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Risk Factors for Dyslipidemia among Hypertensive Patients Attending the Laboratory of the European Gaza Hospital: Case Control Study

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Dedication

To my mother who has always supported me

To my wife who has supported me along the time

To my children Taqa, Ahmed and Abed EL-Rahman

To my brothers and sisters who spared no effort to help

To my aunt for her support

Hader Abu Zohry

Declaration:

I certify that this thesis submitted for the degree of master, is the result of my own research, except where otherwise acknowledged, and that this study (or any part of the same) hasn't been submitted for a higher degree to any other university or institution.

Signature

Hader Abu Zohry

Date:

Acknowledgment

Many individuals contribute to the completion of a successful work, including the creation of this dissertation. Different members brought different gifts, experiences, and expertise to the work completion of this study.

I wish to thank all who made this work possible. The list of individuals who have provided support, advice, and time and impressive. Although I am not able to adequately recognize all on that list, I would like to acknowledge few of these individuals. I would like to express my gratitude to my supervisor Associate Prof. Dr. Yousef Aljeesh, Prof. Dr Yehia Abed, Dr. Bassam Abu Hamad, al Quds university teams for their support, patience, special insights and encouragement throughout my research. It is not often that one finds advisors who always find the time for listening to the little problem and roadblocks that unavoidably crop up in the course of performing research.

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I would like to thank all my friends who supported and helped me for their useful care, and continuous support.

To all of those individuals and institutions I owe many thanks for their insights and unlimited support

Abstract

Dyslipidemia is a common health problem in developed and developing countries and the prevalence is rising steadily. This study aimed to identify risk factors that may lead to dyslipidemia in hypertensive patients, which in turn may contribute to the preparation of preventive programs to decrease mortality and morbidity from hypertension and dyslipidemia. The design of the study was case-control, which is practical and economical design for studying risk factors. The study sample consisted of 237 participants, divided into three groups (case group included 79 hypertensive patients with dyslipidemia, control group included 79 hypertensive patients without dyslipidemia and 79 normal persons). Participants were selected from European Gaza Hospital (EGH) during the period from January 1st 2009 to December 31st 2010. the study instrument consisted of Socio-demographic characteristics, history of smoking, physical activity, compliance to diet and lipid profile. The lipid profiles were analyzed by spectrophotometer at EGH medical laboratory. The study results showed that risk factors for dyslipidemia included; obesity (Chi square = 18.775; P = 0.001), low level of education (Chi square = 19.50; P = 0.012), non compliance to diet (Chi square = 6.723; P = 0.035) and not working or being retired (Chi square = 13.484; P 0.001). Smoking was not significant factor (Chi square = 1.373; P = 0.503) and it could be due to the fact that the majority of participants were female and culturally females are not smokers. The results also showed that even though there were some differences between the three groups in the other factors, but it did not reach significance level: income (Chi square = 1.31; P = 0.518), physical activity (Chi square = 1.085; P = 0.581). In conclusion, the results highlighted some serious issues that need special programs at primary and secondary levels to reduce and modify the risk factors of dyslipidemia. Clients with the identified risk factors need more attention and follow up to reduce the chance of developing dyslipidemia.

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List of Abbreviation

BMI	Body Mass Index
BP	Blood Pressure
CHD	Coronary Heart Disease
CVD	Cardiovascular Disease
EGH	European Gaza Hospital
EMRO	Eastern Mediterranean Regional Office
GNP	Gross National Product
HDL-C	High-Density Lipoprotein Cholesterol
ICU	Intensive Care Unit
LDL-C	Low-Density Lipoprotein Cholesterol
MOH	Ministry of Health
NCEP ATP III	National Cholesterol Education Program(Adult Treatment Panel III)
NGOs	Non-governmental Organization
TC	Total Cholesterol
TG	Triglycerides
UNEP	United Nations Environment Programmes
UNRWA	United Nations Relief and Works Agency
U.S.A	United States of America
WHO	World Health Organization

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Chapter One

1.1 Introduction

No one can deny that hypertension is the one of most common diseases in the developed and developing countries. Hypertension is a major health problem throughout the world because of its high incidence, prevalence and its association with increased risk of cardiovascular disease. The use of advanced technology in the diagnosis and treatment of hypertension has played a major role in recent dramatic declines in coronary heart disease and stroke mortality in all world countries. However, in many of these countries, the control rates for high blood pressure have actually slowed in the last few years. It is estimated that by 2015, 1.2 billion people will be suffering hypertension worldwide (WHO, 2010).

In the Eastern Mediterranean Region, the prevalence of hypertension averages 29% and it affects approximately 125 million individuals. Of greater concern is that cardiovascular complications of high blood pressure are on the increase, including the incidence of stroke, end-stage renal disease and heart failure (WHO, 2010). Hypertension, also known as high blood pressure, is a very common and serious condition that can lead to many complicated many health problems including coronary heart disease, stroke, kidney failure and heart failure.

Hypertension disease in Palestine is the eighth-leading cause of deaths in total population (4.8%), while it was the ninth leading cause of deaths in males and females (2.7% and 3.8% respectively). Hypertension disease is the fifth-leading cause of cardiovascular diseases deaths in Palestine, 12.9% of the total cardiovascular mortality with a rate of 13.0 per 100,000 (Palestine, MOH, 2005). The epidemic of cardiovascular diseases has been observed in developing countries (WHO, 2003).

Dyslipidemia which has been closely linked to cardiovascular diseases is a key independent modifiable risk factor for cardiovascular diseases (Groundy, 1997). The prevalence of dyslipidemia is high and increasing in most developed countries (Wietlisbach, *et al*. 1997) as well as in many developing countries as the result of the westernization of diet and other life style changes (Yamada, *et al.* 1997). The World Health Organization estimates that dyslipidemia is associated with more than half of the global cause of ischemic heart diseases (WHO, 2002). It has been shown that effective treatment of dyslipidemia reduces the rate of morbidity and mortality (Costa, *et al.* 2006).

1.2 Research problem

Cardiovascular disease (CVD) is the most important cause of death in both developed and developing countries of the world population (WHO, 2003).

Dyslipidemia plays an important rule in the development of cardiovascular disease, which has become the leading cause of death in most developed countries as well as in developing countries. According to the World Health Report for 2002 indicates that hypercholesterolemia was the 10th leading risk factor in developing countries and the fourth in developed countries. The 2002 World Health Report indicated that high plasma cholesterol levels are responsible for 56% of CHD and 18% of nonfatal cerebrovascular diseases worldwide (WHO, 2002).

Around one in three adults in England and Scotland have high blood pressure ≥140/90 mmHg. About 57 % of men and 61 % of women in the United Kingdom have mean blood cholesterol levels of 5.3 mmol/L(200mg/dl) for men and 5.4 mmol/L(205mg/dl) for women or above (British Heart Foundation, 2008).

About 40 % of Canadians have high blood cholesterol. This equates to an estimated 10 million Canadians (Heart and Stroke Foundation of Canada, 2008).

According to Palestine Ministry of Health; CVD is the first leading cause of death among Palestinians in 2005 (Palestine, MOH, 2005).

There is no Epidemiological data base about dyslipidemia in Palestine. Many risk factors of dyslipidemia can be modifiable. We hope the result of this study will help directly or indirectly in decreasing the morbidity and mortality rates due to dyslipidemia. Because of limited studies conducted to investigate the factors affecting dyslipidemia in Gaza strip we hope that this study will be the first data base to promote evidence-based diagnosis and management guideline of dyslipidemia.

1.3 Justification of the study

Dyslipidemia association to many diseases such as hypertension, cardiovascular, diabetes and others. Studying dyslipidemia risk factors among hypertensive patients in Gaza Strip, especially in young patients, are potentially useful for raising awareness of the relationship between dyslipidemia and hypertension. The study is important to be conduct in Gaza strip to decrease the cardiovascular mortality and to know the risk factors of dyslipidemia. .

There is no epidemiological data base about dyslipidemia in Palestine. Because of limited study conducted to investigate factors affecting dyslipidemia in Gaza strip we hope that this study will be considered as a base line data to promote evidence-based diagnosis and management guideline of dyslipidemia.

1.4 Objectives

1.4.1 General objective

The general objective of the study is to investigate the common risk factors that are related to development of dyslipidemia among hypertensive patients in European Gaza Hospital.

1.4.2 Specific objectives

1-To identify risk factors affecting dyslipidemia among hypertensive patients(smoking, obesity, physical activity, monthly income, compliance to diet).

2-To identify the relationship between socio-demographic characteristics (work status and level of education) and dyslipidemia.

3- To suggest recommendation to the policy makers and health professionals for adapting creative ways to control risk factors of dyslipidemia.

1.5 Research questions

1- What are the risk factors that affect dyslipidemia among hypertensive patients?

2- Is there an association between level of education and dyslipidemia?

3- Is there an association between work status and dyslipidemia?

4- Is there an association between family income and dyslipidemia?

5- Is there an association between physical activity and dyslipidemia?

6- Is there an association between smoking and dyslipidemia?

7- Is there an association between obesity and dyslipidemia ?

8- Is there an association between compliance to diet and dyslipidemia?

1.6 Context of the study

This study was conducted in European Gaza Hospital; therefore, the researcher presents some background information about the demographic, geographic context, population, Palestinian economy, health situation that have impact on the quality and the utilization of the health services. In addition, some information about the place of the study.

1.6.1 Demographic context

The entire area of historical Palestine is about 27,000 Km2, Palestine stretching from Ras Al-Nakoura in the north to Rafah in the south. Palestine is bordered by Lebanon in the north, the Gulf of Aqaba in the south, Syria and Jordan in the east and by Egypt and the Mediterranean Sea in the west. Palestine was placed under the British mandate in 1919 which had been terminated by Israel establishment in 1948 implementing the Balfour Declaration of 1917 had promised a homeland for Jews. The result of implementation of that promise was the uprooting of most of the Palestinians from their cities, towns, and Villages and the migration to the West bank, Gaza strip, Jordan, Lebanon, Syria, and many other countries (Abu-Lughod, 1971).

Based on estimates prepared by Palestinian Central Bureau of Statistics (PCBS) according to the results of the Population, Housing and Establishment Census of 2007, the total population of the Palestinian territory at mid-2011 was about 4.17 million; 2.12 million males and 2.05 million females. The estimated population of West Bank was 2.58 million of which 1.31 million males and 1.27 million females, while the estimated population of Gaza Strip (GS) totaled 1.59 million of which 806 thousand males and 782 thousand females. The percentage of urban population mid-2011 was about 73.8%, while the percentage of population in rural and camps areas was 16.9% and 9.3% respectively.

Data revealed that the population of the Palestinian territory is a young population; the percentage of individuals aged (0-14) constituted 40.8% of the total population at mid 2011of which 38.9% in West Bank and 44.1% in GS. The elderly population aged (65 years and over) constituted 2.9% of the total population of which 3.3% in the West Bank and 2.4% in GS of mid-2011. Population density of The Palestinian territory is generally high at 693 persons/ Km2, particularly in GS is 4,353 persons/km2 compared to lower population density in West Bank at 456 persons / Km2 at mid-2011 (PCBS, 2011).

Gaza Strip

Gaza strip is a narrow piece of land lying on the coast of the Mediterranean Sea. Its position on the crossroads from Africa to Asia made it a target for occupiers and conquerors over the centuries. The last of these was Israel who occupied the Gaza strip from Egyptians in 1967. Gaza Strip is very crowded place with area 378 sq. Km.(UNEP, 2003). and constitutes 6.1% of total area of Palestinian territory land. In year of 2010 the population number is to be 1,561,906 mainly concentrated in the cities, small villages, and eight refugee camps that contain two thirds of the population of Gaza Strip. In Gaza Strip, the population density is 4,279 inhabitants/km (Palestine, MOH, 2010).

1.6.2 Socio-economical context

The Palestinian economy is severely depressed compared with the pre-intifada period. Real growth of the gross domestic product (GDP) was estimated at 9.3 per cent for 2010, consisting of 7.6 per cent in the West Bank and 15.1 per cent in Gaza. While the gradual easing of movement restrictions contributed to economic growth in the West Bank, the main drivers were public expenditure by the Palestinian Authority and donor support, and also higher private sector confidence and reforms by the Authority. Growth in Gaza was in part attributed to the relaxation of the closure by Israel. Unemployment rates fell slightly in 2010, compared with 2009, from 17.8 to 17.2 per cent in the West Bank, and from 38.6 to 37.8 per cent in Gaza (United Nations, 2011).

According to the national account the real GDP per capita in year 2010 was 1924, 6 US$ in West Bank and 876.7 US$ in Gaza strip. This situation is a result of Israeli enforced restriction on Palestinian movement, military operations, land confiscation and leveling and the construction of Barrier in addition to other escalating activities imposed on Palestinian people (PCBS, 2010).

1.6.3 Health care system

Three main health providers offer health service in Gaza strip, UNRWA, NGOs/private and the Ministry of Health. MOH bears the heaviest burden, as it takes over the responsibility in Gaza strip for 59 primary health care centers, 25 hospitals and one rehabilitation center. (Palestine, MOH, 2010). Secondary health care services are provided by governmental, nongovernmental, UNRWA & private sector. The MOH is responsible for the main portion of the secondary health care services 60 – 70 % of the general & specified beds. There are 76 general hospitals with 4,878 beds 50.336 population/hospital ratio (Palestine, MOH, 2008).

1.6.3.1 European- Gaza hospital

European Gaza Hospital (EGH) is considered one of the advanced medical centers in the Palestine, located In Khan younis Governorate at the southern. The hospital complex contains facilities for a full range of secondary, primary and planned tertiary patient care services for both inpatients and outpatients. The services of the 240 bed center are at a high level of professional standards. EGH includes within its large margins, medical, surgical, orthopedic, cardiology, urology, cardiac catheterization, pediatrics, radiology, occupational health, pediatrics oncology, pediatrics hematology, adult oncology, ENT & audiometric surgery, Anesthesia and ICU (adult & pediatrics). Some patients may be refereed from khan younis to other hospital to receive medical and surgical care that are not provided in there (MOH, 2009).

1.7 Definition of Terms

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Obesity: WHO defined obesity as body mass index {BMI=weight (kg)/height (m2)} equal to and greater than 30kg/m2.

A smoker: a smoker can be defined as someone who, at the time of survey, smokes any type of tobacco product daily or occasionally.

Physical inactivity: physical inactivity could be defined as, no reported exercise, recreation, or physical activities(other than regular job duties) during the previous 2 month-prior the time of survey.

Physical activity: reported exercise, recreation, or physical activities(other than regular job duties) during the previous 2 month-prior the time of survey.

Low level of education: Is the level participating in the study so that the level of no more than high school.

High level of education: Is the level participating in the study so that the level of more than bachelor degree.

Hypertensive patient

It is defined as the patient with blood pressure ≥140/90 mmHg. Prehypertension refers to systolic blood pressure 120–139 mmHg or diastolic 80–89 mmHg. Normal blood pressure is referred to as <120/80 mmHg(WHO, 2006).

Dyslipidemia

High total cholesterol (TC) (> 200) , high triglyceride (TG) > 150) , high low density lipoprotein cholesterol (LDL) (> 130) and low high density lipoprotein cholesterol (HDL) (< 40) (NCEP ATP III, 2002).

1.8 Lay out of the study

This study consists mainly from five chapters: introduction, conceptual framework and literature review, methodology, results and discussion, conclusion and recommendations.

The first chapter browsed general introduction to the study, where a brief background regarding the subject of the study was provided. The researcher illustrated the research problem, justification for conducting the study, objectives of the study, questions of the study, definition of terms and context of the study.

The second chapter included two parts: the first part is conceptual framework where the researcher provided a schematic diagram of the conceptual framework of the study. The second part is the literature review related to the study topic and variables. In-depth detailed theoretical inquiry including previous studies were presented.

The third chapter described methodology including study design, population, instrument, pilot study including validity and reliability of study instrument, ethical considerations and statistical analysis.

In the fourth chapter, the study results and discussion were presented. The researcher treated the results in form of tables that make it easy for the reader to understand and make comments. The results were discussed in respect to available published previous studies that directly related to the topic of this study and its objectives.

Finally, in the fifth chapter, the researcher presented conclusion and recommendations in the light of the study results.

Chapter II

Literature Review

2.1 Conceptual Framework

Some related variables affect the occurrence of dyslipidemia among hypertensive patients in European Gaza Hospital, they include but not limited to: age, obesity , gender , Control of diet , level of education, work status, smoking and physical activity. Conceptual frame work includes two categories, each of them represent a determinant that will be studied in this research.

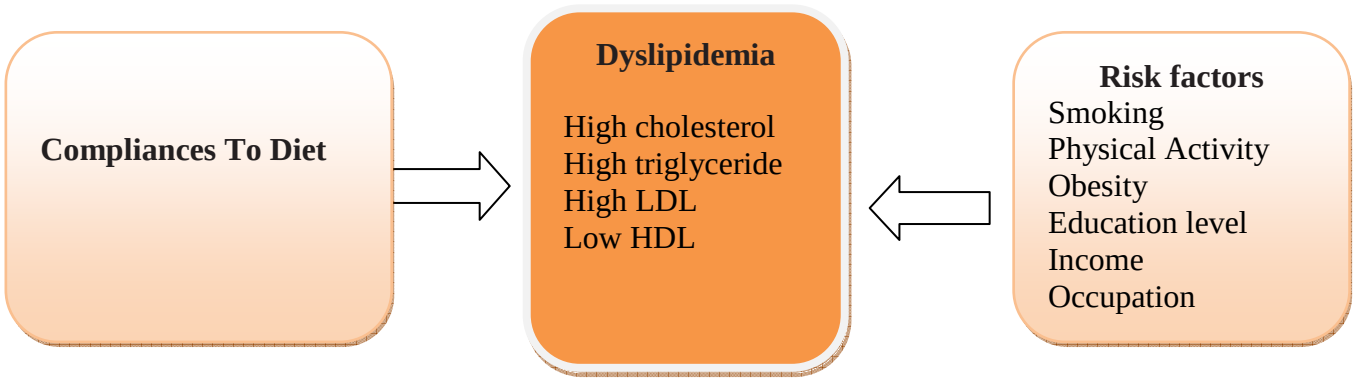

Figure (2.1): Conceptual Framework diagram

2.2 Magnitude of the problem

Worldwide, hypertension is a major global chronic non communicable disease. One-quarter of the world's adult population has hypertension, and this is likely to increase to 29% by2025. The absolute prevalence of hypertension in economically developed nations is 37.3% compared with 22.9% in developing nations. However, because there is a much larger population in the developing world, the absolute numbers of patients affected by hypertension are considerably higher and are likely to grow as increased globalization and economic improvement lead to urbanization and longer life expectancy

(Kearney, *et al*, 2005).

In the Eastern Mediterranean Region, the prevalence of hypertension averages 29% and it affects approximately 125 million individuals .Of greater concern is that cardiovascular complications of high blood pressure are on the increase, including the incidence of stroke, end-stage renal disease and heart failure (WHO, 2010).

Hypertension, also known as high blood pressure, is a very common and serious condition that can lead to and/or complicate many health problems. These include coronary heart disease, stroke, kidney failure and heart failure.

Hypertension disease in Palestine is the eight-leading cause of deaths in total population (4.8%), while it was the ninth leading deaths in males and females (2.7% and 3.8%) of males and females deaths respectively. Hypertension disease is the fifth-leading cause of cardiovascular diseases deaths in Palestine 12.9% of the total cardiovascular mortality, with a rate of 13.0 per 100,000 (Palestine, MOH, 2005).

WHO defined hypertension as a blood pressure ≥140/90 mmHg (WHO, 2006).

Dyslipidemia, a major systemic disorder, is one of the most important risk factors for cardiovascular diseases which are a major cause of morbidity and a leading casus of mortality worldwide(Murray, and Lopez, 1997).

According to World Health Report for 2002 indicates that hypercholesterolemia is the 10th leading risk factor in high mortality in developing countries, and the fourth in developed countries and high plasma cholesterol levels are responsible for 56% of CHD and 18% of nonfatal cerebrovascular diseases worldwide (WHO, 2002).

About 57 % of men and 61 % of women in the United Kingdom have mean blood cholesterol levels of 5.3 mmol/L(200mg/dl) for men and 5.4 mmol/L(205mg/dl) for women or above (British Heart Foundation, 2008).

About 40 % of Canadians have high blood cholesterol. This equates to an estimated 10 million Canadians (Heart and Stroke Foundation of Canada, 2008).

Many health education programmers focus of reduction of CVD through reduce Cholesterol levels < 200 mg/dL or low-density lipoprotein cholesterol (LDL-C) < 130 mg/dL, blood pressure (BP) < 140/90 mmHg are the aims for optimal health in these programmers. Erem.c.et al 2008 conducts research about prevalence of dyslipidemia and associated risk factors among Turkish adults and shows the prevalence of high TC, LDL-C and TG, and low HDL-C increased steadily with increase hypertension.

Dyslipidemia was defined by the presence of one or more than one abnormal serum lipid concentration.

Cholesterol is a waxy, fat-like substance that is found in all cells of the body. The body needs some cholesterol to work the right way. The body makes all the cholesterol it needs. Cholesterol is also found in some of the foods eat. Body uses cholesterol to make hormones, vitamin D, and substances that help in digest foods. Cholesterol travel in blood stream and carried in small packages called lipoproteins . The small packages are made of fat (lipid) on the inside and proteins on the outside. Two kinds of lipoproteins carry cholesterol throughout body. Low-density lipoprotein (LDL) which sometimes called bad

cholesterol. High LDL cholesterol leads to a buildup of cholesterol in arteries. The higher the LDL level in the blood, the greater chance to cause heart disease.

High-density lipoprotein (HDL) cholesterol is sometimes called good cholesterol.

HDL carries cholesterol from other parts of body back to liver. The liver removes the cholesterol from the body. The higher HDL cholesterol level, decrease chance of getting heart disease (American Heart Association, 2011). Cholesterol can build up in the walls of arteries (blood vessels that carry blood from the heart to other parts of the body).

This buildup of cholesterol is called plaque . Over time, plaque can cause narrowing of the arteries. This is called atherosclerosis, or hardening of the arteries .Special arteries, called coronary arteries, bring blood to the heart. Narrowing of coronary arteries due to plaque can stop or slow down the flow of blood to heart. When the arteries narrow, the amount of oxygen-rich blood is decreased. This is called coronary heart disease (CHD). Large plaque areas can lead to chest pain called angina . Angina happens when the heart does not receive enough oxygen-rich blood. Angina is a common symptom of CHD. Some plaques have a thin covering and can burst (rupture), releasing cholesterol and fat into the bloodstream. The release of cholesterol and fat may cause blood to clot. A clot can block the flow of blood. This blockage can cause angina or a heart attack. Lowering cholesterol level decreases chance for having a plaque burst and cause a heart attack. Lowering cholesterol may also slow down, reduce, or even stop plaque from building up .Plaque and resulting health problems can also occur in arteries elsewhere in the body.

(National Heart Lung and Blood Institute, 2008).

There are many factors affecting dyslipidemia and hypertension. These factors affect adversely the general health of hypertension patients. Researches approved that there are some factor associated with dyslipidemia such as age, smoking, BMI (obesity), gender, physical inactivity, social class and educational level.

Cross-sectional population-based study of Prevalence, treatment and control of dyslipidemia in Switzerland in 2010, the study found that Prevalence of dyslipidaemia was positively related with age, smoking and BMI (P for trend <0.001) and presence of CVD (OR=20.9, 95% CI: 16.0–27.1). Also, it showed negatively related with female sex (OR=0.70, 95% CI: 0.60–0.82) and higher educational level (P for trend 0.010)

(Firmann, *et al.* 2010).

A study conducted to determine Prevalence of dyslipidemia and its associated factors among Jordanian adults. The result shown that prevalence of dyslipidemia was greater in men than women except for TC and was significantly associated with age, male sex, and BMI (Khader, *et al.* 2010).

Another study examined of Prevalence and Associated Factors of Dyslipidemia in the Adult Chinese Population. The result showed that presence of dyslipidemia was significantly associated with increasing age (odds ratio (OR):1.02; 95% confidence interval (CI): 1.01, 1.03), female gender (OR:1.51; 95%CI: 1.25, 1.83), body mass index (OR:1.13; 95%CI: 1.10, 1.15),diastolic blood pressure (OR:1.02; 95%CI: 1.01, 1.03), and smoking (OR:1.23; 1.01, 1.51). Among those who had dyslipidemia (Wang, *et al.* 2011).

2.3 Prevalence of Risk Factors

In a nationwide study conducted in Germany with 1,511 primary care physicians and 35,869 patients we determined the prevalence of dyslipidemia, its recognition, treatment, and control rates. Diagnosis of dyslipidemia was based on TC and LDL-C. Basic descriptive statistics and prevalence rate ratios, as well as 95% confidence intervals were calculated. Results: Dyslipidemia was highly frequent in primary care (76% overall). 48.6% of male and 39.9% of female patients with dyslipidemia was diagnosed by the physicians. Life style intervention did however control dyslipidemia in about 10% of patients only. A higher proportion (34.1% of male and 26.7% female) was controlled when receiving pharmacotherapy. The chance to be diagnosed and subsequently controlled using pharmacotherapy was higher in male (PRR 1.15; 95%CI 1.12–1.17), in patients with concomitant cardiovascular risk factors, in patients with hypertension (PRR 1.20; 95%CI 1.05–1.37) and cardiovascular disease (PRR 1.46; 95%CI 1.29–1.64), previous myocardial infarction (PRR 1.32; 95%CI 1.19–1.47), and if patients knew to be hypertensive (PRR 1.18; 95%CI 1.04–1.34) or knew about their prior myocardial infarction (PRR 1.17; 95%CI 1.23–1.53)(Thiessen, *et al*. 2008). Another study conducted in France to determine Low High Density Lipoprotein Cholesterol: Prevalence and Associated Risk-Factors in a Large French Population. A group of 18,483 men and 22,047 women 16–79 years of age were investigated during a medical check-up. Relevant parameters were studied in three groups according to age and gender specific percentile classes (<5th [HDL5] median and O95th). Gender-specific logistic regression models selected variables associated with HDL5. RESULTS: Using the National Cholesterol Education Program Adult Treatment Panel III criteria (threshold: 40 mg/dL in men, 50 mg/dL in women) the prevalence of low HDL-C was 11.1% and 26.4% in men and women and it decreased with age. Mean HDL-C levels increased with age. HDL5 was positively associated with a sedentary lifestyle and

deprivation ($p < 0.00001$) (ROUVRE, *et al.* 2011). Other study conducted in Lithuanian to exam in describe trends in serum total, low and high density lipoprotein cholesterol, triglycerides and nutrition habits in Lithuanian rural population between 1987 and 1999. The article presents the data of three screenings of random samples of the population aged 25–64 of five Lithuanian rural regions. The increasing age was strongly correlated with higher prevalence of hypercholesterolemia in both genders. The prevalence of hypercholesterolemia was higher among men with higher education, overweight, hypertension and smokers than among those with low education, normal weight, normal level of blood pressure and nonsmokers. In women hypercholesterolemia was associated only with hypertension (Grabauskas, *et al.* 2003). Another study conducted in India to analyze Prevalence of dyslipidemia in Young Adult Indian Population. The result shown that prevalence of dyslipidemia was greater in men than women and was significantly associated with age, male sex. The prevalence of dyslipidemia was observed to be higher in males then in females. Among participants who had a total Cholesterol (TC) concentration $\geq$ 200mg/dl, 38.7% were males and 23.3% were females. High density lipoprotein cholesterol (HDL-C) was abnormally low in 64.2% males and 33.8% in females. The increase of prevalence of hypercholesterolemia and hypertriglyceridemia was more prominent in 31-40 age group than in $\leq$ 30 age group (Sawant, *et al.* 2008).

Other study conducted in China to exam in the prevalence of Dyslipidemia and Associated Factors Among the Hypertensive Rural Chinese Population, across-sectional survey was conducted during 2004 - 2006 through a cluster multistage sampling to a resident group of 6,412 individuals (2,805 men, 3,607 women) with hypertension, aged > 35 years. The result showed that Risk factors of TC and LDL-C were women, age prevalence for both was significantly higher in women than in men ($p < 0.001$) and prevalence of both increased with increased age ($p < 0.001$) (Zhang, *et al*. 2006).

Another study investigate the plasma lipid levels in a national representative sample of subjects and to determine the prevalence of dyslipidemia in the Chinese population. Methods Plasma lipid profile was analyzed using the data obtained during the Chinese national nutrition and health survey (CNHS) in 2002 which involved 14 252 participants at the age of 18 years or older. Results shown that the mean levels of total cholesterol (TC), triglyceride (TG) and high density lipoprotein cholesterol (HDL-C) in the participants were 3.81 mmol/L, 1.10 mmol/L, and 1.30 mmol/L, respectively. In the groups of participants at the age of 18-44 years, 45-59 years, and over 60 years the mean TC level was 3.70 mmol/L, 4.09 mmol/L and 4.21 mmol/L, respectively, and the mean TG level was 07 mmol/L, 1.21 mmol/L, 1.20 mmol/L, 1.29 mmol/L, 1.33 mmol/L, and 1.33 mmol/L, respectively. The prevalence of dyslipidemia in Chinese adults was 18.6% and 22.2% in males and 15.9% in females. Dyslipidemia prevalence was higher in urban districts than in rural areas (21.0% vs. 17.7%). The prevalence of hypercholesterolemia, hypertriglyceridemia, and low HDL cholesterol was 2.9%, 11.9%, and 7.4% respectively among the participants (ZHAO, *et al*. 2007).

Another study population-based, cross-sectional study in the Xinjiang pasture area was performed which included 2251 participants aged over 30 years (90.33% participation rate) of whom 71.26% were Kazaks. Several risk factors were considered: hypertension (defined as systolic or diastolic blood pressure or both of at least 140/90 mmHg measured on one occasion or treatment for hypertension) overweight/obesity (body mass index ≥ 25 kg/m2) alcohol intake, smoking/tobacco use and dyslipidemia. Outcomes were prevalence of hypertension, obesity and dyslipidemia and the associated risk factors of hypertension detected by multivariate logistic regression analysis taking into account various metabolic and lifestyle characteristics. Results: The prevalence of hypertension, overweight/obesity and dyslipidemia in all participants from the pasture area of Xinjiang was 51.9%, 47.9%

and 49.2% respectively. Independently, the prevalence and awareness of hypertension was 52.6% and 15.3% among Kazaks (n = 1604), 54.6% and 14.1% among Uygurs (n = 418), 39.5% and 16.1% among Mongolians (n = 81) and 43.9% and 18.2% among non-Xinjiang-born Han immigrants (n = 148). The prevalence of overweight/obesity in Kazaks, Uygurs, Mongolians and Han immigrants was 46.7%, 48.9%, 62.5% and 50.3%, respectively. The prevalence of dyslipidemia in the four ethnic groups mentioned was 53.5%, 34.8%, 49.3% and 47.3%, respectively. The mean blood pressure in all participants was 136/86 mmHg (pre-hypertensive), the mean BMI was 24.7 kg/m2. Based on multiple logistic regression analysis, the significant risk factors for hypertension were age [1.07(1.06-1.09), P < 0.0001], overweight/obesity [overweight: 1.61(1.22-2.13), p = 0.0007; obesity: 1.95 (1.33-2.87), p = 0.0007], hypercholesterolemia [1.30(1.15-1.47), p < 0.0001] and an alcohol intake of over 30 g/day [2.22(1.43-3.45), p = 0.0004] (Yao, *et al*, 2010).

Another study conducted in Thailand to exam in Dyslipidemia in Thai Rural Adults Random sampling was conducted in 443 volunteers, 187 males and 256 females, aged > 35 years present the results showed the high prevalence of dyslipidemia in the present study group, especially in the women. It was found that 57.03% of the women and 46.51% of the men had a total cholesterol level greater than 200 mg/dL, while 20.31% of the women and 17.1% of the men had a total cholesterol level greater than 240 mg/dL.. In addition, the serum cholesterol level increased by age in both genders (Nillakupt, *et al*, 2005).

Another study was conducted in Korea to analyze Prevalence of Low HDL-Cholesterol Levels and Associated Factors Among Koreans data were obtained from the 1998 Korean National Health and Nutrition Examination Survey, which was a cross-sectional national health survey. The total study population amounted to 7,300 individuals (3,283 men, 4,617 women), aged 18 years and older. . It was found that was a greater risk of low HDL-C with an increased body mass index, abdominal obesity, cigarette smoking, and physically

inactive lifestyle in men (Kim, *et al.* 2006). Another study conducted in Taiwan to exam in Prevalence of Dyslipidemia and Mean Blood Lipid Values in Taiwan: Results from the Nutrition and Health Survey in Taiwan (NAHSIT, 1993-1996) They found that (a) cholesterol levels of males were lower than females in mid-to old age group (≥ 45 years old); (b) triglyceride values of females were lower than males in young adulthood (19~44 years), but higher than males after the age of 45 years, and (c) adult females had higher HDL-C value and lower ratio of total cholesterol to HDL-C than males. The prevalence of hypercholesterolemia was 10.2% in adult males and 12.6% in mid-to-old aged men, and that in females was 11.2% and 24.4%, respectively. The prevalence of hypertriglyceridemia was 13.4% and 6.1% in adult males and females (≥ 19 years as a whole), respectively. It was 12.3% in mid-to-old aged men (≥ 45 years), and 11.9% in women. The mean cholesterol values were similar to values of several previous surveys in different areas of Taiwan. But it was higher than those in some areas of Mainland China, and lower than those of western countries. People in metropolitan cities had a higher level of blood cholesterol than other areas. The average triglyceride values of males and females were higher than those of previous studies in Taiwan and of people in Mainland China. Mountainous stratum with predominantly aboriginal residents had higher level of triglycerides and body mass index (BMI) than other strata. The associations between dietary intakes of men and women and blood lipids were examined controlling for age and BMI. Result showed that Keys score, which was derived from saturated fat, polyunsaturated fat and dietary cholesterol of a 24-hour recall, was positively related to blood cholesterol and LDL-C in men, but not in women. Average alcohol intakes per day were related to HDL-C positively, but LDL-C negatively in men and women. The regional differences in blood lipid profiles in Taiwan are consistent with the dietary and life-style variations island-wide (Chang, *et al* . 2002).

Another study was conducted in Nepal to exam in the Lipid profile of adult Nepalese population (n = 454; M: 180 and F: 274; Mean age: 42.8±15.5 years). The mean ± SD (mg/dl) level of total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL) and high density lipoprotein (HDL) was 184±50.7, 147.4±79.9, 111.9±42.0 and 45.0±11.7, respectively. All lipid levels except LDL were higher among 41 to 60 years age group while LDL was higher among participants aged >60 years. Desirable TC level (<200 mg/dl) was found in 78.0% of the total population while the normal TG (<150 mg/dl) and LDL (<129 mg/dl) was found in 61.5% and 72.0%, respectively. High TC (>240 mg/dl) and very high TG (>500mg/dl) and LDL (>190 mg/dl) were found in 8.8%, 2.6% and 5.8% of participants, respectively. Higher HDL level (40 mg/dl) was seen in 60.0% of the total population. Higher percentage of women than men (65.3% vs. 52.2%) had >40 mg/dl HDL level. Normal lipid profile (TC <200 mg/dl, TG <150 mg/dl, LDL <129 mg/dl, HDL >40 mg/dl) was seen in 26.7% of participants, and was higher in females (32.1%) than in males (18.3%). The overall mean cholesterol level was within normal limit. Mean LDL level showed increasing trend with age and about one fourth of participants had normal lipid profile (Limbu, *et al.* 2008). Other study conducted to analyze the Prevalence of Dyslipidemia in Elderly Subjects in Asaba, South-South, Nigeria, total of 176 elderly male (62.5%) and female (37.5%) aged 50 years and above were enrolled in this study. Total cholesterol, LDL-cholesterol, HDL-cholesterol and triglycerides were determined using standard cholesterol LDL precipitating reagents/kits. Majority (43.8%) of the subjects were in the 60-69 age range while 9.1% of the sample population was aged 80 years or more. Mean total cholesterol was 5.38 ± 4.40mmol/l, LDL – cholesterol 2.91 ± 0.82 mmol/L, HDL-cholesterol 1.61 ± 0.42mmol/L and triglyceride 1.80±7.49mmol/L. , 69.9% of the study population had dyslipidemia. In the men, prevalence of dyslipidemia was approximately same between ages 50-69 years, but showed a progressive decline from 70

years. In females, the reverse was observed. Prevalence of dyslipidemia increased progressively with age. Elevated LDL values were the most common observed lipid abnormality in our subjects, while low HDL was the least common(Odenigbo, *et al*. 2010). Other study conducted in Guadeloupe to exam the Lipid profile in an adult population in Guadeloupe. A cross-sectional survey of insured subjects in an Health Center of Guadeloupe in 1999. Data from a consecutive series of 1 010 individuals aged 18 years and older, collected during a 3 month-period, were used. The researcher found that Overall 27% had elevated total cholesterol (TC) levels above 200 mg/dL, 11.7% had TC levels above 240 mg/dL, 18.1% had LDL-C levels above160 mg/dL, 12.5% had HDL-C below 35 mg/dL and 2.7% had triglyceride levels above 200 mg/dL. Isolated low HDL-C was found in 22% of the subjects and 10.8% had both TC above 240 mg/dL and LDL-C above 160 mg/dL. Only 22% of the subjects with high TC were aware of their diagnosis and 5% were treated. The risk of having hypercholesterolemia above 200 mg/dL was independently and significantly higher in case of hypertension, age above 45 in men or 55 in women, body mass index above 30 and familial history of dyslipidemia

(Foucan, *et al*, 2000). In 2009 a cross-sectional CARMELA was a cross-sectional study of cardiovascular risk conducted between September 2003 and August 2005 in adults (aged 25 to 64 years) living in Barquisimeto (n=1,824), Bogotá (n=1,511), Buenos Aires (n=1,412), Lima (n=1,628), Mexico City (n=1,677), Quito (n=1,620), and Santiago (n=1,605). Dyslipidemia was defined as the presence of one or more of the following conditions: triglycerides≥200 mg/dL, or total cholesterol (TC)≥240 mg/dL, or HDL cholesterolb40 mg/dL, or LDL cholesterol=not optimal, or currently taking antilipemic agents. Results. Prevalence rates of dyslipidemia in men and women were: 75.5% (CI: 71.9–79.1) and 48.7% (CI: 45.4–51.9) in Barquisimeto; 70% (CI: 66.2–73.8) and 47.7% (CI: 43.9–51.5) in Bogotá; 50.4% (CI: 46.8–54.0) and 24.1% (CI: 21.0–27.2) in Buenos

Aires; 73.1% (CI: 69.3–76.8) and 62.8% (CI: 59.2–66.5) in Lima; 62.5% (CI: 58.5–66.5) and 37.5% (CI: 33.5–41.6) in Mexico City; 52.2% (CI: 47.9–56.5) and 38.1% (CI: 34.5–41.7) in Quito; and, 50.8% (CI: 47.1–54.4) and 32.8% (CI: 29.3–36.3) in Santiago (Vinueza , *et al*. 2009). A cross-sectional study was conducted in 1846 students from 8 randomly selected public junior high schools in Mexico City. Anthropometry, blood pressure, and 12-hour fasting lipids and lipoproteins were measured. We studied 770 male and 1076 female adolescents (13.2 ± 1 years). The most prevalent dyslipidemia was low high-density lipoprotein cholesterol (HDL-C) (<35mg/dL) either combined with other abnormalities (17.5% for male and 12.9% for female subjects, P <001) or isolated (13.5% and 9.6% for male and female subjects, respectively, P <001). Obese subjects showed the highest prevalence of low HDL-C (47.2% for male and 34.4% for female subjects) and of high total cholesterol, low-density lipoprotein cholesterol (LDL-C), and triglycerides (TG) (19.4%, 27.8%, and 36.1%, respectively, for male subjects; 9.8%, 13.1%, and 24.6%, respectively, for female subjects). Multiple regression analysis showed that waist circumference was negatively associated with HDL-C and positively associated with LDL-C and TG levels, whereas Tanner stages were negatively associated but sex was positively associated with total cholesterol, LDL-C, and TG concentrations. As in Mexican adults, low HDL-C and high TG levels were the most prevalent dyslipidemia. Increased blood lipids over long periods suggest that, as adults, these adolescents will be facing a higher risk for atherosclerosis (Posadas-Sánchez, *et al.* 2007). Another study was conducted in Turkey to estimate Prevalence of dyslipidemia and associated risk factors among Turkish adults: Trabzon lipid study. A total of 4,809 subjects (2,601 women and 2,208 men) were included in the study. Individuals older than 20 years were selected from their family health cards. The researcher found that overall, the mean levels of LDL-C, TG and were higher in men than in women, whereas the mean level of HDL-C was higher in women

than in men. The prevalence's of hypercholesterolemia (C>200 mg/dl), elevated LDL-C (C>130 mg/dl), low HDL-C (<40 mg/dl), and hypertriglyceridemia (C>150 mg/dl) were 37.5, 44.5, 21.1, and 30.4%, respectively. Prevalence's of dyslipidemia were higher in men than in women, except for TC (P<0.0001). The prevalence's of high TC, LDL-C, TG, increased with age, with the highest prevalence's in the 60–69-year-old group, and declined thereafter. The prevalence of high TC, LDL-C and TG, a high and low HDL-C increased steadily in line with BP, BMI. Dyslipidemia was positively associated with marital status, parity, cessation of cigarette smoking and current cigarette use, and negatively associated with the level of education, household income, and physical activity (Erem, *et al.* 2008).

In 1996 cross-sectional national epidemiological household survey was carried out, consisting of 4539 Saudi subjects, over the age of 15 years. The sample was adjusted for gender, age, regional and residency, and urban versus rural population distribution. The following details were taken for each subject: height, weight, calculation of body mass index (BMI) and random blood samples for total cholesterol measurements It was found that the mean TCC for all female subjects was significantly higher than for male subjects (4.24 versus4 mmol/l). The mean TCC of female subjects, aged 40-59 years was higher, but not significantly so, than for male subjects (4.5 versus 4.4 mmol/l). There was a progressive increase in TCC with age, reaching a maximum at the fifth and sixth decades for male and female subjects, respectively. There was a progressive increase in mean TCC with increasing BMI values for male and female subjects with higher values of mean TCC for female subjects for any given BMI value. The prevalence of HC, 5.2-6.2 mmol/l was 9% and 11% for all male and female subjects, respectively (P=O.74), whereas the prevalence of HC, >6.2 mmol/l was 7% and 8% for male and female subjects, respectively (P=O.52). The prevalence of HC 5.2-6.2 mmol/l for subjects aged 40-59 years was 14% and 10% for male and female subjects, respectively (P=O.67), whereas the prevalence of

HC >6.2 mmol/l was 9% and 11% for male and female subjects, respectively (P=O.6). There was a progressive increase in the prevalence of HC with age for male and female subjects. The prevalence of HC >5.2 mmol/l increased with increasing BMI values. The prevalence of HC of female subjects was significantly higher than for male subjects among normal weight groups. The prevalence of HC (>6.2 rnmol/l) for female subjects was higher, however, not significant than for male subjects among overweight and obese groups. The prevalence of HC, whether for male or female subjects, was higher among diabetics when compared with non-diabetic subjects. The prevalence of HC (>6.2 mmol/l) among male subjects was higher for smokers when compared with non-smokers

(Al-Nuaim, *et al.* 1996). Another study was conducted in Kuwait to assess the association between obesity [adult Body Mass Index (BMI) ≥ 30] and cardiovascular risk factors among adult Kuwaiti nationals. A cross sectional study conducted among adult Kuwaiti nationals (20-44 years old). A sample of 296 subjects was selected. Results: Obesity was prevalent among 42% of the sample with male preponderance. Obese individuals were significantly at higher risk of developing cardiovascular risk factors such as higher total cholesterol (OR=48, CI:9.8-235.9), LDL (OR=28, CI:9.3-81.3), impaired fasting blood sugar (OR=16, CI:6.2-43.2), prehypertensive systolic blood p pressure (OR=5.4, CI:1.9-15.4) and prehypertensive diastolic blood pressure (OR=5.5, CI:1.2-25.9) than non obese subjects after adjusting other confounders(Orifan, *et al.* 2007). Another study was conducted in Iraq to establish the prevalence of dyslipidemia in the Iraqi adult population in Mosul, Iraq, according to the different recommended criteria. The study was carried out from October 2003 to April 2004, with 871 apparently healthy volunteers (413 males, 458 females) aged 20-70 year ([mean +/- SD] 41.2 +/- 13.8 year). Fasting blood specimens were collected from all subjects for measurement of serum lipid profile including triglycerides (TG), total cholesterol (TC), high density lipoprotein-cholesterol (HDL-C),

low density lipoprotein-cholesterol (LDL-C), and ratios of cholesterol such as TC:HDL-C, LDL-C:HDL-C, and TG:HDL-C. Classification was carried out according to the different cut-off levels as recommended by the 2001 American National Cholesterol Education Program (NCEP) III using thresholds of TG > or = 150 mg/dl (2.0 mmol/L), LDL-C > or = 100 mg/dl (2.6 mmol/L), HDL-C<40 mg/dl (1.04 mmol/L), and non-HDL-C> or 130 mg/dl (3.37 mmol/L). The criteria of the 1998 British Hyperlipidemia Association (BHA) were also followed using thresholds of TG > or =180 mg/dl (2.4 mmol/L), TC > or 194 mg/dl (5.0 mmol/L), LDL-C > or = 116 mg/dl (3.0 mmol/L), HDL-C< or =45 mg/dl (1.15 mmol/L), TC:HDL-C> or =5.0, HDL-C:DL-C> or =2.5, and TG:HDL-C> or =3.0. Based on the American NCEP III criteria, the dyslipidemic states were noted with high TG (41.6%), high LDL-C (57.8%), low HDL-C (49.9%), and high non-HDL-C (56.8%) from the subjects. Based on the BHA criteria, high TG (24.5%), high TC (32.7%), high LDL-C (37.8%), high TC:HDL-C (30.9%), high LDL-C HDL-C (55.7%), and high TG:HDL-C (58.3%) were noted(Abed and Chilmeran, 2006).

2.4 Risk factors

2.4.1 Age

In Cross-sectional, population-based, To determine the prevalence of dyslipidemia in adults in the city of Campos dos Goytacazes, in the Brazilian state of Rio de Janeiro, and to identify its relation to risk factors. The following prevalence's were observed: of dyslipidemia 24.2%; of hypercholesterolemia, 4.2%; of elevated LDL-C, 3.5%; of low HDL-C, 18.3%; and of hypertriglyceridemia, 17.1%. The following mean levels were observed: cholesterol, 187.6 +/- 33.7 mg/dL; LDL-C, 108.7 +/- 26.8 mg/dL; HDL-C, 48.5 +/- 7.7 mg/dL; and triglycerides, 150.1 +/- 109.8 mg/dL. The following variables showed a positive correlation with dyslipidemia: increased age (P<0.001) (De Souza *et al*. 2003).

The coming study induced 14 963 individuals 20-90 years of age mean serum TC, LDL-C, and TG concentrations were increased compared with the values obtained in 1984-1986, with 52.7% of males and 42.9% of females having at least one abnormal lipid concentration. Hypercholesterolemia occurred in 6% of males and 2.8% of females in the younger group (20-39 years) and in 20.2% of males and 38.7% of females in the older group (>60 years). HDL-C was abnormally low in approximately 7% of males and in 1.6% of females. The prevalence of hypercholesterolemia, hypertriglyceridemia, and abnormally low HDL-C, especially the presence of slight hypertriglyceridemia, were higher than in 1984-1986 in all age groups. The increase was most prominent in the middle age group (40-59 years) (Li, *et al*. 2005).

2.4.2 Gender

Most studies state that dyslipidemia is more prevalent among men than among women

Data from 6246 participants aged 20–64 years (2339 males and 3907 females) in the cross-sectional phase of Tehran Lipid and Glucose Study (February 1999–May 2000) were used to determine distribution of serum lipid levels after 12–14 hour overnight fast. Mean total cholesterol (TC) concentration was 210 mg/dl. TC was significantly greater in females than males, 213 and 206 mg/dl, respectively ($p < 0:0001$). Thirty-one percent of population had TC values between 200 and 239 and 24% had values of 240 mg/dl or greater. Mean low-density lipoprotein cholesterol (LDL-C) was 129 and 135 mg/dl in males and females, respectively ($p < 0:0001$). Twenty-seven percent had LDL-C values between 130 and 159 and 23% had values 160 mg/dl or greater. The mean triglycerides (TGs) values were 190 and 162 mg/dl for males and females, respectively ($p < 0:0001$). The mean high-density lipoprotein cholesterol (HDL-C) was 39 in males and 45 mg/dl in females ($p < 0:0001$) (Azizi, *et al,* 2003).But some other studies indicate that the prevalence is more prevalent among women than among men. The objective of this study was to look at the pattern of

serum total cholesterol concentration (TCC) distribution and the prevalence of hypercholesterolemia (HC) in Saudi Arabia. A cross-sectional national epidemiological household survey was carried out, consisting of 4539 Saudi subjects, over the age of 15 years. The sample was adjusted for gender, age, regional and residency, and urban versus rural population distribution. The following details were taken for each subject: height, weight, calculation of body mass index (BMI) and random blood samples for total cholesterol measurements It was found that the mean TCC for all female subjects was significantly higher than for male subjects (4.24 versus 4 mmol/l) (Al-Nuaim, *et al*. 1996).

2.4.3 educational level and House hold Income

The extent to which high-density lipoprotein (HDL) cholesterol levels can be increased in patients with low HDL cholesterol is important because low HDL cholesterol levels increase the risk of coronary heart disease (CHD). During the past 14 years, we have assessed risk factors in Turks, a population in which extremely low HDL cholesterol levels (mean 36 mg/dl in men, 42 mg/dl in women) are a prime CHD risk factor. Although genetically determined to a significant extent, these low HDL cholesterol levels can be modulated by lifestyle factors, as in other populations. We measured the HDL cholesterol levels in men and women residing in Istanbul at 3 time points: 1990 to 1993, 1996 to 2000, and 2003. The mean HDL cholesterol levels increased from 45.3 +/- 9.5 mg/dl in 1990 to 1993 to 49.7+/- 12 mg/dl in 2003 ($p < 0.0001$) in women, but were virtually unchanged in men (38+/- 8 vs. 39+/- 10 mg/dl). In contrast to previous years, the HDL cholesterol levels in women in 2003 were markedly affected by education level and socioeconomic status, averaging 56+/- 9 mg/dl in those with a university education and 48+/- 12 mg/dl in those with a primary school education. Part of this difference could be explained by less smoking and more exercise and lower body mass index (average 25.6 +/- 4.9 vs. 29.7 5.1 kg/m2) of the highly educated women (Mahley, *et al.* 2005).

A study was designed to estimate Prevalence of dyslipidemia and associated risk factors among Turkish adults: Trabzon lipid study. A total of 4,809 subjects (2,601 women and 2,208 men) were included in the study. Individuals older than 20 years were selected from their family health cards. The researcher found that Overall, the mean levels of LDL-C, TG and were higher in men than in women, whereas the mean level of HDL-C was higher in women than in men. The prevalence's of hypercholesterolemia (>200 mg/dl), elevated LDL-C (>130 mg/dl), low HDL-C (<40 mg/dl), and hypertriglyceridemia (>150 mg/dl) were 37.5, 44.5, 21.1, and 30.4%, respectively. Prevalence's of dyslipidemia were higher in men than in women, except for TC (P\0.0001). The prevalence's of high TC, LDL-C, TG, increased with age, with the highest prevalence's in the 60–69-year-old group, and declined thereafter. The prevalence of high TC, LDL-C and TG, a high and low HDL-C increased steadily in line with BP, BMI. Dyslipidemia was positively associated with marital status, parity, cessation of cigarette smoking and current cigarette use, and negatively associated with the level of education, household income, and physical activity (Erem, *et al*. 2008).

2.4.4 Obesity

Obesity has become an epidemic problem worldwide, and in the Eastern Mediterranean Region the status of overweight has reached an alarming level. A prevalence of 3%.9% overweight and obesity has been recorded among preschool children, while that among schoolchildren was 12%.25%. A marked increase in obesity generally has been noted among adolescents, ranging from 15% to 45%. In adulthood, women showed a higher prevalence of obesity (35%.75%) than men (30%.60%). Several factors, such as change in dietary habits, socioeconomic factors, inactivity and multiparty (among women) determine obesity in this Region. There is an urgent need for national programmers' to prevent and control obesity in the countries of the Region (Musaiger, 2004).

The relationship between dyslipidemia and obesity has been clearly shown in both men and women. A national survey of adults in the United States that included measurement of height, weight, blood pressure, and lipids (National Health and Nutrition Examination Survey III 1988-1994). Crude age-adjusted, age-specific means and proportions, and multivariate odds ratios that quantify the association between hypertension or dyslipidemia and BMI, controlling for race/ethnicity, education, and smoking habits are presented. More than one-half of the adult population is overweight (BMI of 25 to 29.9) or obese (BMI of > or =30). The prevalence of high blood pressure and mean levels of systolic and diastolic blood pressure increased as BMI increased at ages younger than 60 years. The prevalence of high blood cholesterol and mean levels of cholesterol were higher at BMI levels over 25 rather than below 25 but did not increase consistently with increasing BMI above 25. Rates of low HDL-C increased and mean levels of HDL-C decreased as levels of BMI increased. The associations of BMI with high blood pressure and abnormal lipids were statistically significant after controlling for age, race or ethnicity, education, and smoking; odds ratios were highest at ages 20 to 39 but most trends were apparent at older ages. Within BMI categories, hypertension was more prevalent and HDL-C levels were higher in black than white or Mexican American men and women (Brown, *et al*. 2000).

Another study the researchers conducted a cross-sectional assessment for the prevalence of dyslipidemia among rural Thais (in Khon Kaen province) using the National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP III) Guidelines. The 325 subjects recruited (136 men; 189 women) averaged 53.8 +/- 17.6 years of age (range, 20-88). After having the subjects fast 12 hours, serum samples were collected. Total cholesterol, triglycerides, low-density lipoprotein (LDL-C) and high-density lipoprotein (HDL-C) cholesterols were measured. The prevalence of hypercholesterolemia (> 200 mg/dL), hypertriglyceridemia (> 150 mg/dL), high LDL-C (> 130 mg/dL) and low HDL-C (< 40

mg/dL) was 31, 40, 20 and 14 per cent, respectively. Women had a 2- to 3.5-fold higher prevalence of hypercholesterolemia and high LDL-C than men, while the prevalence of hypertriglyceridemia was comparable. The prevalence of dyslipidemia increased with advancing age and increasing BMI (Pongchaiyakul, *et al*. 2005).

The researchers conducted a cross-sectional the prevalence dyslipidemia and obesity in Mexico. The researches find Mixed dyslipidemias (hypercholestremia and

hypertriglyceridemia increased with increase BMI (Barquera, *et al.* 2007). This study was aimed at testing the association across three contrasted populations and at assessing the performances of abdominal obesity as a screening tool for dyslipidemia. Data were drawn from three population health surveys recently conducted in two regions of a developed country (Switzerland, mostly of Caucasian origin, n =52650) and in a less developed country (Seychelles, Indian Ocean, mostly of black descent, n =5806). They found A consistent direct association between abdominal obesity and dyslipidemia (odds ratios

varying from 1.85 to 4.56) was found in the three populations.(Paccaud, F. *et al.* 2000).

2.4.5 Smoking

The researchers comprises individuals enrolled in surveys from Greece and Cyprus. This work includes 53 apparently men and 97 women, aged 65 to 100 years, from various areas of Cyprus. The cohort study was conducted between 2004 and 2005. He found 65% participants had hypercholesterolemia (total serum cholesterol > 200 mg/dl or use of lipid lowering agents). Moreover, 32% of the participants reported physically active, 5% reported smoking habits and 4% that they have stopped smoking during the past decade A positive association was observed between prevalence of hypercholesterolemia and smoking habits (odds ratio = 4.3, p = 0.03), controlled for age, sex, and other factors (Polychronopoulos, *et al*, 2005).

Another study the researchers reviewing the trends and influences of life-style in this country on health and disease in the latter half of 20th century, we focused our attention on 4 major habits of smoking, drinking, exercise and diets, and collected data on the Japanese to conduct a meta-analysis of their relationship with serum lipids and lipoproteins, which are the metabolic risk factors most closely related to atherosclerosis. He found the percentage of smokers was 54.0% in adult males and 14.5% in adult females in 1999. In the data of 7,256 subjects (mean age 47 years) in 16 papers, smoking increased triglycerides by 13 mg/dl (0.15 mmol/L) or in 559 non-drinkers with a mean age of 49 years in 3 papers by 18 mg/dl (0.20 mmol/L), and decreased HDL-cholesterol by 3.5 mg/dl (0.09 mmol/L) with every 20 cigarettes smoked according to the regression equation (Hata, and Nakajima, 2000).

2.4.6 Physical activity and lifestyle

The researchers hypothesized in this study that picture of health and nutritional status in the Arab Middle East countries has changed drastically during the past four decades as a result of changes in dietary habits, socio-economic situation and lifestyle. The chronic non-communicable diseases such as coronary heart disease (CHD), diabetes, hypertension and cancer have become the main public health problems in most of these countries. Pattern of food consumption may play an important part in the increasing incidence of CHD in this region. The traditional diet, characterized by a high-fiber content and low in fat and cholesterol has changed to a more westernized diet with high content of fat, free sugars, sodium and cholesterol. Daily per capita fat supplies showed an impressive increase in most of these countries, ranging from 13.6% in Sudan to 143.3% in Saudi Arabia. A high intake of cholesterol is reported in some of these countries. Also, the consumption of fiber-rich foods such as whole grains, vegetables and fruits is low. Data from food composition

tables in the region showed that sodium content in the Arab Middle East diet is high. (Musaiger, 2002).

Other study comprises individuals enrolled in surveys from Greece and Cyprus. This work includes 53 apparently men and 97 women, aged 65 to 100 years, from various areas of Cyprus. The cohort study was conducted between 2004 and 2005. A diet score that assesses the inherent characteristics of the Mediterranean diet was developed and then a healthy index was calculated that evaluated lifestyle habits, non-smoking, physical activity and adherence to the Mediterranean diet (i.e. above the median of the score). Results: 65% participants had hypercholesterolemia (total serum cholesterol > 200 mg/dl or use of lipid lowering agents). Moreover, 32% of the participants reported physically active, 5% reported smoking habits and 4% that they have stopped smoking during the past decade. A positive association was observed between prevalence of hypercholesterolemia and smoking habits (odds ratio = 4.3, p = 0.03), while an inverse association was observed between hypercholesterolemia, adherence to a Mediterranean diet (odds ratio = 0.77, p = 0.02), controlled for age, sex, and other factors. Adherence to a Mediterranean diet and healthful lifestyle is associated with reduced odds of having hypercholesterolemia among all people (Polychronopoulos, *et al.* 2005).

Another study is a population-based cohort, which during 2001-2002 randomly enrolled 2772 men (n = 1376, 45 +/- 12 years old) and women (n = 1396, 45 +/- 13 years old). Physical activity status was evaluated through intensity (kcal/min expended per day), frequency (per week) and duration (min). Multivariate data analysis evaluated the association of blood lipids with physical activity levels. 78 (42%) men and 584 (40%) women were physically active. Compared to sedentary women, physically active women had lower levels of total cholesterol ($P < 0.05$), low-density lipoprotein (LDL) ($P < 0.05$), oxidized LDL-cholesterol ($P < 0.05$), triglycerides ($P < 0.05$) and higher levels of high-

density lipoprotein (HDL)-cholesterol ($P < 0.05$) and Similar associations were observed in men, but they did not reach statistical significance. However, after adjustments for age, smoking habits, body mass index and dietary intake were made, the effect of physical activity on blood lipids remained statistically significant only for HDL-cholesterol ($P < 0.05$) and in women. Moreover, physical activity was associated with lower total cholesterol levels both in nonsmoker men (-7%, $P = 0.032$) and nonsmoker women (-2%, $P = 0.064$) and lower triglyceride levels in nonsmoker men (-15%, $P = 0.086$) and nonsmoker women (-9%, $P = 0.036$) (Skoumas, *et al.* 2003).

Another study the researchers reviewing the trends and influences of life-style in this country on health and disease in the latter half of 20th century, we focused our attention on 4 major habits of smoking, drinking, exercise and diets, and collected data on the Japanese to conduct a meta-analysis of their relationship with serum lipids and lipoproteins, which are the metabolic risk factors most closely related to atherosclerosis. He found the 25% of males and 21% of females (mean age 47 years) regularly performed exercise such as jogging, swimming, aerobics, and tennis. However, walking was regarded as an easy exercise to be practiced by subjects of all ages. The effects of walking on serum lipids were studied in a total of 46,074 subjects (mean age 47 years) in 8 populations. Triglycerides were significantly lower by 10 mg/dl (0.11 mol/L), and HDL-cholesterol higher by 3 mg/dl (0.08 mmol/L) in those who walked 6,000 or more steps/day than in those who walked less than 2,000 steps/day. The effects of harder exercise like jogging or swimming were analyzed in 2,242 subjects in 14 papers (mean age 44 years). Triglycerides decreased by 10 mg/dl (0.11 mmol/L), and HDL-cholesterol elevated by 5 mg/dl (0.13 mmol/L) with an increase in the exercise intensity by one level of about 300 kcal. In exercise therapy, triglycerides were decreased by a mean of 20 mg/dl (0.23 mmol/L), and heart rate of about 135 bpm, which is equivalent to 50% VO2max for 30 minutes x 3

times/week. 4) In nutritional trends, the mean energy intake in 52 postwar years averaged 2,116+/-84 kcal with no marked changes according to nutritional surveys. However, the percentage of fat in total energy intake was lowest at 7% in 1946, increased thereafter until it exceeded 20% in 1973, and surpassed 25% in 1988. The mean total cholesterol level of the Japanese increased by 28 mg/dl (0.72 mmol/L) in the past 30 years and reached 204 mg/dl (5.28 mmol/L) in a survey in 1990. And total cholesterol was reduced by 20 mg/dl (0.52 mmol/L), triglycerides by a mean of 40 mg/dl (0.45 mmol/L), and HDL-cholesterol was increased by 5 mg/dl (0.13 mmol/L) by restriction of fat intake or restriction of the intake of saturated fat and dietary cholesterol (Hata, and Nakajima, 2000).

Chapter III

Methodology

3.1 Study design

The design of this study is a case control to identify the risk factors of dyslipidemia.

This type of design would be useful for describing the study construct. It's fit and enables the researcher to meet the study objectives. It's suitable in term of time, people, money, resources and it is relatively practical and manageable. This design is chosen because it is the useful design and it is less expensive and enables the researcher to meet the study objectives in a short time.

3.2 Study population

The target population consists of patients from both genders who had been diagnosed as hypertensive and have dyslipidemia attending European Gaza Hospital in year 2009 and 2010 (case group) and hypertensive patient without history of dyslipidemia (control group). Another group was normal adult without history of other diseases. The number of all hypertensive patients attended the European Gaza Hospital in year 2009 and 2010 was 263. The number of cases who met the inclusion criteria was 208 cases. Then they were divided into two groups (cases and control). According to the blood test result, sampling frame was prepared. The sample was 79 cases (hypertensive patient with dyslipidemia) and 79 control (hypertensive without dyslipidemia) and 79 normal control. The case and control groups matched age and gender (1 cases: 2 control). Only 10 subjects were refused and 5 were traveling out side Gaza Strip. The response rate was 93%.

3.3 Period of the study

The study commenced at the end of May 2011 to mid October 2011.

3.4 Setting of the study

The study was conducted at the European Gaza Hospital and blood sample were also analyzed at European Gaza Hospital laboratory.

3.5 Selection criteria

3.5.1 Inclusion criteria

Cases

- Age from 30-65.

- Both gender (male and females will be included).

- Hypertensive patients with dyslipidemia

Control one

-- Age from 30-65.

- Both gender (male and females will be included).

- Hypertensive patients without dyslipidemia.

Control two

- Age from 30-65.

- Both gender (male and females will be included).

- Normal person with normal blood pressure and lipidemic profile.

3.5.2 Exclusion criteria

- Age below 30 years and above 65 years.

- Patients with diabetes mellitus.

- Any hypertensive patient recorded in EGH before 2009 and after 2010.

3.6 Instrument of the study

After reviewing previous literature and studies, the researcher adopted a questionnaire for measuring risk factor of dyslipidemia among hypertensive patients. The researcher implemented the necessary modifications to suit study participants.

The questionnaire consisted of 5 parts:

- The first part included personal and demographic data.
- The second part included smoking habit.
- The third part included physical activity.
- The fourth part included compliance to diet.
- The fifth part included blood test (lipid profiles).

3.7 Pilot testing

Small scale reliability test (pilot) was conducted using a participants (7 case and 14 control). Slight changes were done on the questionnaire in cooperation with the academic supervisors, and the participants were excluded from the study.

3.8 Validity and reliability

Content of the instrument was discussed with a seven experts of public health in addition to other three expert cardiologists to ensure that face and content is highly valid and reliable.

3.9 Data collection

Self administered structure face to face interview was used in this study. The Questionnaire was developed by the researcher and submitted to 10 expert persons (7 experts in the field of public health and 3 cardiologists) to evaluate it from face and content

validity. Lipid profiles include cholesterol, triglyceride, HDL-c, LDL-c were analyze and recording.

3.10 Specimen collection and biochemical analysis

Blood samples were collected from 158 hypertensive patients and 79 normal adult as a second control. Fasting overnight venous blood sample (about 5 ml) were drawn by the researcher himself into vacationer plane tubes from all individuals. The blood was left for a while without anticoagulant to allow blood to clot. Then, serum samples were obtained by centrifugation at room temperature at 4000 rpm/10 minutes. Serum cholesterol, triglycerides, HDL-C and LDL-C were analyzed.

Calculated measurements

- Low density lipoprotein was calculated by Friedewald equation

LDL (mg/dl) = cholesterol – (HDL + triglycerides/5))

Calculation of colorimetric tests for cholesterol, triglycerides, HDL-cholesterol were performed by the auto analyzer automatically according to beer's law after calibration and adjustment of the photometers against water blank using a specific program of every test inserted to the instrument.

The concentration of colorimetric test = $\frac{\text{A test x concentration of standard}}{\text{A standard}}$

Materials

Chemicals and reagents

The chemicals and reagents that had been used in this study. Cholesterol, Triglyceride, HDL-c, LDL-c reagent.

Equipments

The main equipments used in this study was spectrophotometer, centrifuge, refrigerator, water bath, vortex mixer and micropipettes.

3.11 Biochemical analysis

3. 11. 1 Determination of serum cholesterol

Principle

Determination of cholesterol after enzymatic hydrolysis and oxidation. The colorimetric indicator is quinoneimine which is generated from 4-aminoantipyrine and phenol by hydrogen peroxide under the catalytic action of peroxidase

$$\text{Cholesterol ester} + H_2O \xrightarrow{\text{CHE}} \text{cholesterol} + \text{fatty acid}$$

$$\text{Cholesterol} + O_2 \xrightarrow{\text{CHO}} \text{cholesterol-3-one} + H_2O_2$$

$$H_2O_2 + \text{4- aminoantipyrine} + \text{Phenol} \xrightarrow{\text{POD}} \text{Quinoneimine} + 4\,H_2O$$

Reagents

Concentrations are those in the final test mixture

Reagent	**Concentration**
Good's buffer (pH 6.7)	50 mmol/l
Phenol	5 mmol/l
4- Aminoantipyrine	0.3 mmol/l
Cholesterol esterase (CHE)	≥ 200 u/l
Cholesterol oxidase (CHO)	≥ 100 u/l
Peroxidase (POD)	≥ 3 ku/l
Standard	200 mg/dl

Assay procedure

Wavelength: 500 nm

Optical path: 1cm

Temperature: 37 ºC

Measurement: against blank reagent.

- 10 µl of standard (sample or control) was added to 1 ml of working reagent and mixed well.
- The mixture was incubated for 5 min at 37 ºC.
- The absorbance was measured within 60 min.

Calculation

$$\text{Cholesterol [mg/dl]} = \frac{\text{A Test x concentration of standard}}{\text{A Standard}}$$

(KAPLAN, et al,1995)

Reference value (NCEP,2002)

Adult (desirable)	<200 mg/dl

3.11. 2 Determination of serum triglycerides

Principle

Determination of triglycerides after enzymatic splitting with lipoprotein lipase Indicator is quinoneimine which is generated from 4-aminoantipyrine and 4-chlorophenol by hydrogen peroxide under the catalytic action of peroxidase.

$$\text{Triglycerides} \xrightarrow{\text{LPL}} \text{Glycerol + fatty acid}$$

$$\text{Glycerol + ATP} \xrightarrow{\text{GK}} \text{Glycerol-3-phosphate + ADP}$$

$$\text{Glycerol-3-phosphate + O2} \xrightarrow{\text{GPO}} \text{Dihydroxyaceton phosphate + H2 O2}$$

$$\text{2H2O2 + Aminoantipyrine + 4-Chlorophenol} \rightarrow \text{Quinoneimine + HCI + 4H2O}$$

Reagents

Concentrations are those in the final test mixture

Reagent	**Concentration**
Cood's buffer (pH 7.2)	50 mmol/l
4-Chlorophenol	4 mmol/l
ATP	2 mmol/l
Mg2+	15 mmol/l
Glycerokinase (GK)	≥ 0.4 KU/I
Peroxidase (POD)	≥ 2 KU/I
Lipoprotein lipase (LPL)	≥ 2 KU/I
4-Aminoantipyrine	0.5 mmol/l
Glycerol-3-phosphate-oxidase (GPO)	≥ 0.5 KU/I
Standard	200 mg/dl

Assay procedure

Wavelength: 500 nm

Optical path: 1cm

Temperature: 37 ºC

Measurement: against reagent blank.

- 10 µl of standard (sample or control) was added to 1 ml of working reagent and mixed well.
- The mixture was incubated for 5 min at 37 ºC.
- The absorbance was measured within 60 min.

Calculation

$$\text{Cholesterol [mg/dl]} = \frac{\text{A Test x concentration of standard}}{\text{A Standard}}$$

(KAPLAN, et al,1995)

Reference value (NCEP,2002)

Adult (desirable)	<150 mg/dl
High risk	> 400 mg/dl

3.11.3 Determination of serum High density lipoprotein cholesterol

Principle

Chylomicrons, VLDL and LDL are precipitated by adding phosphotungstic acid and magnesium ions to the sample. Centrifugation leaves only the HDL in the supernatant, their cholesterol content is determined enzymatically using cholesterol reagent.

Reagents

Reagent	Concentration
Monoreagent contain: Magnesiu chloride Phosphotungstic acid	1.4 mmol/l 8.6 mmol/l
Cholesterol standard	200 mg/dl

Assay procedure

1- Precipitation

- 200 µl of standard (sample or control) was added to 500 µl of the precipitation reagent and mixed well.
- The mixture was allowed to stand for 15 min at room temperature, and then centrifuged for 20 min at 4000 rpm.

2- Cholesterol determination

Wavelength: 500 nm

Optical path: 1cm

Temperature: 37 ºC

Measurement: against reagent blank.

- 100 µl of the supernatant of standard (sample or control) was added to
- 1 ml of the cholesterol reagent and mixed well.
- The mixture was incubated for 5 min at 37 ºC.
- The absorbance was measured within 45 min.

Calculation

$$\text{HDL-C [mg/dl]} = \frac{\text{A sample X concentration of standard}}{\text{A standard}}$$

(KAPLAN, et al,1995)

Reference value (NCEP,2002)

Child	37 – 75 mg/dl
Adult: M F	35 – 65 mg/dl 35 – 80 mg/dl
High risk of CHD	≤ 35 mg/dl

3.11. 4 Determination of serum low density lipoproteins

LDL-C can be calculated using the empirical relation of Friedewaldl, (1972).

Principle

The ultracentrifugal measurement of LDL-C is time consuming and expensive and requires special equipment. For this reason, LDL-C is most commonly estimated from quantitative measurements of total and HDL-cholesterol and plasma triglycerides (TG) using the empirical equation.

The Equation

LDL-C = Total Cholesterol – (HDL-C + triglycerides /5). (Friedewaldl,1972)

Reference value (NCEP,2002)

Adult (desirable)	<130 mg/dl
High risk	> 130 mg/dl

3.12 Statistical Analysis

The researcher used the statistical package for social science program (SPSS), version 13. Statistical analysis included coding, data entry, data cleaning, and data processing. For description of the study variables the researcher used frequency, percentage. In measuring of central tendency the researcher used mean and standard deviation. Cross tabulation to describe the relationships between two variables or more also used. Statistical test using in this study was chi-square and t test.

3.13 Ethical and Administrative considerations

1. Permission from ministry of health **(MOH)** (Annex 2).
2. Approval from **Helsinki** Committee (Annex 1).
3. Informed consent (Annex 3)
4. Approval from health sectors for field study administration

3.14 Limitations

1. Lack of previous studies and researches
2. Limited Time, and money.
3. Full address of subjects not available.
4. Transportation
5. Costly (it cost me a lot of money).

Chapter Four

Results and Discussions

This chapter presents the findings of statistical analysis of data. Descriptive analysis of demographic characteristics of participants is illustrated and discussed in connection with previous studies. In addition results of different variables were identified; moreover, the differences between selected variables were explored using proper analytical statistical tests, including, percentage, cross-tabulations, t test. Chi square was used to determine significance of results. The results are illustrated below.

4 .1 Characteristics of the study population

The study sample consisted of 237 participants divided equally into three groups, each group consisted of 79 participants, 34 males and 45 females in each group. First group (cases) hypertensive with dyslipidemia. second group (control 1) hypertensive without dyslipidemia and third group (control 2) normal persons without history of other diseases

Their age ranged between 30 – 65 years, from different education levels (illiterate, preparatory, secondary and university level). Their characteristics are illustrated in the following table including age; gender; level of income, level of education; occupation.

Table 1: Socio-demographic characteristics of the study population.

Demographic variable	Frequency	Percent %
Gender		
Male	102	43%
Female	135	57%
Total	237	100%
Age		
30 - 40	27	11.4%
41 - 50	72	30.4%
51 - 65	138	58.2%
Education level		
Illustrate	32	13.5%
Primary	21	8.9%
Preparatory	56	23.6%
Secondary	60	25.3%
University	68	28.7%
Monthly income		
Less than 1000 IS	117	49.4%
1000 IS and more	120	50.6%
Job / work		
Yes	88	37.1%
No	149	62.9%

4.2 Serum analysis

Table 2 Serum lipids of hypertensive patients and normal

Lipid profile	Hypertensive Patients (n=158) Mean ±SD	Normal Control (n=79) Mean ±SD	t	*P*-value
Cholesterol (mg/dl)	183.6± 49.9	167.7±28.9	2.63	0.000
Triglyceride (mg/dl)	168.8± 103.1	123±25.4	3.88	0.000
LDL(mg\dl)	106.1± 43.1	92.5±29.1	2.54	0.000
HDL (mg/dl)	43.4±7.8	50.1±9.6	-6.50	0.000

Serum lipid profiles including cholesterol, triglycerides, HDL-C and LDL-C of hypertensive patients and normal controls were illustrated in table 10. The average levels of cholesterol, triglycerides and LDL-C were found to be higher in hypertensive patients (183.6± 49.9, 168.8± 103.1 and 106± 43.1mg/dl, respectively) compared to normal controls (167.7± 28.9, 123± 25.4and 92.5± 29.1mg/dl, respectively) This elevation was statically significant (P=0.000). In contrast, HDL-C was significantly lower in hypertensive patients than in normal controls (43.4±7.8 vs. 50.1± 9.6 mg/dl, P=0.000). The results of this study is consists with another study done by Reaven,1991 who showed that; patients with hypertension tend to have dyslipidemia, with higher plasma TG concentrations and lower concentrations of HDL-C than normotensive subjects

(Reaven, 1991). Another study talked about hypertensive patient have dyslipidemia, with higher plasma TG concentrations and lower concentrations of HDL-C than normotensive subjects (Shieh, *et al*. 1987). In addition, a study found that prevalence of dyslipidemia in hypertensive was still high (Zhang, *et, al*. 2007). A study in Egypt showed that hypertensive men had significantly higher TC and TG than normotensive men, whereas

hypertensive women had higher LDL-C in comparison to normotensive women (Ibrahim, *et al.* 2001).

4.3 Risk factors for dyslipidemia among the three groups

4.3.1 Obesity

Table 3: Obesity among Cases and Controls

Variable	Category	Hypertensive with dyslipidemia		Hypertensive without dyslipidemia		Normal persons	
		Freq.	%	Freq.	%	Freq.	%
Obesity	Normal weight	3	3.8	6	7.6	15	19
	Over weight	25	31.6	25	31.6	35	44.3
	Obese	51	64.6	48	60.8	29	36.7
	Total	79	100%	79	100%	79	100%
	Chi square = 18.775				**P value = 0.001***		

*statistically significant

Body mass index provides a reliable indicator of body fatness for most people and it is used as a screen for weight categories that may lead to health problems (CDC,2007). According to WHO criteria, BMI less than 18.5kg/m2 means underweight, 18.5-24.9 kg/m2 means normal weight, 25-29.9 kg/m2 means overweight, and BMI more than 30kg/m2 means obesity. As shown in table 3; the numbers of normal, overweight and obese in hypertensive patients with dyslipidemia were 3 (3.8%), 25 (31.6%) and 51 (64.6%), respectively whereas in hypertensive patients without dyslipidemia were 6 (7.6%), 25 (31.6%) and 48 (60.8%), respectively whereas in normal control were 15 (19%), 35 (44.3%) and 29 (36.7%) respectively. This reflects the increase of obesity in the Palestinian population as a result of urbanization, lifestyle shifting toward physical inactivity and increased food consumption. There was a statically significant association between different groups (Chi square = 18.775, P value = 0.001*) indicating that obesity is a risk factor of dyslipidemia. The literature supported the present finding in that obesity is a major risk factor for dyslipidemia. There is increase in dyslipidaemia trend in the study

subjects with increase in BMI (Humayun, *et, al.* 2009). The associations of BMI with high blood pressure and abnormal lipids were statistically significant (Brown, *et al.* 2000).

Presence of dyslipidemia was significantly associated with increasing body mass index (P = 0.001; OR:1.06) (Wang, *et al.* 2010). With increasing overweight and obesity class, there is an increase in the prevalence of hypertension (18.1% for normal weight to 52.3% for obesity class 3), dyslipidemia (8.9% for normal weight to 19.0% for obesity (Nguyen, *et al.* 2008). Delavari, *et al*. 2008 found that is high prevalence of lipid disorders that is consistent with the high prevalence of overweight and abdominal obesity in the population studied (Delavari, *et al.* 2008). A rising trend of dyslipidaemia with increasing BMI (p value 0.008) (Humayun, *et al*, 2009).

4.3.2 Diet Lifestyle

Diet is important as it the cause of many chronic diseases. An individual change in dietary behaviors has the potential to decrease the burden of chronic diseases, particularly cardiovascular disease (Price, and Simmons, 2011).

The prevalence of dyslipidemia is high and increasing in most developed countries as well as in many developing countries as the result of the westernization of diet and other lifestyle changes (Yama, *et al*, 1997).

Table 4: Diet Lifestyle among Cases and Controls

Variable	**Category**	**Hypertensive with dyslipidemia**		**Hypertensive without dyslipidemia**		**Normal persons**	
		Freq.	%	Freq.	%	Freq.	%
Compliance to diet (regime)	Yes	17	21.5	20	25.3	31	39.2
	No	62	78.5	59	74.7	48	60.8
	Total	79	100%	79	100%	79	100%
	Chi square = 6.723				***P* value = 0.035**		

*statistically significant

Table 4 showed that the numbers of compliance to diet; non compliance to diet in hypertensive patients with dyslipidemia were 17 (21.5%) and 62 (78.4%) respectively.

Whereas in hypertensive patients without dyslipidemia the number were 20 (25.3%) and 59 (74.7%) respectively. In normal control they were 31 (39.2%) and 48 (60.8%) respectively. There was a statically significant association between different groups (Chi square = 6.723, P value = 0.035*). Although there was a significant association between dyslipidemia and diet, more than 75% of the cases do not comply to diet. Therefore, diet was found to be associated with dyslipidemia. This necessitates launching of educational programs to show the importance of diet in controlling the dyslipidemia. The results of this study is consistent with the study of Polychronopoulos, *et al.* 2005 who showed that an inverse association was observed between hypercholesterolemia, and adherence to a Mediterranean diet with (odds ratio = 0.77, p = 0.02), controlled for age, sex, and other factors. The prevalence of hypercholesterolemia has decreased. The greatest decrease was observed in the proportion of persons with elevated level of low-density lipoprotein cholesterol (Polychronopoulos, *et al,* 2005). The nutrition habits of Lithuanian rural population have changed, especially over the last five years. The consumption of animal fat has decreased and the usage of vegetable oil and margarine has increased. Women increased consumption of vegetables and fruits. The strengthening of favorable trends in nutrition habits in Lithuanian population should be one of the most important strategies in the implementation of cardiovascular disease prevention programs (Grabauskas, *et al.* 2003). In addition, a study conducted to investigate the associations between dietary intakes of men and women and blood lipids were examined controlling for age and BMI. Result showed that Keys score, which was derived from saturated fat, polyunsaturated fat and dietary cholesterol of a 24-hour recall, was positively related to blood cholesterol and LDL-C in men, but not in women (Chang, *et al,* 2002).

4.3.3 Income

Table 5: Level of Income among Cases and Controls

Variable	Category	Hypertensive with dyslipidemia		Hypertensive without dyslipidemia		Normal persons	
		Freq.	%	Freq.	%	Freq.	%
Income	Less than 1000 IS	42	53.2	40	50.6	35	44.3
	1000 IS and more	37	46.8	39	49.4	44	55.7
	Total	79	100%	79	100%	79	100%
	Chi square = 1.31			P value = 0.518			

No statistically significant

Above table shows that the number of hypertensive patients with dyslipidemia with monthly household income of Less than 1000 IS is 42 (53.2%); the number of hypertensive patients with dyslipidemia with monthly household income of 1000 IS and 1000 IS and more is 37 (46.8%); whereas in hypertensive patients without dyslipidemia the numbers are 40 (50.6%) and 39 (49.4%) respectively. In normal control are 35 (44.3%) and 44 (55.7%) respectively. These findings indicate that the Palestinian people are among the worse economic situations due to the political situation. A continuous closure after

Al-Aqsa Intifada led to many persons without jobs, which has lead to bad economic situation among many the Gaza Strip population. There is no statically significant association among the different groups (Chi square = 1.31, P value = 0.518). That means no statistically significant associations are observed between dyslipidemia and monthly household income of the participants in three group. Our results are in accordance with the study of (Polychronopoulos, *et al*, 2005) who showed that no statistically significant associations were observed between blood lipids levels and income of the participants.

Moreover, (Cetin, *et al,* 2010) stated that no significant relation was found between the prevalence of high level TC, LDL-C, TG, and low level HDL-C and monthly household income.

4.3.4 Level of Educational

Table 6: Level of Education among Cases and Controls

Group	**Level of education**	**Total**	
		Freq.	%
Hypertensive with dyslipidemia	Illiterate	18	22.8
	Primary	6	7.6
	Preparatory	22	27.8
	Secondary	18	22.8
	University	15	19
	Total	79	100%
Hypertensive without dyslipidemia	Illiterate	8	10.0
	Primary	10	12.7
	Preparatory	19	24.1
	Secondary	23	29.1
	University	19	24.1
	Total	79	100%
Normal persons	Illiterate	6	7.6
	Primary	5	6.3
	Preparatory	15	19
	Secondary	19	24.1
	University	34	43
	Total	79	100%
	Chi square = 19.5	**P value = 0.012***	

*statistically significant

In table 6 analysis of the educational status of the hypertensive's with dyslipidemia and hypertensive's without dyslipidemia and normal persons showed that the educational level among the study groups is found to be associated with dyslipidemia ($\chi 2=19.5$, P=0.01). Data presented here suggested that low educational level was risk factors for dyslipidemia.

This result was in agreement with that reported by Erem, *et al.* 2008 who found an inverse relationship between the level of education and the prevalence of dyslipidemia (P <0.0005). Firmann, *et al.* 2010 showed that the prevalence was the highest among illiterate individuals and the lowest among high school and university graduates. As education level rise, the prevalence of dyslipidemia decreased. Higher levels of dyslipidemia were found in men, with increasing age, BMI and lower educational level. In my opinion higher educated participants are much aware of dyslipidemia risk factors and adopt more efficient preventive actions.

4.3.5 Physical Activity

Physical activity is an important component of weight control, and is widely recommended to prevent and treat obesity-related complications such as diabetes and coronary heart disease (CHD). Although the cardiovascular benefits of increased physical activity are likely multifactor, much of the attention has been focused on the known high-density lipoprotein (HDL) cholesterol-raising properties of regular physical activity. Physical activity, however, can also reliably lower triglycerides and favorably affect both low-density lipoprotein (LDL) and HDL particle sizes. Limited data on resistance exercise suggest that this type of physical activity may reduce LDL cholesterol. Although these lipid effects are modest and variable, they are likely to be particularly important in reducing the morbidity and mortality from CHD on a population level, and may be especially important in patients with atherogenic dyslipidemia (Szapary, *et al*,2003).

The rise in CVDs reflects a significant change in diet habits, physical activity levels, and tobacco consumption worldwide as a result of industrialization, urbanization, economic development and food market globalization. People are consuming a more energy-dense, nutrient-poor diet and are less physically active. Imbalanced nutrition, reduced physical activity and increased tobacco consumption are the key lifestyle factors. High blood

pressure, high blood cholesterol, overweight and obesity - and the chronic disease of type 2 diabetes - are among the major biological risk factors. Unhealthy dietary practices include the high consumption of saturated fats, salt and refined carbohydrates, as well as low consumption of fruit and vegetables are risk factors that tend to cluster and increase dyslipidemia cases (WHO, 2003).

Table 7: Physical Activity among Cases and Controls

Variable	**Category**	**Hypertensive with dyslipidemia**		**Hypertensive without dyslipidemia**		**Normal persons**	
		Freq.	%	Freq.	%	Freq.	%
physical activity	physically active	22	27.8	26	32.9	28	35.4
	Non physically active	57	72.2	53	67.1	51	64.6
	Total	79	100%	79	100%	79	100%
	Chi square = 1.085				**P value = 0.581**		

no statistically significant

As shown in table 7, non physically active subjects among cases (72.2%) were higher than among normal controls (64.6%). There was no statically significant association between different groups (Chi square = 1.085, P value = 0.581). That means that no statistically significant associations were observed between dyslipidemia and physical activity of the participants in the three groups. Age and sex affect physical activities profile negatively according to the social acceptance and severity of disease, in this study; most of patients were in the elderly, (> 40 years old). So it is socially not accepted for them to be engaged in a scheduled sport or physical activities, their health situation need a physician follow up during their engagement in sport or physical activity. Our study result is consistent with Cetin and his colleagues who reported in their study that no significant relation was found between the prevalence of high level TC, LDL-C, TG, and low level HDL-C and level of physical activity except for HDL-C (Cetin, *et al.* 2010).

Moreover, Polychronopoulos, *et al.* 2005 stated that no associations were observed between hypercholesterolemia and physical activity (p = 0.38). In contrast many studies shows that an inactive lifestyle is a risk factor for coronary heart disease. Regular, moderate-to-vigorous physical activity helps prevent heart and blood vessel disease. The more vigorous the activity the greater your benefits. However, even moderate-intensity activities help if done regularly and long term exercise can help control blood cholesterol, diabetes and obesity, as well as help lower blood pressure in some people (AHA, 2006).

4.3.6 Smoking

Table 8: Smoking among Cases and Controls

Variable	**Category**	**Hypertensive with dyslipidemia**		**Hypertensive without dyslipidemia**		**Normal persons**	
		Freq.	%	Freq.	%	Freq.	%
Smoking	Yes	11	14	13	16	8	10.1
	No	68	86	66	84	71	89.9
	Total	79	100%	79	100%	79	100%
	Chi square = 1.373				**P value = 0.503**		

no statistically significant

From the above table it is shown that there is no association between smoking and dyslipidemia. Among cases, 14% had positive history of smoking while 10.1% among controls. Chi square was found to be 1.373with P value (0.503) which means that there is no association between smoking and dyslipidemia, also the differences between the three groups don't reaches statistically significance (P-value 0.503). Males reported more smoking than females. Females have social barriers to be smoking, (socially not accepted). Many studies support the result of our study. Presence of dyslipidemia was not significantly associated with smoking (Khader, *et al.* 2010). Moreover, Souza and his colleagues reported in their study that no significant relation was found between dyslipidemia and smoking habit (de Souza *et al.* 2003). Another study supports the results

of our study is that of Foucan, *et al.* 2000 who found no difference in the lipid levels of smokers and nonsmokers.

4.3.7 Work

Table 9 : Work among Cases and Control

Variable	Category	Hypertensive with dyslipidemia		Hypertensive without dyslipidemia		Normal persons	
		Freq.	%	Freq.	%	Freq.	%
work	No	58	73.4	54	68.4	37	46.8
	Yes	21	26.6	25	31.6	42	53.2
	Total	79	100%	79	100%	79	100%
	Chi square = 13.484				**P value = 0.001**		

As shown in table 9, non working subjects among hypertensive with dyslipidemia (73.4%) and hypertensive without dyslipidemia (68.4%) were higher than among normal controls (46.8%). There was statically significant association between different groups (Chi square = 13.484, P value = 0.001). This means that statistically significant associations were observed between dyslipidemia and work of the participants in the three groups. The highest percentage of participants without income are among both hypertensive with dyslipidemia and hypertensive without dyslipidemia controls and normal control with 73.4%, 68.4%, 46.8% respectively. These findings indicate that the Palestinian people are among the worse economic situation due to the political situation. A continuous closure after Al-Aqsa Intifada led to have many persons without jobs, then getting bad economic situation among many shops, trading, and etc.

Chapter Five

Conclusions and Recommendations

5.1 Conclusions

- The primary purpose of the study was to identify the most common risk factors of dyslipidemia among hypertensive patients attending the Laboratory of the European Gaza Hospital that distinguishes Gaza Strip from other country.
- According to the literatures review and our study results we conclude that risk factors of dyslipidemia can be preventable in many cases because most of the risk factors are modifiable.
- Our study found that Body Mass Index , level of education , compliance to diet, and occupation status, are risky factors for developing dyslipidemia. Among the case and control groups at significant level at 0.05.
- On the other hand, smoking, level of income and lack of physical activity did not show statistically significant differences between the case and control groups.

5.2 Recommendations

So this study conclude some of recommendation that may help decreasing morbidity and mortality, so the following recommendations are suggested:

1- Cholesterol screening programs especially in universities.

2- Projects should involve either primary or secondary prevention and focus on children, the community, or the workplace about dyslipidemia risk factors.

3- Consume a diet high in fruits; vegetables, nuts and whole grains, and low in refined grains. Avoid excessively salty or sugary foods.

4- At least 30 minutes of regular physical activity daily.

5- Maintain a healthy weight.

6- Screening programs to determine these who are at high risk for dyslipidemia.

7- The results of this study indicate that dyslipidemia is becoming a major public health problem. Major efforts by health policymakers are needed to improve public education and health programs that aim at early detection and enhance control of dyslipidemia (especially for hypertensive patients). Moreover, clustering of hypertension risk factors with dyslipidemia need more attention.

8- As diet is one of the major risk factors of dyslipidemia, it is essential to find the most effective diet protocol and supply it to dyslipidemia patients in order to lose their weight, this can be done in cooperation with qualified dietitian.

9- Research to estimate the prevalence of dyslipidemia in the community.

10- Research to control hypertension and dyslipidemia in the community

11- Further studies on normal population in the same field are needed to estimate the prevalence of dyslipidemia and its associated factors among Palestinian adults and differences of all risk factors in the population for better diagnosis, treatment and monitoring.

Finally, as life expectancy in Palestine is increasing, more risk factors and complications of dyslipidemia are expected in the next years. So effective interventions must be developed and implemented on the national level.

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ANNEXES

Annex 1

Palestinian National Authority
Ministry of Health
Helsinki Committee

السلطة الوطنية الفلسطينية
وزارة الصحة
لجنة هلسنكي

التاريخ : 07/03/2011

Name: **Haider Abu Zohri**

الاسم: حيدر أبو زهري

I would like to inform you that the committee has discussed your application about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:-

" Risk factors for Dyslipidemia among Hypertensive patients Attending the Laboratory of the European Gaza Hospital: case control study."

In its meeting on March 2011

و ذلك في جلستها المنعقدة لشهر 3 2011

and decided the Following:-

و قد قررت ما يلي:-

To approve the above mention research study.

الموافقة على البحث المذكور عاليه.

Signature
توقيع

Member
عضو

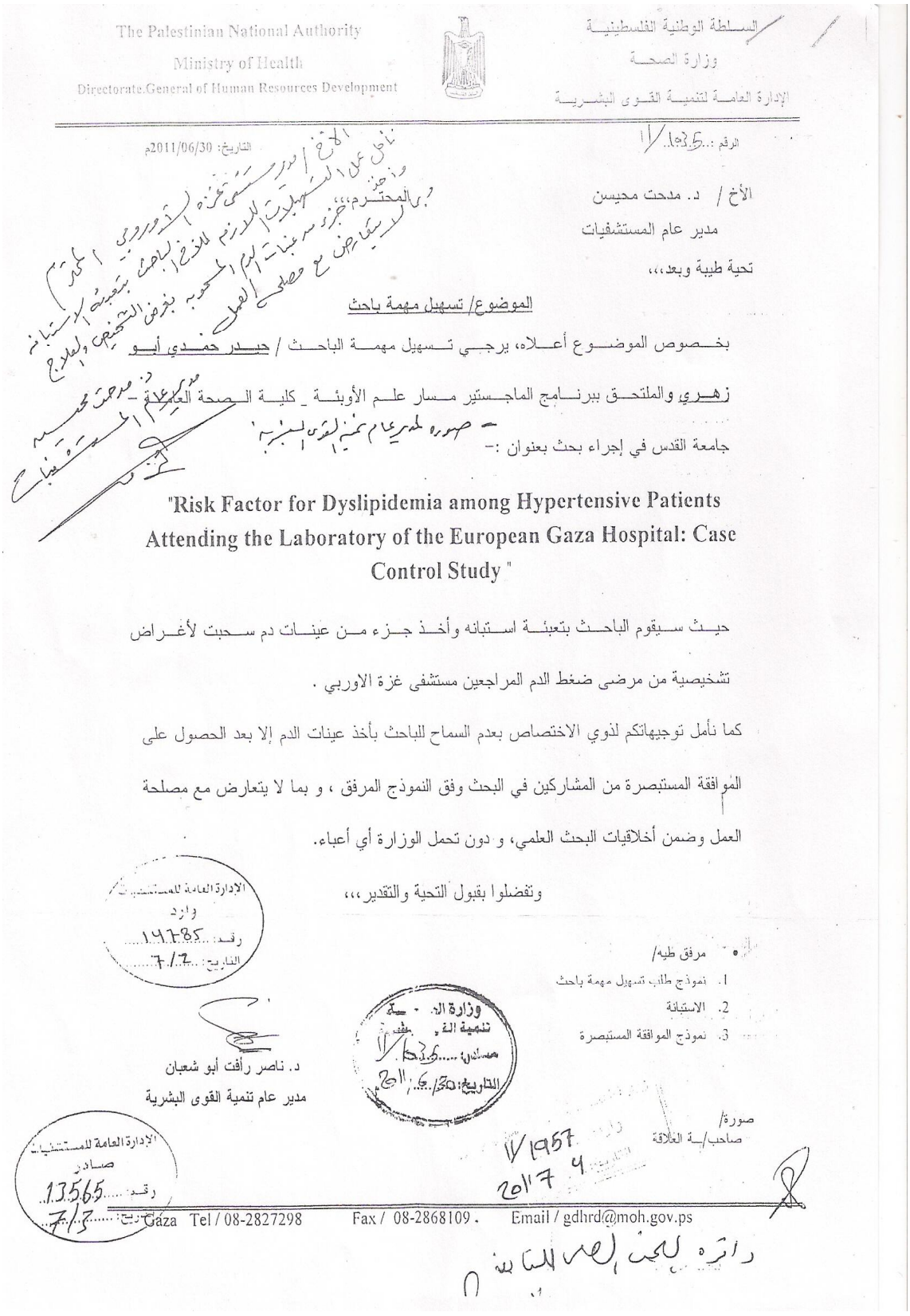
Member
عضو

Chairperson

Conditions:-

- Valid for 2 years from the date of approval to start.
- It is necessary to notify the committee in any change in the admitted study protocol.
- The committee appreciate receiving one copy of your final research when it is completed.

ANNEX 2



The Palestinian National Authority
Ministry of Health
Directorate.General of Human Resources Development

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة لتنمية القوى البشرية

الرقم: ...1/1635

التاريخ: 2011/06/30م

الأخ / د. مدحت محيسن
مدير عام المستشفيات

تحية طيبة وبعد،،،

الموضوع/ تسهيل مهمة باحث

بخصوص الموضوع أعلاه، يرجى تسهيل مهمة الباحث / حيدر حمدي أبو زهري والملتحق ببرنامج الماجستير مسار علم الأوبئة _ كلية الصحة العامة _ جامعة القدس في إجراء بحث بعنوان :-

"Risk Factor for Dyslipidemia among Hypertensive Patients Attending the Laboratory of the European Gaza Hospital: Case Control Study "

حيث سيقوم الباحث بتعبئة استبانه وأخذ جزء من عينات دم سحبت لأغراض تشخيصية من مرضى ضغط الدم المراجعين مستشفى غزة الاوربي .

كما نأمل توجيهاتكم لذوي الاختصاص بعدم السماح للباحث بأخذ عينات الدم إلا بعد الحصول على الموافقة المستبصرة من المشاركين في البحث وفق النموذج المرفق ، و بما لا يتعارض مع مصلحة العمل وضمن أخلاقيات البحث العلمي، و دون تحمل الوزارة أي أعباء.

وتفضلوا بقبول التحية والتقدير،،،

الإدارة العامة للمستشفيات
وارد
رقم: 14785
التاريخ: 7/7

وزارة الصحة
تنمية القوى البشرية
رقم: 1/1635
التاريخ: 2011/6/30

د. ناصر رأفت أبو شعبان
مدير عام تنمية القوى البشرية

مرفق طيه/
1. نموذج طلب تسهيل مهمة باحث
2. الاستبانة
3. نموذج الموافقة المستبصرة

صورة/
صاحب/ـة العلاقة

الإدارة العامة للمستشفيات
صادر
رقم: 13565
التاريخ: 7/7

1/1957
2017

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ANNEX 3

دعوة للمشاركة

في دراسة

Risk Factors for Dyslipidemia among Hypertensive Patients Attending the Laboratory of the European Gaza Hospital: case control study.

"عوامل الخطر لارتفاع الدهون في الدم لمرضى الضغط الذين يرجعون مختبر مستشفى غزة الأوروبي"

المشترك الفاضل:

يسعدني جداً مشاركتكم الفاعلة في هذا البحث الذي هو جزء من رسالة الماجستير في كلية الصحة العامة – جامعة القدس. إن الغرض من هذه الدراسة هو دراسة "عوامل الخطر لارتفاع الدهون في الدم لمرضى الضغط الذين يرجعون مختبر مستشفى غزة الأوروبي".

وقد تم اختياركم كعينة لهذه الدارسة للإجابة على العبارات الواردة فيها.

إذا كنت توافق على المشاركة في هذه الدراسة، يرجى التكرم بقراءة العبارات التالية بدّقة والإجابة عنها بموضوعية لما في ذلك من أثرٍ كبير على صحة النتائج والنصائح التي سوف يتوصل إليها الباحث. مع التأكيد بأن هذه البيانات سوف تستخدم لأغراض البحث العلمي فقط، وسيتم التعامل معها بسرية تامة.

ملاحظه / الوقت اللازم لتعبئة الإستبانة كاملة لا يستغرق أكثر من 20 دقيقة.

أشكركم حسن تعاونكم معي

الباحث/

حيدر حمدي أبو زهري

Annex 4

Questionnaire

Questionnaire No. :_____ case / control

Personal Information:

1- Name:

2- Age:

3- Gender: 1-Male 2- Female

4- Marital status:

1- Single 2- married 3-Divorced 4-Widowed

5-The number of family members :

6- Residence: 1- Khanyounis 2- Rafah

7- Level of education:

1-Illiterate 2- Primary 3-Prepatory 4-Secondary 5-University or more

8 - Occupation:- 1- unemployed 2- employed

9- Monthly income of the family: NIS

10- Number of children for both male and female:

0 1 2 3 4 +5

Smoking:

11- Do you smoke now(shesha or cigarettes) ?

1-Yes 2-No

If no, go to the question number 16

If yes,

12- number of years smoking: year

13- When did you start smoking (age)? Age

14- How many cigarettes per day (24hours)? cigarettes

15- How many years you smoke shesha? Year

16- Have you ever smoke before?

1-Yes 2-No

17- have you got any instructions or advices to give up smoking?

1-Yes 2-No

Physical activity

18- Do you do physically exercise?

1-Yes 2-No

19- If no, go to the question number 22

If yes,

Do you have regular exercise?

1-Yes 2-No

20- Do you engage any of this physical activities?

1- walking 2- Running 3- Others

21- How long hours \ daily

22- Did you play sports in the past and stopped them?

1-Yes 2-No

23- Have you got any advices to do physical activities Which fit your health status by the health care providers?

1-Yes 2-No

Food:

24- How many meals do you eat in the day?

1- One meal 2- Two meal 3- Three meal 4- more than three meal

25- Do you take any snakes between meals?

1-Yes 2-No

26- Did your meals include vegetable or fruit?

1-Yes 2-No

27- Do you eat at night (after 10 pm)?

1-Yes 2-No

28- Did you follow a specific diet?

1-Yes 2-No

29- Do you advise about proper diet regime for your health status by the health care providers?

1-Yes 2-No

30- Do you find any difficulties while implementing the diet regime that prescribed by health care providers ?

1-Yes 2-No

Disease History:

31- Do you have family history of hypertension?

32- If the answer is yes who?

1-Father 2-Mother 3-Brother 4-Sister 5-Others

33- Since when did you suffer from hypertension: /year(s)

34- Do you measure your blood pressure regularly?

1-Yes 2-No

35- Mode of treatment?

1-diet 2-pills 3-both

36- Is your blood pressure under control ?

1-Yes 2-No

37- Do you have any complication?

If no, go to questions number 39

If the answer is yes

38- Which type of complication?

1-Diabetes 2-Coronary Artery Disease 3-Others

39- Do you have a regular follow-up health care?

1-Yes 2-No

40- Do you have dyslipidemia (increase concentration of lipid in blood) ?

1-Yes 2-No

42 If the answer is yes when: Years

43- Mode of treatment ?

1-diet 2-pills 3- both

44- Do you receive a health education about control of dyslipidemia by diet ?

1-Yes 2-No

45- Weight: Kg

46- Height: centimeter

47- BMI

Blood Sample	
TEST	RESULT
Total Cholesterol	mg/dl
Triglyceride	mg/dl
HDL-c	mg/dl
LDL-c	mg/dl

THE END .....

Researcher:

Hader Hamdy Abu Zohry

Annex 5

استبانة "عوامل الخطر لارتفاع الدهون في الدم لمرضى الضغط الذين يراجعون مختبر مستشفى غزة الأوروبي

Serial No. : case/ control

معلومات أساسية:

1)الاسم: .....

2)العمر بالسنة: .....

3) الجنس: 1- ذكر 2- أنثى

4) الحالة الاجتماعية:

1- أعزب/ عزباء 2- متزوج/ة 3- مطلق/ة 4- أرمل/ة

5) عدد أفراد الأسرة :..... فرد

6) مكان السكن: 1-خان يونس 2- رفح

7) المستوى التعليمي:

1- أمي 2- ابتدائي 3- إعدادي 4- ثانوي 5- جامعي أو أكثر

8) طبيعة العمل

1-ربة بيت 2-عامل/ة 3- عاطل/ة عن العمل 4- موظف/ة

9) دخل الأسرة ..... الشيكل

10) عدد الأطفال ذكورا وإناثا

1-لا يوجد 2- طفل 3- طفلان 4- ثلاثة أطفال 5- أربعة أطفال 6- خمسة أطفال فأكثر

11) هل أنت مدخن الآن (السجائر أو الارجيلة) ؟

1- نعم 2 - لا

إذا كانت الإجابة لا انتقل لسؤال رقم 16

إذا كانت الإجابة نعم

12) **عدد سنوات التدخين**.....

13) **كم كان عمرك عندما بدأت التدخين؟ العمر(السنوات)**

14) كم عدد السجائر التي تستهلكها في اليوم؟ .....

15) كم سنة وأنت تدخن الارجيلة؟..... سنة

16) هل سبق لك التدخين من قبل؟

1- نعم 2- لا

17) **هل تلقيت أي نصائح أو إرشادات للإقلاع عن التدخين ؟**

1- نعم 2- لا

18) **هل تمارس الرياضة؟**

1- نعم 2- لا

إذا كانت الإجابة لا انتقل لسؤال رقم 22

إذا كانت الإجابة نعم

19) **هل تمارس التمارين الرياضية بانتظام؟**

1- نعم 2- لا

20) **هل تشارك في أي من هذه الأنشطة البدنية؟1**

1-المشي 2- الجري 3- أنشطة أخرى

21) **كم من الوقت تمارس الرياضة؟..... ساعة/ اليوم**

22) **هل مارست الرياضة في الماضي ،وتوقفت ؟**

1- نعم 2- لا

23) هل نصحك أي من مقدمي الخدمة الصحية بممارسة التمارين الرياضية الملائمة لوضعك الصحي؟

1- نعم 2- لا

24) **كم عدد الوجبات التي تتناولها في اليوم؟**

1-وجبة واحدة 2- وجبتان 3- ثلاث وجبات 4- أكثر من ثلاث وجبات

25) **هل تتناول أي وجبات خفيفة بين الوجبات؟**

1- نعم 2- لا26

26) **هل تتضمن وجبات طعامك الخضار أو الفاكهة؟**

1- نعم 2- لا

27) **هل تتناول الطعام في الليل (بعد 10 مساء)؟**

1- نعم 2- لا

28) **هل تتبع نظام غذائي محدد؟**

1- نعم 2- لا

29) **هل يتم إرشادك إلى الالتزام بالوزن الملائم لوضعك الصحي من قبل مقدمي الخدمة الصحية؟**

1- نعم 2- لا

30) هل تجد صعوبة في تطبيق نظام الحمية الموصوف لك من قبل مقدمي الخدمة الصحية؟

1- نعم 2- لا

31) **هل يعاني أحد أقاربك من الضغط الدم المرتفع؟**

1- نعم 2- لا

إذا كان الإجابة نعم،

32) حدد صلة القرابة

1-الأب 2-الأم 3-الأخ 4- الأخت 5- آخرين

33) **منذ متى تم تشخيصك أنك تعانى من ضغط الدم المرتفع .....(سنة)**

34) **هل تقيس ضغط الدم بانتظام؟**

1- نعم 2- لا

35) طريقة العلاج

1-الحمية الغذائية 2-الحبوب 3- كلاهما 4- أشياء أخرى أذكرها

36) هل أخبرك الطبيب بأن ضغط دمك تحت السيطرة ؟

1- نعم 2- لا

37) **هل تشكو من اى مضاعفات ؟**

1- نعم 2- لا

إذا كانت الإجابة لا انتقل لسؤال رقم 39

إذا كانت الإجابة نعم،

38) حدد نوع مضاعفات : سكر، قلب ، الخ .....

39) **هل تتابع في المركز الصحي بانتظام ؟**

1- نعم 2- لا

40) **هل قمت بعمل فحوصات مخبريه لمستوى الدهون ووظائف الأعضاء ؟**

1- نعم 2- لا

إذا كانت الإجابة لا انتقل لسؤال رقم 45

إذا كانت الإجابة نعم

41) **هل تعلم بأنه لديك زيادة في تركيز الدهون في الدم؟**

1- نعم 2-لا

42) **منذ متى اكتشفت أنك تعاني من زيادة في تركيز الدهون في الدم .....**

43) **طريقة العلاج**

1-الحمية الغذائية 2- الأدوية (الحبوب) 3-كلاهما 4- أشياء أخرى أذكرها

44) **هل حصلت على التثقيف الصحي حول السيطرة على الزيادة في تركيز الدهون في الدم عن طريق النظام** الغذائي ؟

1- نعم 2 – لا

45) الوزن: .....

46) الطول:.....

47)مؤشر كتلة الجسم:.....

Blood Sample	
TEST	RESULT
Total Cholesterol	mg/dl
Triglyceride	mg/dl
HDL-c	mg/dl
LDL-c	mg/dl

الباحث

حيدر حمدي أبو زهري

ملخص الدراسة

يعتبر ارتفاع الدهون في الدم (dyslipidemia) مشكلة صحية شائعة في البلدان المتحضرة والنامية، وأن معدل انتشارها في ازدياد مستمر. تهدف هذه الدراسة إلى تحديد عوامل الخطر لارتفاع الدهون في الدم لمرضى ضغط الدم الذين يراجعون المختبر بمستشفى غزة الأوروبي.

منهجية الدراسة

هذه الدراسة تعتبر دراسة تحليلية تدرس الحالات المرضية وتقارنها مع عينة ضابطة.

الطرق والأدوات

إن البيانات المستخدمة في هذه الدراسة تم الحصول عليها من خلال المقابلة المباشرة مع المرضى، والتحاليل الكيميائية للدم لعينة الدراسة، والتي تشمل 79 مريضاً من مرضى ضغط الدم لديهم ارتفاع في نسبة الدهون في الدم و المجموعة الثانية تضمنت 79 مريضاً من مرضى ضغط الدم لديهم نسبة الدهون طبيعية كمجموعة ضابطةً. وقد تم اختيار 79 شخصا طبيعيا كمجموعة ضابطة أيضا من مراجعين مستشفى غزة الأوروبي في الفترة من 2009/1/1 إلى 2010/12/31 ولقد اشتملت هذه الدراسة على العديد من المتغيرات و منها الديموغرافية وذلك لدراسة عوامل الخطر لارتفاع الدهون في المجموعتين من مرضي ضغط الدم و المجموعة الضابطة.

النتائج:

في هذه الدراسة تم التعرف على العديد من عوامل الخطر التي نعتقد أنها ذات تأثير مباشر بالإصابة بارتفاع الدهون و لوحظ بأن هنالك علاقة ذات دلالة إحصائية بين ارتفاع الدهون، ومؤشر كتلة الجسم وانخفاض المستوى التعليمي لدى الفرد وكذلك للأشخاص العاطلين عن العمل والأشخاص الذين لا يلتزمون بنظام غذائي محدد(رجيم). ولقد أوضحت هذه الدراسة أن عوامل

الخطر الأخرى التي تم دراستها ليست ذات دلالة إحصائية كالتدخين ، مستوى الدخل وقلة النـــشاط البدني. و أظهرت الدراسة أن المرضى الذين يعانون من ارتفاع الدهون يحتاجون إلى المزيد مـــن العناية والاهتمام والمتابعة للتقليل من أمكانية تطور ارتفاع الدهون في الدم.