterol) should be determined, followed by measurement of plasma triglyceride concentrations.

This will allow differentiation of whether the low density lipoproteins (LDL), HDL cholesterol or triglyceride-rich particles such as the small dense β -very low density lipoproteins (VLDL) are the major cause for concern. Once identified, those individuals with a high lipid risk profile should be treated before, rather than after, experiencing coronary heart disease (CHD [11]).

2.5. statistics

Cardiovascular disease is the leading cause of death worldwide and in the U.S.

Almost half of adults in the U.S. have some form of cardiovascular disease. It affects people of all ages, sexes, ethnicities and socioeconomic levels.

In 2016, cardiovascular disease (CVD) was listed as the underlying cause of death for 841K people in the U.S., a staggering 1 out of every 3 deaths [12].

2.6. Physio-Bio Chemistry of Lipid

The lipids are heterogenous group of compound related actually or potentially to fatty acids.

They have common property of being relatively insoluble in water and soluble in non-polar solvents such as ether, chloroform and benzene (Mayes, 1998) lipids constitute over 10% of the body weight of normal adult individual.

Fifty percent of total caloric requirement per day are derived from lipid. Fat absorbed from the diet and lipids synthesized by the liver and adipose tissue are transported between tissue and organs for utilization and storage.

Since lipids are insoluble in an aqueous medium, so their transport in the plasma presents a special problem.

This problem is solved by associating non-polar lipids (triglycerol and cholesteryl ester) with amphipathic lipids and proteins to makes water soluble lipoproteins are called apo-proteins.

Cholesterol and triglycerides are the two main lipids in the blood [13].

2.7. Classification of total cholesterol

Total cholesterol mg/dl <200 Borderline high :High >240 Lipoproteins : Lipoproteins are water soluble complex of high molecular weight composed of lipids (cholesterol, triglycerides, phospholipids) and one or more specific proteins, called apo- proteins.

Lipoproteins represented the functional unit of for water soluble lipids in the blood.

The lipoproteins are divided into various categories according to density, as determined by ultracentrifugation. Chylomicrons: Chylomicrons formed in the intestine, transport exogenous triglycerides, composed of 98.00-99.50% lipid and 1.2% protein. It floats to form a superficial layer on serum when allowed to stand overnight.

Partially degraded chylomicrons, called chylomicron remnants, carry some atherogenic potential [13].

2.8. Functions of cholesterol

Cholesterol is essential to life, as it performs a number of important functions. It is a structural component of cell membrane.

1. Cholesterol is a precursor for the synthesis of all other steroids in the body. These include steroid hormones, vitamin D and bile acids.
2. It is an essential ingredient in the structure of lipoproteins in which the lipids of the body are transported.
3. Fatty acids are transported to the liver as cholesteryl ester for oxidation [13].

Chapter three
(Patient and Method)

3. patient and methods:

This study is cross sectional one that was conducted over two months period from January 2023 to march 2023 in hospital setting the study was done in ALHilla Iraq at al marjan hospital the final year trained students went to hospital laboratory and collected the analysis of 20 patients 10 of them were male and other was female (analysis about lipid profile) To predict the percent of patients who have risk of heart disease.

3.1 Procdure:

Each one of three student visited the hospital and ask the analystis to give her the analysis result after the end of the visit the student wrote the gender ,age and the result of triglyceride and cholestrole of each patient The research was approved by the clinical biochemistry department in collage of pharmacy university of babylon .

3.2 staistical analysis:

The results were coded and entered in Excel and revised, . Descriptive statistics (result of triglyceride amd cholesterol/avarge of results) were used for all responses.

Chapter Four

(Results)

4. The difference between Cholesterol and Triglycerides.

Figure(4-a), The difference between cholesterol and triglycerides

Group	Age	Correlation	Mean	Sd	Sig
Cholesterol	20-76	0.7695	181	47.69	P>0.5
Triglyceride	20-76	0.7695	82	40.22	

A correlation value of 0.769573356 indicates a strong positive relationship between two variables. In statistical terms, correlation measures the strength and direction of the linear relationship between cholesterol and triglyceride. A value of 0.769573356 suggests that there is a strong positive association between the variables being analyzed. The correlation coefficient ranges from -1 to +1. A positive value indicates a positive correlation, meaning that as one variable increases, the other variable tends to increase as well. In this case, a correlation value of 0.769573356 indicates that as cholesterol increases, the triglyceride tends to increase with a relatively strong linear pattern. Figure (4-a).

It's important to note that correlation does not imply causation. Even though two variables may be strongly correlated, it does not necessarily mean that cholesterol is causing the triglyceride to change. Correlation simply quantifies the relationship between variables and provides a measure of how well they vary together. Figure (4-a).

Figure(4-b), Cholesterol calculation for Patient and Control

Group	No. Of Samples	Mean of cholesterol	Sd	Sig
Patient	22	132	21.3	P<0.5
Control	20	120	22.6	

A cording to T.test there was significant difference between the mean of cholesterol, Figure(4-b).

Figure(4-c), Cholesterol triglyceride for Patient and Control

Group	No. Of Samples	Mean of Triglyceride	Sd	Sig
Patient	22	65	18.9	P>0.5
Control	20	97	20.4	

A cording to T.test two samples mean that referred there where no significant difference was found between the mean of triglyceride of patient and control, Figure(4-c).

Chapter Five
(Discussion)

DISCUSSION:

The elevated lipid profile is an important risk factor for cardiovascular diseases in among young and old population.

The National Cholesterol Education Program (NCEP) recommends lipid screening beginning at age twenty and continuing every five years, with normal levels, and more frequently with abnormal levels throughout adulthood.

This research provides information regarding the serum cholesterol and triglycerides levels among different gender , weight and age.

The balanced lipid profile is an important factor, in adult age to maintain good health and in the later life to avoid early morbidity .

Thus blood lipid profile in adults should be screened as early as possible to detect imbalances.

At the age (20-30) the cholesterol between (150-200) and triglycerides (60-90) when the physical activity and dietary habits are likely to become better which may be the reason of lower TC, triglycerides and higher HDL-C levels .

At the age (30-50)the cholesterol level also (150-200) and triglycerides(70-120) But at age (50-70) there is an increase in cholesterol and triglycerides, cholesterol level (220-300) and triglycerides (150-180) ,The aging Liver Blood vessels lose the ability to supply sufficient blood flow .

Free radicals move in and cause further cell damage and death.

These combined actions interfere with the liver's ability to metabolize LDL cholesterol by up to 35 percent.

Also we notice that cholesterol and triglycerides in females younger than 50 are lower than older age and also lower than male because the effect of estrogen that increase HDL(good cholesterol)and reduce LDL(bad cholesterol)and also affect the level of triglycerides.

But females over 50(post menopause)have cholesterol and triglycerides higher than younger age (lack of estrogen)in post menopausal female so the risk of CAD and IHD increase in Female postmenopausal.

The correlation is significant at the level 0.01(2_tailed) So the relationship between cholesterol and triglycerides is Positive relationship which correlation is 0.7695.

Chapter Six
(Conclusion)

CONCLUSION:

The outcome of this study is most people should conduct a healthy lifestyle.

Consuming a balanced diet, staying hydrated, and getting adequate amount of sleep, together with exercise and a healthy lifestyle will ensure both physical and mental health.

It is recommended that any person should have lipid profiles checked at least by the age of 10 years, to detect imbalances early, so that necessary modifications in dietary consumption of fats, adoption of healthy lifestyles and encouragement of physical activity can be done and to detect if there is any possible risk of heart disease or atherosclerosis to overcome this problem by normalise lifestyle or maybe by taking antihyperlipidemic drug.

Chapter Seven
(Recommendations)

Recommendations:

1. Patients should be aware about analysis the level of lipid profile (especially with family history of dyslipidemia and heart diseases)and take care of their life style .
2. As a pharmacist we give advices for patients with heart disease to analysis the level of lipid profile and reffer them to the cardiologist.
3. They must be carefule about the Medication best time to take (statins should be taken at night).
4. Encourage any physical activity and aim for at least 30minutes of moderate intensity physical activity on most.
5. Suggest a target waist measurement <94cm for men and <80cm for women,and BMI $\leq 25 \text{kg/m}^2$.