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Effectiviness of an Education Program on Patients Knowledge Regarding Risk Factors of Coronary Heart Disease at AL-Najaf center for cardiac surgery and Trans Catheter Theory

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By
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of Doctorate of philosophy in Nursing Sciences

Supervised By
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بِسْمِ اللّهِ الرَّحْمَنِ الرَّحِيمِ

﴿وَإِذَا مَرِضْتُ فَهُوَ يَشْفِينِ﴾

صدق الله العلي العظيم

﴿سورة الشعراء/ الآية80﴾

Supervisor Certificate

This is to certify that the dissertation entitled: **Effectiveness of an educational Program on patient's knowledge regarding risk factors of coronary heart disease at Al-najaf center for cardiac surgery and trans cardiac therapy s**ubmitted by **Alaa sabeeh al-khazali** to the University of Babylon, College of Nursing in partial fulfillment of the requirements for the Degree of Doctor

of Philosophy in Nursing. The dissertation work was carried out by the student under my supervision and guidance

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Date: / / 2022

Committee Certification

We, the members of the Dissertation Discussion Committee, certify that the we have reviewed the dissertation entitled ‘‘: **Effectiveness of an educational Program on patient’s knowledge regarding risk factors of coronary heart disease at Al-Najaf center for cardiac surgery and trans cardiac therapy**” carried out by **Alaa Sabeeh al-khazali** and examined the student in its contents and what is related to it on / / 2022.

We decided that the dissertation is accepted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy in Nursing with an estimation of ( ).

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Dedication

To

Praise be to Allah Almighty first.

My mother with all love and respect.

My father with all love and respect

My wife and family with all love and respect.

with all my respect.

My dear friends with my love and respect.

Alaa Alkhazali

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I was pleased with the patients' participation in this study, despite the difficult circumstances they are going through under the Corona pandemic, as well as my appreciation to their families and parents for encouraging them to participate in the program. and here my journey is ended.

Summary

Coronary heart disease (CHD) is an important cause of death worldwide. may be ill Coronary heart has more than one cause, including a buildup of plaques or problems that affect how it works Based on the number of risk factors The blood vessels in the heart. Your risk of coronary heart disease increases with us You have and how dangerous it is. Some risk factors - such as high blood pressure and high blood pressure - can be altered Cholesterol - through heart-healthy lifestyle changes. There are other risk factors These can be changed, such as gender, older age, family history, and ethnicity. Researchers have shown Reduction in risk factors for infection for example, high pulse, High levels of fat, and an abundance of body size, the absence of cigarettes can also because Activity reduced coronary heart disease mortality by about 40-60.

The current study used a quasi-experimental study design consist of two assessments (Pre-program, and exams after program) for study and also control group. The study done during the period from (23^{th} December 2020 to 4^{th} April 2022) an educational program on patient's knowledge regarding risk factors of coronary heart disease at Al-Najaf center for cardiac surgery and trans cardiac therapy

A purposive, non-probability sample was selected for the patient who was reviewed for the Najaf Center for Cardiac Surgery and trans cardiac therapy. The sample consists of 72 patients who attend the periodic treatment schedule at Al-Najaf Center for Cardiac Surgery and Catheter Intervention, who have previously been diagnosed with coronary artery disease, and who are subject to continuous treatment and follow-up by the medical and nursing staff in the center.

A majority of patients participating in the program were males, about 70.8%. The average age of the participating patients ranges between

(young adults and old adults). The highest percentage of the participants was married, the majority of the study participants had no smoker 70 %. The majority of the study participation low knowledge about risk factors of coronary heart disease before education program. The program had a clear effective after its application in improving patients' knowledge regarding the risk factors for coronary heart disease, and this is what we saw in the results after applying the program and testing them later. After education the frequency of good knowledge was much increased to 91.7% in study group while still unchanged in controls, with highly significant difference between both groups.

Giving special workshops and seminars for heart patients in general and heart diseases for a specific coronary illness and a full clarification of the risk factors for these diseases. Guiding patients with coronary heart disease by relying on themselves in the dimensions of risks by raising knowledge about those risks that can be controlled.

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List of Abbreviations

Items	Meaning
CHD	Coronary heart disease
CME	Continuous clinical instruction
LDL	Low-Density lipoprotein
HDL	High-Density lipoprotein
DM	Diabetes Mellitus
HTN	Hyper-Tension
NCCS&TCT	Najaf Center Cardiac Sugary and Trans Cardiac Therapy
WHO	World Health Organization
NCPDP	National Continuous Professional Development Program
CDC	Centers for Disease Control and Prevention
NCHS	National Center for Health Statistics

List of Statistical Symbols

Symbols	Meaning
ANOVA	Analysis Of Variance
R	Correlation Coefficient
SD	Stander Deviation
SPSS	Statistical Package of Social Sciences
M.S	Mean of score
R. M. ANOVA	Repeated measure of ANOVA
S.D.	Strongly disagree
D.	Disagree
U.N.	Uncertain
A.	Agree
S.A.	Strongly Agree
O.P.	Observed Power
SE	Standard error
%	Percentage

Chapter One

Introduction

1.1. Introduction:

Coronary heart disease (CHD) is a significant reason for death around the world. Researchers have demonstrated a hold with decrease of coronary heart disease danger agents, for example, raised pulse, elevated lipid levels, abundance of body size, cigarette also absence from activity be able to add to a decrease of (CHD) death of approximately 40-60% (kelly & fuster., 2010).

Toward ideally deal with the danger agent of coronary heart disease(CHD), a danger agent should be there present distinguished. This determination empowers hazard delineation of the patients by way of CHD. Present are distinctive danger assessment results (Conroy, et al.,2013), Framingham (d'agostino, et al., 2008) .and (Woodward, et al., 2007)

Hazard aspect assessments be significant the same as coronary heart disease a multi-factorial illness. This danger assessment score be based to best objective level used for every one hazard issue. An objectives are principles on which everyone from risk issue control is begun. The gathering from unobtrusively insane danger elements can bring about a higher complete danger than a solitary unhinged danger factor as various danger agent present multipliable and added substance hazard (lloyd-jones., 2010).

Coronary heart disease risk assessment framework ought to be systemically vigorous, simple to utilize and ought to have a useful result (lloyd-jones., 2010). However, hazard factor assessment frameworks ought to hypothetically further develop results, very few investigations have demonstrated the above (lloyd-jones., 2010).

Subsequently at this point, until the genuine advantages of hazard factor assessment frameworks can be demonstrated, ordinary clinical

practice ought to imply the evaluation of hazard agent with direct from this. To control risk agent should know about the objective stage for every one cause (lloyd-jones., 2010).

However, on there be no investigations through demonstrate to significant the objectives used for every hazard cause is valuable, meaningful the objectives used for every one hazard agent would empower doctors toward partake auxiliary avoidance effectively. The idea of scheming every hazard aspect on a specific edge was dubious idea when coronary heart disease hazard is a field (perk, et al., 2013).

However, while additional preliminaries be accessible contrasting that impacts of prevailing personality danger agent against complete danger agent manage for patient, that insightful to manage a danger thing recognized. This objectives of hazard cause be in command of modify occasionally. They are the consequence of broad of clinical exploration. While trying to normalize and further develop care, worldwide wellbeing organizations have distributed rules for optional avoidance of coronary heart disease danger aspect. Aha (smith, et al.,2011),

Nationwide hypertension learning courses (chobanian, et al., 2013), and nationwide lipid learning team (national cholesterol education program., 2012) be a few of this. Reading evaluating an information with endeavors for specialists within optional counteraction contain discovered to specialists don't pressure adequate on top of the job for auxiliary anticipation to their (filippi, et al.,2004).

Absence for mindfulness regarding avoidance rules (hyman & pavlik., 2010), absence for inspiration (cabana, et al., 2011) might be potential cause. An absence of observance to rules prompts mistaken or imperfect administration of hazard factors. The targets of this review were to survey the information on auxiliary avoidance among clinical officials,

to discover the techniques for continuous clinical instruction among clinical officials and to discover their apparent job in hazard factor counteraction. Cme is one incredible technique for overcoming any issues between proof based medication with medical do. Continuous is a significant region of support of high-quality medical consideration (peck, et al., 2009).

The many nations in south Asia, however here different proceeding with clinical instruction programs, there is no revalidation interaction and no settled procedure for granting credits for instructive exercises (mendis, et al., 2004).

Sri lanka is an agricultural nation and there is no settled obligatory persistent clinical schooling system or else re-validation method of sri lanka as of now. Present the "national continuous professional development program", which is willful (mendis, et al., 2004).

Present the lack for information of sri-lanka to effect of proceeding with clinical schooling programs overall. No investigations have been done on information evaluation on auxiliary anticipation of coronary heart illness of sri-lanka. This review desires toward satisfy above destinations through a point of well again auxiliary counteraction of coronary heart disease danger agents of nation. (mendis, et al., 2004)

Late logical information upholds the solid connection between the manner in which an individual or populace lives and their danger for creating or kicking the bucket from heart disease. (grundy., 2009) genetics can be a central point for certain individuals, for example, those with low-thickness lipoprotein cholesterol [ldl-c] receptor deficiency (haskell., 2003) and other danger factors, for example, expanding age and a family background of coronary illness can't be controlled. For a large portion of the populace, way of life is the significant determinant of the danger of

heart disease. (johnson & manson., 2005)

Data from the framingham health study evaluated hazard based on the presence of a scope of variables for heart disease. (wilson, et al., 2008) although hazard factors for coronary illness are generally something very similar for people, there are some differences. (hochman, et al., 2009) women, just as men have a more prominent shot at creating coronary illness when they have numerous danger factors. (miracle., 2006)

The significant danger factors for creating coronary illness are something similar for all kinds of people. These incorporate hypertension, cigarette smoking, hyperlipidemia, diabetes, weight, stationary way of life, stress, age, heredity and race. (wilson, et al., 2008) women are more probable than men to have various danger factors for coronary heart disease. (lewis, et al., 2008) women's attention to hazard for coronary illness isn't proportionate to its reality, and ladies neglect to follow heart-sound way of life practices. (robertson., 2011)

Heart infection is a multifaceted interaction that is added to by an assortment of organic and social attributes of the person.(haskell., 2003) women with a dad or sibling who created coronary illness before age 55 or a divorce women’s created cardiovascular disease previous to age (65) are at expanded risk.(johnson & manson., 2005) race is additionally a factor, with people of color more in danger of creating coronary illness than white women.(johnson & manson., 2005) most of components that add to coronary illness incorporate various grounded and arising hazard factors like smoking, inactive way of life, heftiness and diet.(haskell., 2003)

These variables can be controlled or altered by simplifying changes in way of life and, if vital, taking certain medications. (johnson & manson., 2005) women and wellbeing experts need to perceive the presence of hazard factors and the potential for creating future cardiovascular danger.

Progressing cardiovascular danger appraisal ought to be a piece of every female patient's clinical care. (meagher., 2004) interventions focused on way of life changes like normal exercise, cholesterol-bringing down dietary changes and smoking end are prescribed to diminish the shot at having a first or intermittent heart attack. (wenger., 2006)

Coronary heart disease is a term used to describe a collection of illnesses. That concern the cardiac and vessels of coronary. (mendis, et al.,2011) angina and myocardial infarction are examples of coronary artery disorders commonly identified when the heart attack. (mendis, et al.,2011), coronary heart disease, hypertension, cardiac, cardio sympathy, rheumatic irregular heart rhythms, congenital heart disease, the heart disease valvar, infection in cardiac, aneurysms of aortic, peripheral artery illness, clot in embolic illness, and venous clots are examples of other coronary heart diseases. (naghavi, et al., 2015) concerned on ailment, unlike mechanisms were at work. (mendis, et al.,2011)

Illnesses brought about by atherosclerosis are coronary illness, arterial thrombosis with intra-cysts. Illness caused by atherosclerosis are coronary heart disease and coagulation of arteries and peripheral arteries. (mendis, et al.,2011) high blood pressure, cigarette, diabetes, increase blood cholesterol, not diet, heavy alcohol drink, (mendis, et al.,2011) and meager sleep, with other things, can all contribute to this. Hyper-tension is thought a be responsible for 13% of coronary heart disease fatalities, with tobacco accounting for 9%, dm 6%, inactivity 6%, and high weight 5%. After untreated strep throat, rheumatic heart disease can develop. (mendis, et al.,2011)

Up to 90% of cardiovascular disease is thought to be avoidable. (mcgill, et al., 2008) (o'donnell, et al., 2016) coronary heart disease is prevented by risk factors that improving such as good diet, exercise, stop

smoking, and stopping alcohol drinking, it is also effective to treat factors of risk like when hyper-tension, blood cholesterol, and diabetes mellitus. (mendis, et al.,2011) antibiotics can help people with rheumatic heart disease. Can reduction by antibiotics in patient who have throat. (spinks, et al., 2013)

The advantage of the aspirin taking to people who are otherwise health are arguable. (sutcliffe, et al., 2013) except in africa, cardiovascular disorders are the most common cause of mortality. (mendis, et al.,2011) in 2015, 17.9 million people died as a result of cardiovascular disease (coronary heart disease), up from 12.3 million in 1990 (25.8%). (naghavi, et al., 2015) coronary heart disease deaths are very common and have be growing across a lot of the develop globe, though duty in most of industrialized globe have been declining 1970s. (fuster & kelly., 2010) males mission for 80% of coronary heart disease deaths, while females account for 75%. (mendis, et al.,2011) the majority of cardiovascular disease occurs in those above the age of 50.

Coronary heart disease affects 11% of adults among the age of 20 with 40 in the united states, 37% of those seen between ages of 40 and 60, 71% of those between the ages of 60 and 80, and 85% of those above the age of 80. (go, et al., 2013) in the industrialized world, the average age of mortality due to coronary artery disease is over 80, but in the poor world, it is around 68. (fuster & kelly., 2010) men have a seven- to ten-year head start on women when it comes to disease diagnosis. (mendis, et al.,2011)

A few hazard factors for coronary illness are sex, smoke, not have of exercise, age, undue alcohol, poor diet, high weight, hereditary disposition and family background of coronary illness, hypertension, diabetes mellitus, elevated cholesterol level, no medicated disease of celiac, mental health, poverty, and a poor diet. (fuster & kelly., 2010) while the

risk factor's particular contribution differ by population or ethnic group, the aggregate impact of that factors of risk is rather invariable.(yusuf, et al., 2014)

A few hazard factors for coronary illness factors of risk are unchangeable, old, gender, or family unit medical history predilection; though, a lot of major coronary heart disease risk factors can be changed by routine changes of life, community changes, and medication therapy for prevention of the example of hypertension, hyper-lipedema, and diabetes. (mcphee, et al., 2012) obese community are more likely to develop atherosclerosis in their coronary arteries. (eckel., 2007)

The majority of risk factor for developing coronary heart disease is old, with a risk approximately doubling-up every life of decade. (finegold, et al., 2013) in adolescence, fatty streaks in the coronary arteries disease might develop. (d'adamo, et al., 2015) 82 those show who die of cardiovascular a 65 or adult, according to estimates. (balady, et al., 2011) at the same time, at the age of 55 at the risk of coronary heart disease. (mackay, et al., 2004) why does aging raise the danger of coronary illness? Several theories have been presented. One of these has to do with cholesterol levels in the blood. (jousilahti, et al., 2009) the amount of blood total cholesterol rises with aging in most populations. This rise in men's testosterone levels peaks around the age of 45 to 50. The rise in women lasts until they are 60-- 65 years old. (jousilahti, et al., 2009)

Age is as well linked to change of the vascular wall's involuntary and constitutional characteristics, which can result in arterial stiffness loss and lower arterial compliance, which can lead to cardiovascular disease. (jani&rajkumar., 2006)

Heart disease is more common in males than in women before menopause. (bergin., 2016)(once your menstrual cycle stops, ladies are

bound to create coronary heart disease than male, but who's opinion is the opposite. (finegold, et al., 2013)female diabetics are more prone than male diabetics to suffer heart disease. (danaei, et al., 2014)

Men in their middle-aged are 2 to 5 times more likely than women to suffer from atherosclerosis. (jousilahti, et al., 2009) according to world health organization research, gender accounts for around 40% variance of gender ratio a coronary artery illness morbidity. (jackson, et al., 2007) an additional study found that sex differences account for approximately half of the risk of developing cardiovascular disease, hormonal differences have been postulated as one cause for sex variations in cardiovascular disorders. (jousilahti, et al., 2009)

Estrogen is the most common sex hormone in females. Estrogen may protect glucose metabolism and the hemostasis system, as well as enhancing endothelial cell function directly. (jousilahti, et al., 2009)
After menopausal, estrogen production declines, which may shift lipid metabolism of female on the method a further atherogenic state through lowering hdl cholesterol levels in the blood. (jousilahti, et al., 2009)

Body overweight, pulse rate, stroke amount, height and artery agreement varies significantly between men and women. (jani & rajkumar., 2006) women have greater plasticity and stiffness in their major arteries than males in the extremely old. (jani & rajkumar., 2006) this might be due to women's lower body sizes and artery diameters, which are not related to menopause. (jani & rajkumar., 2006)

Cigarettes are the most widely used tobacco product. (mendis, et al.,2011) tobacco use is harmful to one's health not just when it is used directly but also when secondhand smoke is inhaled. Cigarette is responsible for approximately 10% of CHD. (mendis et al., 2011); nevertheless, people those who stopped smoking from before age of 35

years have roughly the same mortality rate as cigarettes. (doll, et al., 2004)

Inadequate bodily exercise (clear as fewer of 5 x 30 min of fair action each 7 days or fewer of 3 x 20 min of forceful motion per 7days) is presently a quarter leading reason of loss in the globe. (mendis, et al.,2011) in 2008, 31.3 percent of individuals aged 15 and up were inadequately exercise (28.2 % males and 34.4 % women). (mendis, et al.,2011) aging who engage in 150 minutes of moderate physical exercise per week had a lowered hazard of coronary illness and diabetes mellitus by about a third (or equivalent). (world health organization., 2007)

Exercise also aids body size reduction by enhancing management of blood glucose, blood pressure, serum cholesterol, and sugar levels. These effects may help to explain why it's so helpful for your heart, at least in part. (mendis, et al.,2011)

A lack of fruit, vegetables, and seafood as well as increase fat and sodium eating, be all associated to risk factors a coronary heart disease, though all of the connections imply causation are questionable. According to the world health organization, inadequate fruit and vegetable consumption is responsible for 1.7 million deaths worldwide. (mendis, et al.,2011) consuming high-energy foods on a regular basis, like the process food rich in oils with carbohydrates, increases over weight and may well raise heart disease risk. (mendis, et al.,2011)

The amount of salt consumed in one's diet may play a role in hypertension and the overall risk of coronary artery disease. (mendis, et al.,2011) reduced unhealthy oils eating for at less two years is linked toward the reduced danger of coronary heart illness, according to evidence of intermediate quality. (hooper, et al., 2020) trans-fat consumption has been linked to increased blood cholesterol with circulate infection markers, (booker & mann., 2008), and removing trans-fat from the diet have be

extensively advised. (remig, et al., 2010)

The world health organization (who) has recorded that all projections indicate that the mortality rate is half a million cases per year due to saturated fats. Sugar consumption has been linked to blood pressure and bad blood lipids, with sugar consumption has too been linked to an increased danger of diabetes mellitus. (te morenga, et al., 2014) increased risk of coronary heart disease by processed animal protein consumption is associated, probably suitable to enlarged dietary sodium eating. (micha, et al., 2012)

The connection among excessive drinking with the severity of coronary heart disease varies depending on the amount of alcohol consumed. (bell, et al., 2017) there is a clear link between excess alcohol use and coronary heart disease. (mendis, et al.,2011) moderate alcohol intake without bouts of drinking can be linked to a lower risk of coronary heart illness, (mukamal, et al., 2010) although data suggests that correlations between moderate alcohol consumption and stroke prevention are no causal. (millwood, et al., 2019)the health hazards from consuming drinking overweigh any possible advantages at the population level (world health organization., 2019)

1.2. objectives of Study:

I To evaluate the level of Patient's Knowledge regarding Risk Factors of Coronary Heart Disease at Al-Najaf center for cardiac surgery and trans therapy.

II To measure the effectiveness of an educational program by difference in tests scores.

III To find out the relationship between Patient's level of knowledge in all tests and their sociodemographic data.

1.3. Problem statement:

Effectiveness of An educational program on patient's knowledge regarding risk factors of coronary heart disease at Al-Najaf center for cardiac surgery and trans cardiac therapy.

1.4. Importance of a study:

The primary strategy for lowering the social and economic costs of cardiovascular disease and other non-communicable illnesses are to identify risk factors at the personal level. This work started in 1948. With the Framingham research and has proceed unabated since. In numerous rich countries, epidemiological examinations have distinguished the essential drivers of coronary illness and added to huge general wellbeing enhancements, including the aversion of much early coronary illness and the extending of future in moderately aged and more established people the seven nation study, one of the primary examinations, made huge advances to distinguishing populace level dangers.

In spite of the current information's capacity to clarify the predominance of coronary illness in populaces, there is huge help for proceed with the journey for extra danger of coronary illness factors notwithstanding question about the danger factor approach's inadequacies. This paper is partitioned into three areas. To begin with, we sum up the illustrative force of accessible data on pandemic coronary illness causes at the country level, just as the opportunities for essential pestilence coronary illness counteraction. Second, we think about the advantages of examination into "arising" or new coronary illness hazard factors. At long last, we underscore that, except for the most unfortunate countries, arrangements and projects dependent on existing information may significantly work on grown-up wellbeing in a couple of years in

everything except the least fortunate nations. (akhabue, et al., 2014)

To provide care to any patient, you must start with health education to provide them with sufficient information about the disease that the patient has in order to be able to self-care, especially patients with coronary heart disease, you must have sufficient information about this disease and risk factors in order to be able to prevent or reduce these factors and thus maintain therefore, here in this study that we conducted, we raise the knowledge of patients about the danger reason for CHD so that they can self-care, and this is what i derive from the theory of self-care of the view dorothea Orem,

1.5. Research questions:

What is an impact of educational program on patient s knowledge regarding risk factors of coronary heart disease?

1.6. Research hypothesis:

H0. There are no significant difference scores of heart patients in two test

H1. There are significant difference scores of heart patients in two test

1.7. Definition variables (theoretical and operational definition).

1.7.1. patient's knowledge

Theoretical meaning:

The action or state of being familiar with doing something earned via learning or experience. (Yuldashevna., 2019)

Operational definition:

It is the information that coronary artery patients have about the risk factors for these disease and how to reduce them.

1.7.2. Risk factors

Theoretical definition:

A feature, condition, or activity, such as hypertension or cigarette, that enhances the risk of sickness or harm. (memish, et al., 2014)

Operational definition:

Are certain habits, practices, conditions, or factors that increase an individual's risk of developing coronary illness, such as lack of movement, unhealthy diet, smoking, diabetes, age, and familial lineage.

1.7.3. Effectiveness:

Theoretical definition:

is the capability of producing a desired result or the ability to produce desired output? When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, vivid impression. (dictionary .com)

Operational definition:

It is the impact of the program on their information about the risk factors for coronary heart disease and the strength of its impact on them.

1.7.4. Education program:

Theoretical definition:

Is institution or ministry of education which determines the learning progress of each subject in all the stages of formal education. (ASC. 2018)

Operational definition:

It consists of lectures presented to patients through a presentation in the hall of the Najaf Center for Cardiac Surgery and Interventional Catheterization. These lectures contain knowledge of the risk factors for heart disease.

Chapter Two

Review of literature

Literature Review

This chapter presents the review of literature, which is related to the coronary heart disease and risk factor for this.

2.1. Overview

Coronary heart disease (CHD), also known as coronary artery disease (CAD), is caused by the buildup of plaque in the arteries that supply oxygen-rich blood to the heart. Plaque, a mixture of fat, cholesterol, and calcium deposits, can build up in the arteries over many years. Over time, this plaque can cause the narrowing and hardening of the coronary arteries, a condition called atherosclerosis. Coronary heart disease can often be symptom-free but people with CHD have an increased risk of angina (chest pain or discomfort), heart attack, heart failure, and cardiac arrhythmias. Angina and heart attacks are caused by reduced or blocked blood flow to the heart. Stable angina will typically intensify with physical exertion and subside with rest but a heart attack can cause heart muscle death and requires emergency attention. (Applegate, R et al., 2008)

Coronary heart disease (CHD), also called coronary artery disease, is the leading cause of death in the United States for both men and women. CHD occurs when plaque builds up inside the coronary arteries. These arteries supply your heart muscle with oxygen-rich blood. Plaque is made up of fat, cholesterol, calcium, and other substances found in the blood. Over time, plaque hardens and narrows the arteries, reducing blood flow to your heart muscle. Eventually, an area of plaque can rupture, causing a blood clot to form on the surface of the plaque. If the clot becomes large enough, it can mostly or completely block the flow of oxygen-rich blood to the part of the heart muscle fed by the artery. This can lead to angina or a heart attack. Angina is chest pain or discomfort that occurs when not enough oxygen-rich blood is flowing to an area of your heart muscle. Angina may feel like pressure or squeezing in your chest. The pain also

may occur in your shoulders, arms, neck, jaw, or back. A heart attack occurs when blood flow to an area of your heart muscle is completely blocked. This prevents oxygen-rich blood from reaching that area of heart muscle, causing it to die. Without quick treatment, a heart attack can lead to serious problems or death. (Jarjour, N et al., 2012)

An estimated 58 million deaths globally from all causes in 2005, cardiovascular disease (CVD) accounted for 30%. This proportion is equal to that due to infectious diseases, nutritional deficiencies, and maternal and perinatal conditions combined. It is important to recognize that a substantial proportion of these deaths (46%) were of people under 70 years of age, in the more productive period of life; in addition, 79% of the disease burden attributed to cardiovascular disease is in this age group .(Skodova, Z et al., 2008)

Although CVD already places a significant economic burden on low- and middle-income countries, the resources available for its management in these countries are limited because of competing health priorities. It is, nevertheless, essential to recognize that the transition to lower levels of infectious diseases and higher levels of non-communicable diseases is already under way; failure to act now will result in large increases in avoidable CVD, placing serious pressures on the national economies (10–12). In this context, it is imperative to target the limited resources on those who are most likely to benefit. (Skodova, Z et al., 2008)

Coronary heart disease is the second leading cause of death in Washington, causing 6,767 deaths in 2011. Older adults, men, American Indians and Alaska Natives, Native Hawaiians and other Pacific Islanders, and people in lower socioeconomic positions experience higher rates of coronary heart disease death than others. Deaths from coronary heart disease could be prevented or delayed by modifying known risk factors,

such as high blood cholesterol, high blood pressure, tobacco use, physical inactivity, obesity and diabetes. (Dalen, J. E and & Devries, S., 2014)

The 2010 Global Burden of Disease Study reported that, in line with global trends, the largest single cause of death in the combined regions of Central, Eastern, and Western Europe was IHD (26.6% of all deaths), followed by cerebrovascular diseases with 11.0% of the total number of deaths. For the world, IHD accounted for 13.3% of mortality again followed by stroke with 11% of global mortality. In 2010, in Europe, IHD accounted for 13.8% of the total European disease burden (DALYs). (Lozano, R et al., 2012)

Fifty-seven per cent of CVD deaths (19% of global deaths) can be attributed to eight risk factors associated with poor diet and low rates of physical activity: high blood pressure; high blood glucose; physical inactivity; overweight and obesity; high cholesterol; and low fruit and vegetable intake. The 2010 Global Burden of Disease Study reported that the two leading risk factors for global disease burden overall were high blood pressure (9.4 million deaths and 7% of global DALYs) and tobacco smoking, including second-hand smoke (6.3 million deaths and 6.3% DALYs), both of which are key factors in increasing the risk of CVD. In Europe, the leading risk factor was also high blood pressure, with smoking ranked either second or third (depending on the region of Europe). (Lozano, R et al., 2012)

Studies have shown that adherence to lifestyle guidelines advocating moderate physical activity, a cardio-protective diet and abstinence from smoking can reduce the incidence of CVD by more than 80% compared to the rest of the population. However, studies have also shown that neither the general population nor (more surprisingly) people with established CVD typically adhere to these recommended guidelines. (Lozano, R et al., 2012)

Evidence for the effectiveness of blood pressure lowering, cholesterol lowering and anti-platelet medications in preventing both initial and subsequent cardiovascular events is compelling, with hundreds of thousands of patients analyzed in met analyses and reviews over the last 10 years. Although most people with established CVD in high-income countries have been started on recommended medications, significant numbers of people in high-income countries and even larger numbers in low- and middle-income countries either do not receive or do not remain adherent to these treatments in the long term (Lozano, R et al., 2012)

Cardiovascular disease is one of the commonest causes of death and morbidity in both developed and developing countries. Health policies for the control and prevention of cardiovascular disease have traditionally relied on the control of risk factors as a major element of any strategy. Such approaches — generally termed health promotion — are well illustrated by the Healthy Cities program me the British Health of the Nation strategy the Adelaide Conference and the Ottawa Charter. It is always tacitly assumed that the costs of prevention will be outweighed by the costs of disease and that prevention should be promoted even in poorer countries. All these strategies make the assumption that currently available technologies are capable of modifying risk factors sufficiently to lead to reductions in disease risk. (Murray, C et al., 2012)

Coronary heart disease refers to a set of conditions resulting from the process of atherosclerosis, which is an accumulation of plaque in the coronary arteries. A complex atherosclerotic process occurs over a span of many years as a result of various risk factors related to a series of biochemical, immune-inflammatory and hemodynamic processes. The most common clinical manifestations of coronary heart disease, angina chest pain and myocardial infarction are among the most widely researched areas not only in the fields of cardiology and public health, but also in

health psychology .The perception of CHD, its treatment and prevention have changed considerably over the last few decades. (Kotseva, K et al., 2009)

Halfway through the last century, health was perceived from a mechanistic biomedical viewpoint, and very small importance was given to psychosocial factors. Since then a large amount of attention has been focused on psychological and social influences, and a more complex model of understanding chronic diseases has been established. Because of the complex pathophysiology of coronary disease, various psychological, social and behavioral variables may be related to different aspects of the disease process (Kotseva, K et al., 2009)

Atherosclerotic cardiovascular disease (CVD) has a significant impact on women's lives and the healthcare system. Coronary heart disease (CHD) and stroke, two forms of CVD, are the first and third causes, respectively, of mortality in the United States (US) (Centers for Disease Control and Prevention (CDC., 2010). Among women, CVD claims more lives than cancer, chronic lower respiratory disease, Alzheimer's disease, and accidents combined (Turner., 2011). The financial burden for treatment of CVD is immense and totaled $444 billion in 2010, accounting for $1 of every $6 spent on healthcare (CDC, 2010).

Eighty-three million adult Americans are living with at least one type of CVD (CDC, 2010.) Montana is no exception to the impact of CVD where it is the leading cause of death and a major cause of chronic disease and disability (American Heart Association., 2009).

Certain risk factors for CVD are non-modifiable, including age, gender, and family history. However, many factors are modifiable. Risk of heart attack and stroke are reduced by as much as 80% with proper control of hypertension (HTN), weight, cholesterol, and smoking status (Kumar A et al., 2009).

Modifiable risk factors of CVD also include sedentary lifestyle, unhealthy diet, harmful use of alcohol, obesity, diabetes, and stress (Mendis, Puska, & Norrving, 2011),(Mosca, etal., 2007), (Wong, et al., 2005).

The longest running research of essential HTN and coronary artery disease in biracial children, the Bogalusa Heart Study, has found cardiovascular changes as early as 8 years of age (Tulane University School of Medicine, 2011) supporting the importance of proper health promotion and preventive health education at early ages. People living in rural areas are a vulnerable sub-group to stroke and heart disease. This comes as no surprise as major health issues in rural areas include tobacco use, diabetes, obesity and access to healthcare providers and healthcare services (Gamm et al., 2003)

Topics directly related to the development and management of CVD. Public health programs and primary care providers would benefit from increased understanding of local residents' CVD risk factors and how to maximize their health promoting behaviors (HPBs) to combat the burden of CVD. Healthy eating, adequate exercise, and avoidance of smoking are the focus of HPBs to prevent and treat CVD (Mosca et. al., 2007).

Significant positive effects on aging may be seen with earlier adoption of healthy behaviors. In a recent AHA update on CVD statistics, the authors state, Since cardiovascular disease is one of the leading causes of mortality in the world, accounting for 29.3% of all deaths , there is a large need for quantitative and accurate methods for the early detection of cardiovascular diseases. In developed countries, ischemic heart disease and cerebrovascular disease are together responsible for 36% of all deaths. Moreover, the mortality and burden resulting from cardiovascular diseases are rapidly increasing in developing regions and population growth, ageing

and globalized lifestyle changes combine to make cardiovascular disease an increasingly important cause of morbidity and mortality.(Nichols et al., 2014)

This is the fourth in a series of papers describing the burden of cardiovascular disease (CVD) within Europe. CVD remains the most common cause of death worldwide, with the 2013 Global Burden of Disease (GBD) study estimating that CVD caused 17.3 million deaths globally. It accounted for 31.5% of all deaths and 45% of all non-communicable disease deaths, more than twice that caused by cancer, as well as more than all communicable, maternal, neonatal and nutritional disorders combined. The 2013 GBD also reported that CVD caused a greater number of deaths and was responsible for a greater percentage of all deaths than in 1990 when 12.3 million deaths were attributed to CVD, corresponding to 25.9% of total deaths. Previous publications in this series have reported that despite the decreases in CVD mortality in Europe more than 4 million people die from CVD across the continent every year, with more than 1.4 million dying prematurely, before the age of 75 years. (Luxembourg, F., 2016)

Where possible we provide statistics for all CVD and for coronary heart disease (CHD) and stroke in particular. All data included here are updated from previous publications and we present prevalence statistics for the first time. This series of publications describing the current burden and distribution of CVD and CHD in Europe has been based on the European Cardiovascular Disease Statistics 2012 report,5 the fourth in a series of Europe-wide compendia, which was published jointly by the European Heart Network and the European Society of Cardiology.(Nichols, M et al., 2013)

Diseases of the heart and circulatory system (CVD) are the leading cause of mortality in Europe as a whole, responsible for over 3.9 million

deaths a year, or 45% of all deaths. In men, CVD accounts for 1.8 million deaths (40% of all deaths), while in women it is responsible for 2.1 million deaths (49% of all deaths). By comparison, cancer – the next most common cause of death – accounts for just under 1.1 million deaths (24%) in men and just under 900,000 deaths (20%) in women respectively, The main forms of CVD are ischemic heart disease (IHD) and stroke. IHD is the leading single cause of mortality in Europe, responsible for 862,000 deaths a year (19% of all deaths) among men and 877,000 deaths (20%) among women each year. Stroke is the second most common single cause of death in Europe, accounting for 405,000 deaths (9%) in men and 583,000 (13%) deaths in women each year(Lameko, V., & Schoeffel, P., 2021)

CVD is also the leading cause of mortality in the EU, where it causes just over 1.8 million deaths each year – around 800,000 deaths in men and 1 million deaths in women. Interestingly, the share of all deaths attributable to CVD in the EU is slightly lower than that in the continent as a whole, with CVD responsible for 37% of all EU deaths – 34% among men and 40% among women. Cancer, the next most common cause of death in the EU, accounts for 748,000 deaths (30%) in men and more than 590,000 deaths (24%) in women. (Wilkins, E et al., 2017)

As in Europe, IHD and stroke are, respectively, the first and second most common single causes of death in the EU. IHD is responsible for over 335,000 deaths (14%) among men and for over 297,000 deaths (12%) among women in the EU, while stroke accounts for over 176,000 (7%) male deaths and just under 250,000 (10%) female deaths, Comparing the CVD mortality burden across individual European countries reveals substantial variation, with a higher burden typically found in Central and Eastern European countries compared to that in Northern, Southern and Western countries. This is evident across both EU and nonEU member

states. Within the EU, the proportion of all deaths due to CVD ranges from 23% in France3 to 60% in Bulgaria among men, while in women, the burden ranges from 25% in Denmark to 70% in Bulgaria. Outside the EU, the CVD mortality burden varies from 24% in Israel to 59% in Ukraine among men, and from 25% in Israel to 75% in Ukraine among women. Interestingly, cancer is a more common cause of death than CVD among men in 12 countries, most of which are in the EU: Belgium, Denmark, France, Israel, Italy, Luxembourg, the Netherlands, Norway, Portugal, Slovenia, Spain and the UK. In women, the number of cancer deaths exceeds that of CVD in two countries: Denmark and Israel. (Lameko, V., & Schoeffel, P., 2021)

CVD is the leading cause of mortality under 75 years in Europe as a whole, accounting for more than 1.3 million deaths (35% of all deaths under 75 years) each year. By comparison, cancer – the second most common cause of mortality – is responsible for around 1.1 million deaths (29%) under 75 years each year. In men under 75 years in Europe, CVD causes just under 900,000 deaths (35%), compared to around 655,000 deaths (26%) attributable to cancer. In women of the same age in Europe, CVD is responsible for around 480,000 deaths (35%), compared to 459,000 (33%) due to cancer, IHD is the leading single cause of death under 75 years in Europe in both men (450,000 deaths, 18%) and women (214,000 deaths, 16%), while stroke is the second 12 European Cardiovascular Disease Statistics 2017 most common single cause in women (137,000 deaths, 10%) and the third most common in men (183,000 deaths, 7%) after IHD and lung cancer. (Wilkins, E et al., 2017)

The 20th century was the first century in which heart disease was the most common cause of death in the US, and it may be the last century during which it was the leading cause of death. (Jones, D et al., 2012)

In 1900 it was the fourth most common cause of death, trailing infectious diseases such as pneumonia and tuberculosis.2 Three decades later, heart disease deaths had increased to become the commonest cause of death in the US.3 Heart disease deaths continued to increase until the mid-1960s.The large majority of cardiac deaths in the US are due to coronary heart disease secondary to coronary atherosclerosis. In 2009 coronary heart disease accounted for 64% of all cardiac deaths.(Griffin, M et al., 2014)

Many explanations for the increase in coronary heart disease deaths from 1900 to the 1960s have been offered. The marked increase in deaths attributed to heart disease, from 1900 until the late 1960s, was almost certainly due to an increase in the incidence of coronary atherosclerosis, with resultant coronary heart disease. Americans were living longer due to a decrease in deaths from infectious diseases. Changes in diet led to the consumption of processed foods, more saturated fats, added sugars and other high glycemic index carbohydrates. There was a spectacular increase in cigarette smoking:(Go, A et al., 2013)

Part of the increase in mortality attributed to coronary heart disease was due to increased recognition of myocardial infarction. Herrick, in 1912,6 was the first to diagnose heart attacks during life, and 6 years later he encouraged the use of the electrocardiogram to diagnose myocardial infarction.7 The ability to diagnose myocardial infarction during life increased the recognition of coronary heart disease on death certificates (Cole, H. M and & Fiore, M. C., 2014)

In the mid-1960s, heart disease deaths began a remarkable and steady decline that has persisted to the present . Coronary heart disease deaths decreased from 466/100,000 in 1965 to 345 in 1980: a 26% relative decrease.8 From 1980 to 2008, the decrease was 64%: from 345 to

123/ 100,000. The reasons for this decline in cardiac deaths are not clear and are likely to be multifactorial, as in the development of coronary

heart disease. Was the decline due to better medical and surgical treatment? Primary prevention of coronary atherosclerosis? Secondary prevention of myocardial infarction and sudden death in patients with coronary heart disease? Everyone would like to take credit. As John Kennedy said after the Bay of Pigs debacle: “Victory has a hundred fathers; defeat is an orphan.” (Strong, J et al., 2013)

Given that coronary heart disease is a complex, multifactorial process, it is unlikely that there is a single explanation for the decline in coronary heart disease deaths in the US over the past 50 years. The continuing decline in coronary heart disease deaths could be due to a decreasing prevalence of coronary atherosclerosis, which would lead to a decrease in the prevalence of coronary heart disease. The Path Biological Determinants of Atherosclerosis in Youth Study was a multi-institutional study of atherosclerosis in 15- to 34 year-old American men.9 Investigators from this study reported the results of 2876 autopsies performed in this population between 1987 and 1994. They demonstrated that coronary atherosclerosis begins as fatty streaks at ages 15-25 years and progresses to raised intimal lesions during ages 25-35 years. (Strong, J et al., 2013)

The first evidence that the prevalence of coronary atherosclerosis might be decreasing in the US population was based on the autopsy findings of young American servicemen who died during the Korean,10 Vietnam,11 and Iraq and Afghanistan12 wars. The average age of the casualties in the Korean and Vietnam wars was 22; none were known to have symptoms of coronary heart disease before their wartime deaths.(Webber, B et al., 2012)

In 35% there was fibrous streaking or intimal fibrous thickening without luminal obstruction. Forty-two percent had plaques causing at least 10% luminal narrowing, and 15% had at least 50% obstruction of one or

more coronary arteries. In the smaller Vietnam War autopsy study (1968-1978), 45% of 105 American casualties had evidence of coronary atherosclerosis. Five percent were judged to have severe disease. In contrast, postmortem examination of 3832 American casualties in the Iraq and Afghanistan wars (2000-2011) demonstrated evidence of coronary atherosclerosis in only 8.5%, and severe disease (>50% obstruction) in only 2.3% of these young Americans (Webber, B et al., 2012)

The average serum total cholesterol levels of American men and women as measured in a number of nationally representative National Health and Nutrition Examination Surveys17,18 consistently decreased between 1960 and 2010. The average cholesterol level in men decreased from 217 mg/dL in1960-1962 to 194 in 2007-2010. The decrease in women over the same time period was from 222 to 198. The decrease in population cholesterol levels after statins were introduced in 198719 was nearly the same as the decrease in the 20 years before their introduction. This decrease in serum cholesterol levels occurred despite the fact that the percent of saturated fat in the average US diet was the same (14%) in 1993 as it was in 1975.(Carroll, M et al., 2010)

Secondary prevention including dietary changes, statin therapy, aspirin therapy, earlier detection and treatment of hypertension, decreased smoking, and increased physical activity could also have prevented or impeded the progression of minor (nonobstructive) coronary disease to obstructive coronary heart disease.(James E et al., 2014)

Cardiovascular diseases (CVD) were the leading cause of death in 2010 worldwide (1). The global deaths due to CVD have climbed from 12.59 million in 1990 to 17.92 million in 2015 (Lozano R et al., 2012).

coronary heart disease (CHD) and stroke are the major types. A systematic review reported that the prevalence of CHD across Asia,

Europe, and North America ranged from 0.99 to 56.5%, and the overall prevalence was 6.3% . (Zhu KF et al., 2016)

while a global study pertaining to the epidemiology of stroke have reported the prevalence ranged from 0.18 to 1.00% across central Latin America, Asia, Europe and Oceania (Roth, G et al., 2017). The CVDs, major forms of chronic disease, are now becoming increasingly more common in the developing countries (Wang, H et al., 2016).

As the largest developing country, China experienced rapid health transitions. A Chinese study in 2007–2008, involving 152 cities and 112 counties, suggested that the prevalence rates of CHD and stroke were 0.63 and 0.83% (Tsioufis, C et al., 2007). Another study reported that there would be an increase of ~21.3 million cardiovascular events and 7.7 million cardiovascular deaths in China from 2010 to 2030 (Moran, A et al., 2010)

The number of epidemiological studies of CHD and stroke in China has been increasing during the past decades. However, most of the previous studies were conducted in urban areas, much fewer in rural areas. Due to the lower educational level, lower quality of health services, and less frequency of proven therapies used, rural population might have a higher prevalence of cardiovascular disease than urban population (Yusuf, S et al., 2014),(Yan R et al., 2017)

the epidemiology of CHD and stroke in rural area and what mainly affect the diseases will enable the development of reasonable strategies to combat the CVD. Therefore, the aim of this study was to estimate the prevalence of CHD and stroke in Chinese rural population with exploring the related factors.(Alwan, A., 2010)

Cardiovascular diseases (CVDs), especially coronary heart disease (CHD), have assumed epidemic proportions worldwide. Globally, CVD led to 17.5 million deaths in 2012. (Kelly, B. B& Fuster, V ., 2010) More

than 75% of these deaths occurred in developing countries. In contrast to developed countries, where mortality from CHD is rapidly declining, it is increasing in developing countries. (Narayanaswamy, A et al., 2018)

This increase is driven by industrialization, urbanization, and related lifestyle changes and is called epidemiological transition.(Defo, B., 2014) This transition affected the developed world, including countries of Europe and North America, in the early 20th century and spread to developing countries 50 years later.(Defo, B., 2014)

Epidemiological transition is divided into 5 stages: age of pestilence and famines, marked by malnutrition, infectious diseases, and high infant and childhood mortality with low mortality from CVD (<10%); age of receding pandemics, when better public health systems lead to decreased mortality from communicable diseases and emergence of CVD as important, with 10%- 35% mortality; age of degenerative and human made diseases is characterized by mortality from CVD surpassing mortality from communicable diseases and leading to 35%-65% of all deaths; age of delayed degenerative diseases, when cancer and CVDs are predominant causes of deaths and CVD leads to >40% of all deaths but there is a declining trend in death rates; and age of inactivity and obesity, when declining physical activity leads to epidemics of diabetes, hypertension, and lipid abnormalities, with increasing CVD deaths rates. (Defo, B., 2014)

India is a large and socioeconomically diverse country, and there could be evidence of all the stages of this transition in the country.(Gupta, R., & Gupta, K., 2009) However, this has not been studied. Other striking features of CVD epidemiology in India are high mortality rates, premature CHD, and increasing burden.6(Gupta, R et al., 2012) CHD mortality in India using data from the Registrar General of India (RGI),(Gupta, R et al., 2016) the World Health Organization (WHO) report on non-

communicable diseases (NCDs),1 and the Global Burden of Diseases, Injuries, and Risk Factors (GBD) study9,10 reports. (Naghavi, M et al., 2013)

RGI data have been used to demonstrate geographic variability in CHD mortality and evidence of epidemiological transition. We have also updated our previous reports on the prevalence of CHD in India.(Gupta, R et al., 2008) Finally, we focus briefly on risk factors, conventional and emerging, that are considered important in the pathophysiology of CHD in India WHO data are available in a report on NCDs,1 and data from the GBD study were obtained from their website. (Institute for Health Metrics and Evaluation., 2014)

We searched the PubMed database for additional data sources. The initial search term “heart disease India” yielded 11,103 citations. An alternative search with “heart disease epidemiology India” yielded 2314 citations, and “coronary heart disease epidemiology India” had 1267 results. Searches using the term “coronary heart disease prevalence India” produced 1261 citations. We manually read all the titles and removed duplicates and small studies and included 45 studies for further evaluation. The inclusion criteria for the studies were: studies performed since 1965, when the first study using WHO criteria was performed13; studies that included men and women 20 years old; sample size of at least 500; and studies where clinical diagnosis as well as electrocardiographic findings were reported. All these reports were manually reviewed for content. Additional studies were identified using hand search or review of journals that traditionally publish CHD epidemiological studies from India including studies from our previous reports. Descriptive statistics are reported. (Sarvotham, S. G., & Berry, J., 2014)

The office of the RGI has periodically reported data on cardiovascular mortality rates in India. These data have been summarized

as circulatory system deaths in the Medical Certification of Cause of Deaths reports, and in 1980s and 1990s it was reported that CVD led to 15%-20% of deaths in the country. An increasing trend in proportionate

CVD mortality has been reported, with 20.6% deaths in 1990, 21.4% in 1995, 24.3% in 2000, 27.5% in 2005, and 29.0% in 2013.7 However, these reports were based on incomplete data (mainly rural health surveys) from which national data were extrapolated. The Million Death Study Group in collaboration with RGI reported deaths for the year 2001-2003 using a validated verbal autopsy instrument. This study used the existing sample registration surveys of the Indian government and evaluated more than 120,000 death reports obtained from 661 districts of the country using a nationally representative sample of more than 6 million participants. CVD emerged as the most important cause of death in men and women, in urban and rural populations, and in developed and developing states of the country.(Gupta, R et al., 2006)

In India, more than 10.5 million deaths occur annually, and it was reported that CVD led to 20.3% of these deaths in men and 16.9% of all deaths in women.15 According to 2010-2013 RGI data,8 proportionate mortality from CVD increased to 23% of total and 32% of adult deaths in years 2010-2013. The mortality varies from 35% in more developed urban locations.10 Geographic distribution of CVD mortality in India indicates that in less developed regions, such as the eastern and northeastern states with low Human Development indices, there is lower proportionate mortality compared with better developed states in southern and western regions(Gupta, R et al., 2006)

there is a linear relationship of increasing proportionate CVD mortality with regional Human Development Index, which confirms the presence of the epidemiological transition introduced earlier.(Mohan, I et al., 2016)

The RGI data do not classify CVD into CHD, stroke, and other vascular causes of deaths, however, and this is a limitation. The WHO reported that in 2010, non-communicable diseases led to 5.87 million deaths globally and in India led to 1.2 million deaths in men and 0.9 million deaths in women. These numbers are much more than in any other country in the world except China. According to the WHO, the South Asian region has one of the highest cardiovascular mortality rates in the world.1 Age-adjusted CVD mortality rates in countries of this region vary from a low of 179/100,000 in men and 153/ 100,000 among women in Bangladesh to a high of 349/100,000 among men in India and 294/ 100,000 in women in Pakistan. In India the age-adjusted CVD mortality rates are 349/100,000 in men and 265/100,000 in women. These rates are >2-3 times greater than in the United States, where rates are 170/100,000 in men and 108/ 100,000 in women. The GBD study has reported that deaths as well as disability from CHD have more than doubled in India in the last 30 years.(Forouzanfar, M et al., 2012)

The absolute number of persons dying from CHD increased from 0.62 million in 1990 to 0.78 million in 1995, 0.95 million in 2000, 1.01 million in 2005, and 1.13 million in 2010.9 The proportions of years of life lost (YLLs) as a result of CVD was 5.1% in 1990 and 9.8% in 2010, whereas YLLs from CHD doubled from 3.3% in 1990 to 6.7% in 2010.16 The GBD study also provides YLLs from individuals dying from CHD in India. Accordingly, in 1990 the YLLs as a result of CVD were 5.1% of the total and increased to 9.8% in 2010, whereas YLLs as a result of CHD were 3.3% and doubled to 6.7% in 2010. YLLs are a reflection of premature mortality from a particular disease. In India and other developing countries, premature occurrence of CHD is a concern. High premature mortality from CVD has been reported in the Million Death

Study. It was reported that in 2010, out of a total of 1.89 million annual deaths, 0.59 million (31%) occurred at age (Mishra, G et al., 2012)

Previous epidemiological studies on CHD prevalence in India used multiple criteria to diagnose this condition. These included specific criteria such as known CHD on treatment or evidence of previous myocardial infarction (clinical history and/or electrocardiogram [ECG] Q waves), as well as less specific criteria such as Rose questionnaire positive angina, ST-segment changes, or T-wave changes on ECG. Accordingly, a high prevalence of CHD has been reported in the country, varying from 1%-2% in 1960s to 8%-10% in late 1990s. We reviewed CHD epidemiology studies from 1960s to 1990s and reported that CHD prevalence in the country has increased 6- to 9-fold over this period, more in urban than in rural populations. Large studies that have reported epidemiology of CHD in India using clinical criteria (known CHD) as well as more stringent criteria (clinical history and/or ECG Q waves) (Gupta R et al., 2008)

Although diagnosis of CHD using clinical criteria alone (known CHD) is likely to lead to under-reporting of this condition, these are used in the US-based National Health and Nutrition Evaluation studies. Therefore, use of clinical and more stringent criteria are desirable for within-country and international comparisons. We identified CHD epidemiological studies that have reported its prevalence using the search strategy reported earlier. We identified studies that used clinical criteria alone (known angina or myocardial infarction or on treatment) as well as studies that additionally used presence of ECG criteria (Q waves with or without ST-T changes) for diagnosis. (Gupta et al., 2016)

CAD is a leading cause of mortality, morbidity, and disability in Iranian population. It accounts for nearly 50 percent of all deaths per year. CAD is characterized by the presence of atherosclerosis in the epicardial coronary arteries. Atherosclerotic plaques, the hallmark of atherosclerosis,

progressively narrow the coronary artery lumen and impair ante grade myocardial blood flow. The reduction in coronary artery flow may be symptomatic or asymptomatic, may occur with exertion or at rest, and may culminate in a myocardial infarction, depending on obstruction severity and the rapidity of its development .(Joshi, R et al., 2006)

CAD is the most common form of cardiovascular disease with an estimated prevalence of CAD in men is 6.9% and 6% among women . For people at 18 years of age and above prevalence estimates are: only 11.4 percent among whites. While 5.9 percents suffered from heart disease, 5.9 percent have hypertension and 2.3 percent have had a stroke.(Soman, C et al., 2011)

Among African Americans black only, 9.9 percents had heart disease, 5.3 percents CHD,31.6 percents had hypertension and 3.5 percents had experienced a stroke .(Soman, C et al., 2012) Among Hispanics or Latinos, 7.7 percents had heart disease, 4.5 percents have CHD, 19.0 percents had hypertension and 2.2 percents had a stroke. Among Asians, 5.6 percents had heart disease, 3.8 percents had CHD, 16.1 percents had hypertension and 1.8 percents a stroke. In South Asia the prevalence of hypertension is 3.2 percent, diabetes 2.6 percent, and CAD is 3.2 percent. However, in Urban and immigrant populations the prevalence rates are, 12–20 percents, 6–8 percents and, 7–14 percents respectively. Mean serum cholesterol level is 180–200 mg/dl, frequency of obesity 5–8% and dietary fat intake contains 20–30% of total calorie intake. (Singh, R et al., 2010)

Several subgroups of South Asia do have high smoking rates, especially in Urban areas. The prevalence of cigarette smoking in Indians was 1.3% as compared with 27% in whites in the UK, cholesterol levels among Indians were found to be lower than the native population, while in the USA total cholesterol and LDL-c level among Indians and whites were similar. In a study of migrant Indians physicians to the USA, mean level of

HDL-c level were significantly less in younger Indian men and women than their Western counterparts. Similar trends have been found for triglycerides as well. Among the known risk factors, levels of HDL-c have been found to be inherently low in the normal South Asians population. Low HDL-c alone or in combination with high levels of LDLc, insulin resistance and hypertension constitute a very important intermediate phenotype for CAD. In a recent study on young myocardial infarction patients, 70.3% were found to have HDL-c lower than 40 mg/dl .(Hatmi, Z et al., 2007)

The average annual rates for the first major cardiovascular events rise from seven per 1000 men at 35 – 44 years of age to 68 per 1000 at 85 – 94 years of age. For women, comparable rates occur 10 years later in life. Preliminary mortality data proved CVD as the underlying cause of death accounting for 37.3 percent of all deaths, or one of every 2.7, in the United States in 2003. CVD as an underlying or contributing cause of death accounted for about 58 percent of the deaths in 2002 . Data from the 2003 BRFSS study of adults of 18 years of age and above showed the prevalence of respondents reporting two or more risk factors for heart disease and stroke increased among successive age groups. The prevalence of having two or more risk factors was highest among the blacks (48.7 percents) and American Indians/Alaska Natives (46.7 percents) and lowest among Asians (25.9 percents), the prevalence was similar in women (36.4 percents) and men (37.8 percents) were similar. The estimated direct and indirect costs for coronary heart disease in 2006 is $142.5 billion.(Pednekar, M et al., 2011)

CAD is a chronic process that begins during adolescence and slowly progresses throughout life. Independent risk factors include a family history of premature CAD, cigarette smoking, diabetes mellitus, hypertension, dyslipidemia, a sedentary life style, advanced age, gender

and obesity. The risk factors accelerate or modify a complex and chronic inflammatory process that ultimately manifests as fibrous atherosclerotic plaque .(Singh, R et al., 2010)

The Incidence of CAD is compatible with the pattern of the distribution of CAD risk factors, CAD occurs when its risk factors are present. According to a case-control study of 52 countries (INTER HEART), nine easily measured and potentially modifiable risk factors accounts for over 90 percent of the risk of an initial acute myocardial infarction (MI). The effect of these risk factors is consistent in men and women, across different geographic regions, and by ethnic group, making the study applicable worldwide. These nine risk factors include cigarette smoking, abnormal blood lipid levels, hypertension, diabetes, abdominal obesity, a lack of physical activity, low daily fruit and vegetable consumption, alcohol over consumption, and the psychosocial index.(Yusuf, S et al., 2004)

Population in Turkey is regularly followed by the „Address Based Population Registration System". According to 2013 statistics, total population in Turkey is 77,667,864 (male 50.1% and female 49.9%), with an annual growth rate of 12%. As shown in the population pyramid below number of people in middle age and old age is increasing rapidly. Demographical projections suggest that half of the population will be over age 34 and 10.2% will be over age 65 in 2023. Life expectancy at birth increased rapidly in the last decades and current estimations are 79.2 years for women and 74.7 years for men. Mortality rate is 5‰. Most of the deaths (46,2%) occur in the old age group (>75 years). The first six causes of death cases were diseases of the circulatory system (39.8%), neoplasms (21.3%), diseases of the respiratory system (9.8%), endocrine, nutritional and metabolic diseases (5.6%), external causes of injury and poisoning (5.5%) and diseases of the nervous system and the sense organs (4.1%)

respectively. Most of the deaths from circulatory diseases were seen in women and deaths from neoplasms were occurred in men. Turkey espacially Turkish women is among the countries with highest CV mortality in Europe(Onat, A et al., 2012)

Major CV risk factors in Turkish adult population are investigated in several national surveys . Among them Turkish Adults

Risk Factors Study (TARF) − the earliest and longest epidemiological study sponsored by TSC − is the most comprehensive study that evaluated CV disease and its risk factors in Turkey . Accumulating evidence generated in the TARF study demonstrated that standard risk factors fail to identify a large proportion of individuals at high coronary heart disease risk and that inflammatory markers and type-2 diabetes are far more pertinent in this regard, particularly in Turkish women, than in Western populations . In an effort to establish a unique risk estimation system from TARF database, the authors reported that age, presence of diabetes mellitus, CRP, systolic blood pressure, LDL-cholesterol, smoking status, and HDLcholesterol were relevant in the estimation of CV risk in men, while the latter two factors were not predictive among women .(Onat, A et al., 2012)

The risk factors profile has changed in the last decade. After national smoking ban, several campaigns and programmes, prevalence of smoking decreased significantly and rapidly in a relatively short period of time - between 2008 and 2012. Turkey has achieved such rapid results because it is the first country in the world to implement the full range of policies to address each of World Health Organisation‟s (WHO‟s) M-P-O- W-ER (MPOWER) strategies to reduce tobacco use(Kozan, Ö et al., 2013)

Heart Disease (HD) remains a worldwide public health problem. There is remaining no cure for many forms of HD. New clues are emerging that might lead to better treatments in the future .(Hajar, R., 2017)

Coronary Artery Disease (CAD), the most important entity of HD; occurs when atherosclerotic plaque builds up within walls of the coronary arteries leading to narrowing and appearance of the clinical manifestations of Acute Coronary Syndrome (ACS) that include angina and Myocardial Infarction (MI) . (Williams, R., 2009)

ACS is caused mainly due to deficient blood and oxygen flow to the heart muscle and will be the main cause of death till the year 2020 .(Barth, J et al., 2010)

CAD has symptoms that require ongoing monitoring and treatment to prevent further complications as MI and Heart Failure (HF). (Leal, J et al., 2006)

In Egypt, the National Hypertension Project (NHP) found an adjusted overall prevalence of CAD is 8.3% . (Ibrahim, M et al., 2012)

Different reasons are postulated to this; increasing prevalence in developing countries, high expenses of surgical and other treatment modalities, side effects, and the resultant inability make CAD one of the most important medical and health issues .(Strik, J et al., 2003)

Cardiovascular Disease (CVD) has become the largest single cause of death worldwide. It is responsible for an estimated 17 million deaths and led to 151 million disability-adjusted life years (DALYs) lost (~30.0% of all deaths and 14.0% of all DALYs lost). Also, 12.2% of global deaths (7.2 million) are caused by CAD , (Lopez, A et al., 2006) so it is a leading cause of morbidity, disability, and mortality worldwide .(Williams RA et al., 2009)

Further, by 2020, 32.0% of the world population deaths will be caused by CVD and by 2030; it will be responsible for 33.0% of all deaths (24.2 million). At this time, 14.9% and 13.1% of deaths in men and women respectively will be caused by CAD . In Egypt, WHOR showed in 2014 that CAD deaths reached 107,232 (23.14%) of all deaths. Age adjusted

death rate is186.36/100,000 population; this ranks Egypt #23 in the world . (Nowbar, A et al., 2014)

CAD deaths were 78,897 (21.73%) of all deaths, which make CAD the first killer in Egypt in 2013 (Nowbar, A et al., 2014). The high prevalence and morbidity associated with CAD is one of the most pressing health problems. (Nozari, Y et al., 2007) Data indicate that the elder population has higher prevalence of CAD risk factors. (Hatmi, Z et al., 2007)

CAD risk factors are classified into unmodified (e.g., age and genetic factors) and modified (e.g., smoking, obesity, psychosocial, etc). Only half of the variances of CAD are explained by unmodified risk factors . (Rutledge, T et al., 2009)

Most of the CAD studies focused on the biological risk factors and lifestyle, but evidence shows psychological/psychosocial factors have important role in etiology, development, continuity and the consequence of this illness . (Bunker, S et al., 2003),(Albus, C ., 2010)

Psychological factors are considered as independent risk factors in CAD. (Rutledge, T et al., 2009) CAD has multi-factorial etiology, with many of the risk factors being influenced by lifestyle, so rapid changes in dietary habits coupled with decreased physical activity as a consequence of modernization may partly explain the escalation of CAD. (Mohan V., 2004)

Many risk factors have been implicated in causation of CAD, but not all CAD occur in subjects with multiple risk factors. Elevated levels of Blood Pressure (BP) and cholesterol remain the leading causes of CAD. (Gaziano JM et al., 2012) While, tobacco use, obesity, and physical inactivity remain important contributors. (Lopez AD et al., 2006)

Atherosclerosis is a major risk factors for CAD, the main risk factors for atherosclerosis is gender, age, heredity, smoking, Diabetes Mellitus

(DM), high BP, High Triglyceride (TG) levels, Low Density Lipoprotein (LDL) levels, Chronic Kidney Disease (CKD), alcohol abuse, overweight, insufficient exercise, excessive stress. (Kasper, D et al., 2015)

Also, studies have cleared psychosocial and psychiatric factors have a great role in the etiology, development, duration, and outcome of CAD. (Albus C., 2010) The great important factors are depression , anxiety, and stress .(Steptoe, A., & Kivimäki, M ., 2012)

Coronary artery disease (CAD) due to atherosclerosis is a major cause of death all over the world and is the most common form of heart diseases. Its incidence is increasing among different populations and by 2020 it is estimated that it will be the major cause of death all over the world. (Mohammed et al., 2013)

There is a number of personal attributes that may increase liability for development of CAD often described as risk factors. Nowadays, the prevalence of these risk factors tends to increase in developing countries compared to the developed world because of lack of institutional implementation of specific policies that target these risk factors. (Pająk, A., & Kozela, M., 2012)

In clinical practice coronary stenosis is often considered as the main cause of myocardial ischemia. However, other causes should be considered especially in normal coronary angoigraphy in documented cases of ischemic heart disease (IHD). Although there are many advances in modalities for evaluation of coronary lesions, however the coronary angiography remains the “gold standard” for identifying the presence or absence of stenosis in coronary arteries and meanwhile provides reliable information during percutaneous coronary intervention. (Mohammed et al., 2013)

Coronary artery disease (CAD) has become the most prevalent serious global burden of morbidity and mortality in industrialized countries

and is a rapidly growing problem in developed countries. According to the Third Report by the World Health Organization, 12 million people die annually of CVD worldwide, and it is estimated that by 2025, cardiovascular mortality on worldwide scale will likely surpass that of every major disease group, including infection, cancer, and trauma. (Nascimento, B et al., 2019)

Similar to many high-income countries during the 20th century, low- and middle-income countries are seeing an alarming increase in the rates of CVD, and this change is accelerating that is responsible for 80% of global deaths. Atherosclerosis is considered the main cause of acute myocardial infarction (AMI), in which 70% of fatal events among patients with AMI are caused by occlusion from atherosclerotic plaques. (Bhatt, D et al., 2006)

Atherosclerosis is characterized by endothelial dysfunction, vascular inflammation, and the formation of atherosclerotic plaque. This buildup of atherosclerotic plaque causes an inadequate supply of oxygen to myocardial tissue, leading to myocardial hypoxia. Consequently, the plaque rupture and atherothrombosis cause further narrowing of coronary arteries and almost occluding the blood flow, leading to fatal acute coronary syndromes. The most evident manifestation of CAD is the AMI. For instance, the ruptured atherosclerotic plaques followed by thrombosis and loss of blood flow in the coronary vessel cause the predominant signs and symptoms of AMI in the coronary arteries. (Scheen, A., 2018)

Clinical trials have demonstrated that the early detection and lowering these risk factors by aggressive treatment reduce cardiovascular risks. There are current worldwide variations in the global burden of ischemic heart disease. For instance, the prevalence of most cardiovascular risk factors has declined in the high-income nations such as in most European countries and the United States over the past 40 years. However,

most Eastern Mediterranean countries have undergone the shift in the burden of CAD. (Traina, M et al., 2017)

CAD is estimated to increase more dramatically in the next decade than any other global regions. (Turk-Adawi, K et al., 2018) According to epidemiological reports by the WHO in 2016, the highest prevalence rate of ischemic heart disease was observed in Saudi Arabia (46%) and Kuwait (41%). (Kalaf, H et al., 2016)

In Iraq, the epidemiological data on the incidence and prevalence of CAD as evidence of awareness are limited due to the unavailability of evidence-based national guidelines for the management of cardiovascular disease and surveillance studies as compared to other Eastern Mediterranean countries. (Traina, M et al., 2017)

In a recent study in 2014, cardiovascular disease mortality was estimated to account for 33% in Iraq. (Abdullah, A et al., 2021) A better understanding of the burden of cardiovascular disease and associated risk factors in this region and increasing the public knowledge and awareness of CAD symptoms and its risk factors are highly imperative to control and prevent this disease. (Kalaf, H et al., 2016)

There are multiple conventional cardiovascular risk factors of AMI. These include behavioral (modifiable) risk factors such as insufficient physical activity, smoking, poor diet, and harmful alcohol consumption and clinical (nonmodifiable) risk factors such as hypertension, dyslipidemia, diabetes, and obesity. Smoking has been shown to accelerate atherosclerosis and precipitate AMI by multiple mechanisms, such as (a) increases the levels of serum lowdensity lipoprotein-cholesterol (LDL-C) and triglyceride concentrations and reduces serum high-density lipoprotein-cholesterol (HDL-C); (b) stimulates the free radical to oxidize LDL-C molecules, this leads the oxidized LDL-C molecules to accumulate within the arterial wall; (c) induces vascular inflammation characteristic of

atherosclerosis, as reflected by higher serum C-reactive protein levels in smokers; and (d) The nicotine and free radicals in the cigarette activates the sympathetic nervous system (SNS) and leads elevation of heart rate, contractility and wall tension. Consequently, this increase causes high myocardial oxygen demand to heart. The high activity of SNS due to nicotine effect results in increased oxygen demand to myocardium. The myocardial oxygen flow is decreased through coronary arterial vasoconstriction. In addition, cigarette smoking causes increase in the levels of carboxyhemoglobin in the blood, with the potential to further reduce myocardial oxygen delivery from oxyhemoglobin. (Drozdz, D et al., 2014)

Hypertension is considered a strong risk factor of fatal CAD. Its prevalence is dramatically on rise and its effective treatment remains challenging, highlighting the need for preventive program. (Chow, C et al., 2020)

Several mechanisms can account for the increased coronary risk in hypertensive patients. Hypertension accelerates the effects on atheroma, increases shear stress on plaques, exerts adverse functional effects on the coronary circulation, and impairs endothelial function and control of sympathetic tone. (Drozdz, D., & Kawecka-Jaszcz, K., 2014)

Dyslipidemia, including high levels of LDL-C, elevated triglycerides (TG), and low levels of HDL-C, is associated with an increased risk of cardiovascular events. (Khot, U et al., 2003)

Moreover, diabetes mellitus (DM) ranks among the major cardiovascular risk factors. Diabetic patients have 2-8 fold higher rates of CVD risks as compared to nondiabetic patients, and 75% of mortality in patients with DM result from CVD. Due to the importance of CAD, especially AMI, this study aimed to determine the prevalence of most frequent cardiovascular risk factors, including hypertension,

hyperlipidemia, smoking, family history, insufficient physical activity, and obesity among Iraqi patients with AMI. (Tenerz, Å et al., 2013)

2.2. Risk factor of coronary heart disease:

2.2.1. family history:

A family history of coronary heart disease (CHD) is associated with an approximately 1.5- to 2.0-fold higher risk of CHD independent of conventional risk factors. (Kociol, R et al., 2012)

Highlighting the contribution of genetic factors to disease susceptibility. Whether discussion of risk associated with a family history of CHD influences shared decision making regarding statin initiation is unknown. The Myocardial Infarction-GENES (MI-GENES) study2-4 tested the hypothesis that incorporating a multilocus genetic risk score (GRS) into CHD risk estimates would be associated with lower low-density lipoprotein cholesterol levels. We conducted a post hoc analysis to assess whether disclosure of risk associated with a family history of CHD was associated with initiation of statin therapy. (Huynh, Q et al., 2015)

Individuals with a family history of coronary heart disease (CHD) appear to be at a significantly increased risk for events related to CHD. As such, they form a potential target population for early aggressive primary prevention strategies. The Framingham Risk Score presently incorporates the conventional cardiovascular risk factors (age, total cholesterol, smoking, HDL cholesterol, and systolic blood pressure) only in its calculation of a 10-year global CHD risk score. The Framingham algorithm does not include family history information as a criterion to guide pharmacotherapy primary prevention, and as such may underestimate risk for developing CHD amongst those with the strongest family histories. In order to incorporate the prognostic significance of

family history data into potential risk stratification strategies, it is important to first correlate family history of premature CHD with existing subclinical atherosclerosis in asymptomatic individuals. Markers of subclinical coronary heart disease include coronary artery calcium (CAC), carotid intimaemedia thickness, inflammatory markers, and measures of endothelial dysfunction, among others. The presence of a significant association between family history of premature CHD and subclinical atherosclerosis would warrant the development of a strategy to include this risk factor into prediction algorithms such as the Framingham risk score, allowing for timely preventive efforts. (Pandey, A et al., 2013)

Epidemiological studies indicate that family or parental history of myocardial infarction is a risk factor for coronary heart disease (CHD) . (Sesso, H et al., 2012),(Shea, S et al., 2014). The innate susceptibility to CHD was suggested 20 years ago in the Framingham cohort, which showed that family history of premature CHD conferred excess risk. (Snowden, C et al., 2014),(Schildkraut, J et al., 2010)

A history of death due to CHD in parents of the cohort was found to be associated with a 30% increased risk of CHD, a risk which was not mediated by other risk factors. The common disorders such as CHD, diabetes, Alzheimer's disease or bronchial asthma are considered complex diseases arising from interactions between genes and environment. (Clayton, D., & McKeigue, P., 2001)

The usual measure of the effect of gene–environment interaction is the ratio of disease incidence between exposed and unexposed individuals i.e. individuals with a positive or negative family history of disease. But very important questions remain: how to define a positive family history? Usually, how far both parents and siblings are affected is considered together, and the age limit at which they were affected is given. It is well known that females are prone to CHD at least 10 years later than men. A

positive family history is seen as fathers who succumb earlier than 55 years of age, and mothers before 65 years. (Wood D et al., 2010)

The answers always depend on the level of information available, and the intellectual power of the probands. Those with higher education may be considered better informed in this matter(Andresdottir, M et al., 2002)

Coronary artery disease is becoming more prevalent in developing countries, particularly in urban areas, and it is a leading cause of mortality, morbidity and disability with high health care cost in Iran. (Azizi, F et al., 2014) Coronary artery disease is significantly determined by genetic background. (Antman E et al., 2013) However, there is much controversy about the role of positive family history as an independent risk factor. (Hopkins, P et al., 2012)

Thus, some authors refuse to take family history into account for coronary artery disease in offspring, while others assume it as an independent predictor with a strong influence on coronary artery disease in the next generation, focusing on earlier case finding and more intensive management of the modifiable risk factors. Actually, patients whose first-degree relatives develop early coronary artery disease are at higher risk of developing coronary artery disease than the general population. (Gus, I et al., 2002)

The objectives of this study were to investigate: 1) the influence of positive family history of coronary artery disease on the presentation of coronary artery disease in adult offspring, and 2) the relationship of pattern and severity of coronary atherosclerosis with positive family history.(Saghafi, H et al., 2006)

Globally, cardiovascular diseases (CVD) remain one of the single largest contributors to mortality. (Roth, G et al., 2018) The CVD epidemic is advancing rapidly in low- and middle-income country (LMIC) settings

and India is not an exception. (Prabhakaran, D et al., 2018) Coronary heart diseases (CHD) is a major constituent of CVD in India. (Prabhakaran, D et al., 2016)

Which is attributable to approximately two-thirds of the total CVD burden. In India, CHD affects in the productive age groups and younger people are affected disproportionately as compared to high-income country settings. (Joshi, P et al., 2007) Family history of CVD is an important risk factor for development of future CHD. (Chacko, M et al., 2020)

However, inclusion of family history of CVD in the traditional risk scores failed to improve risk prediction of CHD. (Okrainec, K et al., 2004)

It has been however postulated that family history is strongly associated with development of premature CHD events. Only a few risk equations, like QRISK2 , JBS3 and Reynolds , use family history of CVD for assessing future risk. Since the risk scores consider age as an important risk factor for CHD, the risk associated with family history in premature CHD gets diluted in the risk equations. Hence, it is important to study the significance of a positive family history of CVD in a subgroup of patients with premature CHD. (Bhopal, R et al., 2008)

Family history is an important constituent of the health history of any patient and may imply the shared family behaviour, environment and genetic heritage. Although a detailed family history that includes number of relatives, age, and sex of the affected individual may make it relatively harder to acquire during clinical visits, the complexity in detailed family history collection is similar to other behavioural risk measurements. Further, the role of detailed family history in premature CHD is not studied in detail in the LMIC settings due to the undervaluation of such data collection efforts.(Board, J., 2014)

Coronary heart disease (CHD) is a disease in which fatty deposits made up of cholesterol and other cellular materials (collectively called

plaque) accumulate inside the coronary arteries on the surface of the heart, leading to narrowing of the arteries. This decreases the flow of oxygen-rich blood to the heart, which can trigger a heart attack and may cause serious heart damage or sudden death. This process often evolves slowly over a long period, and many affected individuals only become aware of their condition when they suffer a serious heart attack.(Puig-Cotado, F et al., 2020)

CHD, like most non-communicable chronic diseases, is complex and influenced by interrelated personal, social and commercial factors. Unhealthy behaviors, such as tobacco use, alcohol abuse, unhealthy diets and physical inactivity, are major examples of risk factors. These, and the resulting intermediary health conditions, such as obesity and diabetes mellitus, increase the risk of developing CHD. CHD, the leading cause of death and disability globally, causes the loss of 9.4 million lives and over 203 million disability-adjusted life-years (DALYs) every year . (Everett, J., 2013)

Disabilities caused by CHD include angina and fatigue, which may limit functional capacity and impair quality of life. CHD has also been linked to a decrease in work productivity with subsequent emotional distress. In addition, in most low and middle-income countries, families might experience a significant financial burden and need to compensate for their family member’s disability by increasing their work responsibilities .

Although not curable, CHD can be managed effectively with medication and relevant medical and surgical procedures and by addressing risk factors, e.g. by quitting tobacco use.(Puig-Cotado, F et al., 2020)

2.2.2. smoking:

Tobacco use (both smoking and smokeless) and second-hand smoke (SHS) exposure contribute to heart disease through several mechanisms, including inflammation, vasoconstriction, clot formation and reduced oxygen supply. As well as directly damaging coronary arteries, smoking also raises levels of harmful oxidized low-density lipoprotein and reduces beneficial high-density lipoprotein (which removes excess cholesterol deposited in the arteries), thereby contributing to an increase in fatty deposits (plaque) at the site of the injury in the arteries (6, 7) – a disease known as atherosclerosis. Smokers have higher extracellular lipid content in their plaque, which renders the plaque vulnerable to rupture. (Barua RS & Ambrose JA., 2013)

Endothelial injury and dysfunction promote platelet adhesion and lead to the formation of a blood clot – a process known as thrombosis. Tobacco smoking also induces a hypercoagulable state, increasing the risk of acute thrombosis. Smoking-mediated thrombosis appears to be a major factor in the pathogenesis of acute cardiovascular events. The reduction in vital nutrients and oxygen to the heart muscle caused by coronary thrombosis can cause catastrophic heart damage, resulting in major disability or sudden death. Stimulation of the sympathetic nervous system and heart by nicotine increases the demand for myocardial oxygen, causing angina. Tobacco smokers are more likely to experience an acute cardiovascular event at a younger age and earlier in the course of their disease.(Csordas, A., & Bernhard, D., 2013)

The heart-related effects of SHS exposure are nearly as great as the effects of smoking itself, and most likely operate through the same biological mechanisms. Exposure to SHS for as little as one hour can damage the inner layer of the coronary arteries, which increases the risk of heart attack. Smokeless tobacco products are also harmful to health; they contain over 2000 chemical compounds, including nicotine. Toxic metals,

such as cadmium or nickel, and other additives that make smokeless tobacco more palatable, such as liquorice, are reported to have an adverse effect on the cardiovascular system. Smokeless tobacco has been shown to lead to elevated blood pressure and chronic hypertension, both of which are major risk factors for CHD.(Siddiqi, K et al., 2015)

There is a well-established causal link between tobacco smoking and morbidity and mortality related to CHD. The disease contributes to 9.4 million, or 16.6%, of the 56 million global annual deaths . Smoking is responsible for 1.62 million, or 18%, of global deaths from CHD, and causes substantial ill health estimated at 40.6 million DALYs lost from CHD. Risk of damage to the cardiovascular system increases with duration of smoking, and with the number and type of smoked tobacco products consumed. The strong dose-response relationship is, however, not linear. The risk is substantially increased even at low exposure levels – those who smoke only one cigarette per day incur half the risk of CHD of people who smoke at least 20 cigarettes per day. Beyond its status as a major independent risk factor for CHD, smoking tobacco has a synergistic action with other major risk factors for CHD, such as high blood cholesterol, untreated hypertension and diabetes mellitus. (Hackshaw, A et al., 2018)

An estimated 382 000 people died of CHD attributable to SHS exposure in 2017, representing 4.3% of all deaths from CHD and 31% of all deaths from exposure to SHS. SHS exposure was also estimated to be responsible for 8.8 million DALYs lost from CHD in the same year. Various systematic reviews and meta-analyses indicate that adults exposed to SHS, in countries with income levels ranging from high to low, have a 23–30% increased risk of developing CHD. Cohort studies established in the 1970s and 1980s in multiple countries now demonstrate the adverse effects of childhood SHS exposure on the development of cardiovascular disease, including early-onset atherosclerosis. One major challenge in these

studies is accurately assessing lifetime exposure to SHS. The cumulative lifetime SHS exposure may be significantly higher than reflected over the study period, which potentially results in an underestimation of the true risk and impact of SHS exposure on CHD (West, H et al., 2015)

The growing body of evidence was summarized in a 2015 global report on the burden of disease due to smokeless tobacco use. With data from 113 countries, the report estimates that 204 000 deaths (or 2.4% of all CHD deaths in 2010) may be attributed to smokeless tobacco use. The report also estimates that smokeless tobacco use contributed to 4.7 million DALYs lost due to CHD in 2010 .(Siddiqi K et al., 2015)

2.2.3. hypertension:

There is a strong and frequent association between arterial hypertension and coronary heart disease (CHD). In the PROCAM study, in men between 40 and 66 years of age, the prevalence of hypertension in patients who had a myocardial infarction was 14/1000 men in a follow-up of 4 years. This figure increased to 48 when hypertension was associated to diabetes mellitus and 114 when it was associated to diabetes and hyper-lipedema. Major secondary prevention trials with statins (4S, CARE and LIPID), included patients with myocardial infarction and angina pectoris. If baseline characteristics of these trials are analyzed it is observed that patients in the 4S study had hypertension in 26% of the cases, and patients in the CARE3 and LIPID4 studies had 43% and 41% incidence of hypertension respectively. On the other hand the mortality rate of CHD is 2.3 times greater. (Stamler J et al., 2010)

When hypertension is present. There is no doubt that the magnitude of hypertension does have an impact in the incidence of CHD. If the risk ratio is for a diastolic pressure 80 mm Hg, this ratio increases progressively when diastolic pressure is higher, and at least duplicates at values of 94

mm Hg or more. Risk ratio for myocardial infarction is when systolic pressure is between 120 and 129 mm Hg, and almost when this value is greater than 140 mm Hg. There are important pathophysiologic links between arterial hypertension and CHD which might explain the pathogenesis of CHD when hypertension is present. First of all, atherosclerosis is exacerbated by arterial hypertension. Hypertension is frequently associated to metabolic disorders, such as insulin resistance with hyperinsulinemia and dyslipidemia, which are additional risk factors of atherosclerosis. (Defronzo RA et al., 2010)

Deposition of lipids and the formation of the atherosclerotic plaque may be favoured by the increase of transmural pressure in arterial vessels, with an increase in mechanical stress and endothelial permeability. Furthermore, it is well documented that there is endothelial dysfunction, remodelling of coronary arteries and increased resistance at microvascular level, all contributing to a decrease of coronary reserve. Coronary reserve is impaired in patients with essential arterial hypertension in the absence of CHD,10 which is explained in part by the presence of left ventricular hypertrophy. Experimental studies have shown that minimal coronary resistance is increased in spontaneous hypertensive rats, along with a decrease in capillary density and coronary reserve. (Strauer BE., 2013)

In dogs with chronic Reno vascular hypertension and left ventricular hypertrophy it has been shown that the wall/lumen ratio is not significantly increased in arterioles and arteries of different sizes, compared with normotensive animals. An increase in the wall/lumen ratio would not explain the increased vascular resistance. This increased resistance has been confirmed in patients; flow is also increased along with a significant increase of myocardial oxygen consumption. It has been recently confirmed that coronary blood flow is increased in hypertensive patients

with left ventricular hypertrophy compared with hypertensives without hypertrophy and normotensives. (Tomanek RJ et al., 2013)

The lumen area was similar in hypertensive with hypertrophy of the left ventricle and normotensives, and significantly greater than hypertensive without hypertrophy. Vessel area was significantly greater in hypertensive with hypertrophy than in those without. Vessel area increased significantly with plaque area in the three groups. On the other hand, responses to acetylcholine (endothelium dependent) and to adenosine (non-endothelial dependent) are significantly decreased in patients with left ventricular hypertrophy. (Strauer BE., 2013)

These results suggest that functional abnormalities in humans with hypertension and left ventricular hypertrophy are associated with structural changes, namely coronary remodeling. The increase in lumen area would contribute to maintain a constant flow velocity in large epicardia arteries and as a consequence a normal endothelial function with a normal shear stress. This would result in a reduced release of endothelium-derived relaxing factor which is known to be a potent vasodilator, inhibits proliferation of vascular smooth muscle cells, endothelial movement and extracellular matrix production. (Strauer BE., 2013)

In an experimental model in rats, coronary hypertension (banding of ascending aorta) without hypertrophy (right ventricle) remodeling was expressed in arterial micro vessels larger than 30 m but not in small micro vessels (30 m). Medial thickening by proliferation of smooth muscle cells and perivascular fibrosis were observed. On the other hand, in myocardial hypertrophy without coronary hypertension (pulmonary artery banding) no vascular hypertrophy was observed, but deposition of collagen in perivascular tissues of small micro vessels (60 m in lumen diameter). (Tanaka, M et al., 2012)

Cardiac renin angiotensin-aldosterone system, endothelial growth factor, platelet derived growth factors, atrial natriuretic peptide, and endothelin among other susbstances may be involved in this response. Increased wall stress owing to pressure overload may stimulate perivascular fibroblasts proliferation and extracellular matrix proteins by these cells. When coronary hypertension is combined with hypertrophy, as is often the case in systemic arterial hypertension, the two remodelling processes described are superimposed. Medial hypertrophy and perivascular collagen deposition have been observed in small and larger microvessels in a study in humans by biopsy samples and in autopsies of hypertensive patients. (Ito N.,2012)

Experimental data show that after relief of pressure overload there is a regression of medial hypertrophy and perivascular collagen, first at larger arterial microvessels and then in small microvessels but perivascular collagen deposition may remain. Capillary density (capillary number by unit area) is decreased in hypertrophic muscle and may also regress after treatment. Either due to coronary atherosclerosis or to a decreased coronary reserve, clinical manifestations of CHD (angina, myocardial infarction) are frequent in hypertensive patients. Resting electrocardiogram show alterations of repolarisation suggestive of ischaemia and exercise tests may have a falsepositive response. Ischaemia may also contribute to produce subendocardial fibrosis which in turn contribute to diastolic as well as to systolic dysfunction. It has been suggested that acute coronary syndromes might be favoured by an increased flow velocity and shear stress which could contribute to plaque disruption. It has been shown in hypertensive patients with normal coronary arteries that flow velocity is increased which is only partially reversed by isosorbide. (Nitenberg A., 2014)

In hypertensive with left ventricular hypertrophy the risk of reinfection, overall mortality and mortality due to CHD are significantly increased. It is important to emphasize that treatment of hypertension reduces significantly the number of fatal and non-fatal cardiovascular events in patients with CHD. General principles for the treatment of hypertension fully apply to patients with hypertension and CHD. Recent data from the Hypertension Optimal Treatment (HOT) Trial in a cohort of 19000 patients, show no evidence of increased mortality when diastolic blood pressure fell below 85 mm Hg, contradicting former data of an increased mortality when treated diastolic blood pressure fell below that figure (J curve).(Hansson, L et al., 2014)

It is advisable to avoid sudden decreases in blood pressure values and tachycardia when angina pectoris is present. Vasodilator agents may cause reflex stimulation of baroreceptors and tachycardia and increased contractility resulting in increased myocardial oxygen demand and thus aggravating angina. On that respect, hydralazine or short-acting calcium antagonists should be avoided. Global evaluation of the patient is mandatory. It is important to evaluate the extension of organic damage, the presence of diabetes and other risk factors, and the presence of aggravating factors such as thyrotoxicosis and anaemia, etc, and obviously the severity and extension of coronary disease. Nonpharmacologic and pharmacologic treatment must be linked to reduce overall cardiovascular risk. Furthermore, stabilization of atherosclerotic plaque is of extreme importance. Antithrombotic agents, as well as statins when necessary, are important on these grounds. All other therapeutic considerations to treat CHD should be considered including revascularization procedures. (Kullisaar, T et al., 2016)

Hypertension is associated with an increased risk of cardiovascular events. This concept has been established by large observational studies,

showing a strong association between high blood pressure and incidence of ischemic heart disease (IHD), stroke and peripheral vascular disease, and is supported by intervention trials in which a consistent reduction in cardiovascular events was achieved by lowering blood pressure . Hypertension has also been claimed to directly promote the formation and progression of atherosclerotic lesions. A role for hypertension in thermogenesis is unequivocally based on the evidence that atherosclerotic plaques never develop in low-pressure districts of the circulation. However, in some experimental models, atherosclerosis could be induced by hypertension only when high serum lipid levels were concomitant. Moreover, reducing blood pressure levels did not by itself lead to regression of the atheromatous lesions, whereas this occurred when lipid concentrations were also lowered . (MacMahon, S et al., 2014)

In humans, although a role for high blood pressure in accelerating the atherosclerotic process in cerebrovascular and peripheral districts is widely recognized, there is little evidence that hypertension is an independent atherogenic factor for coronary arteries . The major intervention studies have clearly shown that reduction in the incidence of IHD by blood pressure lowering is less than predicted by cross-sectional associations, whereas reduction in the incidence of stroke is as expected . A few human studies, based on postmortem examination, have analysed the impact of hypertension on coronary atherosclerosis. From these, a definite influence of hypertension per se, independent of diabetes and/or hyper-cholesterolaemia, on the extent of coronary atherosclerosis has not emerged clearly. Morphological data, obtained in vivo from the analysis of coronary angiographic patterns, are lacking for large populations. In a sample of patients with effort angina, (De Cesare et al). found that, on angiography, coronary atherosclerosis was not more severe in hypertensive than in normotensive patients; only in older (. 60 years) patients was the

prevalence of triple-vessel disease 20% higher amongst hypertensive.(Collins, R et al., 2014)

In another study, although patients with angiographic evidence of coronary atherosclerosis had higher prevalence of hypertension than the background population, the only variables significantly associated with the degree of atherosclerosis were total and HDL cholesterol; in that study, the role of diabetes was not taken into account. Using quantitative angiography in survivors of a first myocardial infarction, arterial hypertension was not related to the extent of coronary atherosclerosis. All in all, as recently reviewed, the assumption that hypertension related IHD risk is due to a more severe atherosclerotic involvement of the coronary arteries is not fully supported by the available data. Indeed, much attention has been devoted to factors other than atherosclerotic narrowing such as impaired coronary reserve, microcirculatory abnormalities, increased ventricular mass which could explain the higher incidence of IHD in patients with hypertension. In the present work, we reviewed the clinical chart, coronary angiogram and follow-up information of 1700 nondiabetic patients (38% with hypertension) consecutively admitted to the coronary division of the C.N.R. Institute of Clinical Physiology for the clinical work-up of myocardial ischemia, namely patients who had either angina pectoris and/or previous myocardial infarction and/ or positive stress test and who underwent coronary angiography for evaluation of the prognosis (based on the severity of the atherosclerotic lesions and the number of affected vessels) as well as the possible therapeutic options (i.e. angioplasty, bypass surgery or medical treatment). Our aim was to estimate the impact of hypertension on the clinical picture, the atherosclerotic involvement of the coronary bed, and also the outcome of a cohort of patients at high risk for coronary artery disease. (MacMahon S et al., 2014)

Coronary heart disease (CHD) is a leading cause of morbidity and mortality in many countries worldwide (WHO, 2015). CHD refers to a group of a closely related syndrome caused by the imbalance between the myocardial oxygen demand and the blood supply. Depending on the rated severity of coronary artery narrowing and the myocardial response, which is divided into angina pectoris (chest pain), acute myocardial infarction, sudden cardiac death and chronic ischemic heart disease (Kumar et al.,2015).

The most common risk factors of CHD are hypertension(Jindrich.,2012), Smoking, obesity (Paratz et al. 2015), Diabetes (Go.,2014), Stress, gender, age(Ashif.,2011) And dyslipidemia (Sarwar et al., 2007), (Campos et al., 2010)

These are high levels of total cholesterol, Triacylglycerol's (TAG), low-density lipoprotein cholesterol (LDL-C) and very low-density lipoprotein(VLDL) and with low levels of High density lipoprotein cholesterol (HDL-C)(Ahmed et al.,1998),(Kullisaar et al., 2016). That considered as one of the most common modifiable risk factors for CHD(Di Angelantonio .,2009).

Cardiovascular diseases are the main causes of morbidity and mortality in the world population. Due to aging of the global population, cardiovascular diseases, mainly represented by coronary artery disease (CAD), play an incremental role on global mortality. changes in lifestyle have contributed to increased incidence of cardiovascular risk factors and ultimately of coronary disease. Due to its increasing incidence on a global scale (39% of adults aged 18 years and older are obese), obesity has become one of the factors with the greatest impact on the risk of CAD. Obesity is recognized as one of the most important underlying risk factors for a wide variety of metabolic diseases, such as hypertension,

dyslipidemia, and diabetes, which are strongly associated with the development of cardiovascular diseases. (Arnlov J et al., 2010)

Nevertheless, whether obesity alone is a risk factor for CAD has not been well established. (Karelis AD., 2011)

In this regard, the phenotype of metabolically healthy but obese (MHO) individuals, with hormonal and insulin resistance profile not compatible with increased adiposity has become a matter of discussion. (Primeau, V et al., 2011) Previous studies have investigated the incidence of cardiovascular disease in MHO, with controversial results. (Kramer CK et al., 2013)

2.2.4. obesity:

Also, although data derived from intermediate markers of disease (e.g. the carotid intima media thickness) can evaluate the association of these parameters with the presence of CAD in MHO individuals, there are few data available about the association between body mass index (BMI) and coronary artery calcium score as determinant of subclinical atherosclerosis. Coronary artery calcium score was shown to be superior than other methods for the evaluation of subclinical atherosclerosis in cardiovascular event prediction. (Yeboah J et al., 2012)

Obesity is associated with increased risk of HTN, DM, MetS, and dyslipidemia. Through its affect on these diseases, obesity increases the risk of developing CAD. In the following section we describe the relationship between obesity and CAD. Obesity's relationship with HTN has been well described in the literature in large studies such as the Framingham cohort and the Physician's Health Study. The Framingham cohort demonstrated that 34% of HTN in men and 62% of HTN in women aged 35-75 years was attributable to excess weight (defined as a BMI ≥25 kg/m2).(Wilson PW et al., 2002)

The Physician's Health Study described an 8% increase in risk of incident HTN with each 1-unit increase in BMI during a median follow-up of 14.5 years. Weight loss, on the other hand, decreases the risk of HTN. An analysis of the Framingham cohort demonstrated that sustained weight loss of 1.8 kg or more was associated with a long term HTN risk reduction of 22% in middle-aged patients and a 26% reduction in older patients. The mechanism for the association between obesity and HTN is likely multifactorial. Through the production of angiotensin, a precursor of the renin-angiotensin-aldosterone system, adipose cells have a endocrine effect on a known pathway for the pathogenesis of HTN. Beyond adipose cell's endocrine effect, there is an increase in circulating blood volume and total peripheral resistance seen with increasing BMI, which may lead to HTN. Obesity is an independent risk factor for both DM and Mets, with the prevalence of DM being closely related to the rise in obesity. (Dorresteijn, J et al., 2012)

The Behavioral Risk Factor Surveillance System demonstrated that the prevalence of DM increased 33% throughout follow up, a rise related with increasing rates of obesity. DM increases the risk of CAD through its association with endothelial dysfunction and dyslipidemias, both initial steps in the atherogenic process. Through these mechanisms, DM is one of the strongest CAD risk factors, characterized by very high 10-year risk of CV events. Additionally, DM is a common cause of renal dysfunction, an independent risk factor for CAD. Similarly MetS increases the risk of CAD and is defined by HTN, dyslipidemia, impaired fasting glucose, and central obesity, all risk factors for CAD.(De Schutter, A et al., 2014)

The exact mechanisms linking obesity with insulin resistance and other factors influencing risk of DM and CAD are unclear. Research shows that adipose tissue functions as an endocrine organ and has been associated with elevated levels of circulating proinflammatory cytokines and fat

related hormones. A number of inflammatory responses are found to occur with obesity including increased clotting factors such as fibrinogen, von Will brand factor, and factors VII and VIII; and increasing plasminogen activator inhibitor type-I that are associated with decreased fibrinolysis, all which may lead to increasing CAD. Elevated levels of tumor necrosis factor alpha in obesity have also been implicated in the development of insulin resistance. (Rader, D., 2007)

Finally, leptin levels are higher in obesity and chronically elevated leptin levels have been related to negative CAD outcomes and are associated with in-stent restenosis. Other potential mechanisms for the increase in CAD risk associated with DM include decreased insulin-mediated vasodilation, increased insulin mediated renal sodium reabsorption, insulin related sympathetic nervous system stimulation, and increased vasoconstriction related to elevated circulating free fatty acids. Obesity, in addition to increasing the risk of HTN and DM, also increases the risk for dyslipidemia. Higher BMI is associated with lower levels of high-density lipoprotein cholesterol (HDL-C), high levels of triglycerides, in addition to small, dense, atherogenic low-density lipoprotein cholesterol (LDL-C), all potentially increasing the risk for CAD. (Khan, U. et al., 2011)

2.2.5. physical activity:

Cardiovascular disease (CVD), including coronary heart disease CHD) and stroke, is a major contributor to the World's burden of disease, ranging currently as the most important cause of death and producing substantial disability and reduced well-being among surviving people.(Smith Jr, S., 2011)

Distinct measures of primary prevention, mainly regular physical activity (PA), healthy diet, and smoking cessation have been investigated, with convincing evidence of respective risk reductions of cardiovascular morbidity and mortality. (O'Donovan, G et al., 2010)

This evidence includes studies of protective effects of regular PA against CHD, but fewer—and less consistent— investigations were conducted with regard to protective effects against stroke. (Goldstein, LB., 2010)

In addition, most of early reports on the relationship between PA and CVD were focused on men, and the few studies exploring associations of PA with CVD among women demonstrated conflicting results, in part due to the fact that different types of activity, their duration and intensity were monitored. (Shiroma, E. J., & Lee, I., 2010)

More importantly, the majority of existing evidence of health benefits relates to leisure time PA whereas another principal type of physical activity, i.e., occupational PA has been less thoroughly investigated. (Howley, E,. 2001)

Both leisure time and occupational PA are generally considered to provide protective effects on health, however, recent studies observed that heavy occupational PA might be harmful to health. (Holtermann, A et al., 2012)

Another crucial question is how much PA is good for cardiovascular health. It is still unclear whether more PA is even better, as expected from research on dose-response relationships. (Carnethon, M., 2009)

Cardiovascular disease (CVD) is the leading cause of death in India, and its contribution to mortality is rising; deaths due to CVD are expected to double between 1985–2015. Regular physical activity reduces the risk of obesity, blood lipid abnormalities, hypertension, and non-insulin dependent diabetes mellitus, and has been shown to reduce substantially

the risk of coronary heart disease (CHD). Conversely, measures of sedentary lifestyles or physical inactivity have been associated with a 1.5- to 2.4-fold elevation in CHD risk. It is estimated that US$24 billion or 2.4% of the US health care expenditure is directly related to a lack of physical activity. (Colditz, G., 2010)

As a result of economic changes and increased mechanization, the prevalence of physical inactivity is increasing in India, particularly in urban areas, to levels comparable with the West. However, the association between leisure-time exercise, sedentary lifestyles, and risk of CHD has not been assessed within India. We conducted a hospital-based case control study of acute myocardial infarction (AMI) in two major cities in India to address the relation between leisure-time exercise and sedentary activity and risk of CHD. (Tanuja Rastogi et al., 2004)

2.2.6. LDL and LDH:

Five specific risk factors for CVD were included in the model: elevated level of glycated hemoglobin, elevated level of LDL (low-density lipoprotein) cholesterol level, albuminuria, smoking status, and elevated blood pressure levels. The authors found that for the T2D subjects who had these 5 risk factor variables within the target range, there was no significant excess risk of death, myocardial infarction, or stroke when compared with the control population. The authors did report, however, that in the T2D subjects, the risk for hospitalization for heart failure was higher than that observed in the control subjects. Importantly, elevation of the glycated hemoglobin outside the target range was the strongest predictor of stroke and acute myocardial infarction. Yet, although strict control of hyperglycemia may afford some benefit in reduction of major macrovascular events in patients with type 1 diabetes mellitus and T2D, the increased risk of hypoglycemia and its associated consequences render

such a therapeutic approach not necessarily applicable to all subjects. (Pennells, L et al., 2019)

Hence, there is an urgent need to identify new therapies for diabetes mellitus and its CVD consequences to enhance quality and duration of life in the ever-growing number of subjects affected by these disorders. This Brief Review highlights some of the recent therapeutic advances for diabetes mellitus and CVD and considers emerging preclinical approaches at various stages in the development pipeline mellitus drugs conduct noninferiority trials to demonstrate that the emerging therapies would not result in increased CVD risk. Recently, such CVOTs (Cardiovascular Outcome Trials) have led to the discovery of unexpected benefits of some of the newer classes of glucose-lowering agents on CVD. (Miller, R et al., 2019)

2.2.7. diabetes mellitus:

Cardiovascular disease (CVD) remains a leading cause of morbidity and mortality in type 1 diabetes mellitus and type 2 diabetes mellitus (T2D). Beyond the inherent increase in mortality in diabetic subjects, when diabetes mellitus is combined with manifestations of CVD, such as myocardial infarction or stroke, the mortality rate is nearly doubled, leading to an estimated reduction in life expectancy of ≈12 years. Notably, a recent study reporting on the Swedish National Diabetes Register included 271174 patients with T2D and matched them with 1355870 control subjects; subjects were studied for median follow-up of 5.7 years.(Beckman, J et al., 2013)

GLP-1 (glucagon-like peptide-1), a potent incretin hormone, is produced in the L cells of the distal ileum and colon. It exerts distinct functions, depending on the specific site in the body. For example, in the periphery, GLP-1 functions to inhibit gastric acid secretion and inhibit

glucagon secretion. Other actions are considered to be central, in the nervous system, in which GLP-1 induces satiety. At the level of the pancreas, GLP-1 enhances insulin secretion. (MacDonald, P et al., 2002)

The receptor agonists, therefore, mimic the effect of endogenous GLP-1. Although not all members of the GLP-1 RA (GLP-1 receptor agonists) family of agents exerted benefit in major adverse cardiovascular events (MACE), a major trial known as LEADER (Liraglutide Effect and Action in Diabetes: Evaluation of Cardiovascular Outcome Results) reported on findings in 9340 patients with T2D who were at high CVD risk. Subjects received either liraglutide or a placebo for a median follow-up period of 3.8 years. Significant cardiovascular benefits were observed in the liraglutide versus placebo-treated subjects, as the rate of first occurrence of death from cardiovascular causes, nonfatal myocardial infarction, or nonfatal stroke was lower in patients with T2D treated with liraglutide versus placebo.(Marso, S et al., 2016)

In other studies, testing a distinct GLP-1 RA, SUSTAIN-6 (Trial to Evaluate Cardiovascular and Other Long-Term Outcomes With Semaglutide in Subjects With Type 2 Diabetes), once weekly semaglutide was administered versus placebo in T2D subjects with known high CVD risk. In that study, the rate of CVD death, nonfatal myocardial infarction, or stroke was significantly lowered by semaglutide. (Marso, S et al., 2016)

A recent report, however, indicated that semaglutide carries a safety warning, as its use was associated with mild to moderate gastrointestinal side effects and retinopathy versus placebo treatment. (Coon SA et al., 2018)

In the EXSCEL study (Exenatide Study of Cardiovascular Event Lowering), once weekly treatment of patients with T2D with or without previous CVD resulted in no significant difference in the incidence of any

component of MACE between the 2 subject groups. (Holman RR et al., 2017)

In the FREEDOMCVO trial, subdermal implantation of exenatide is being tested for 1 year in patients with T2D; efficacy results on CVD and MACE are still pending. (Wittbrodt ET et al., 2018)

Other studies have focused on the testing of DPP-4 (dipeptidyl peptidase-4) inhibitors in T2D; DPP-4 inhibits GLP-1 degradation; therefore, agents that inhibit DPP-4 increase the availability of GLP-1. In several studies to date, SAVOR-TIMI (Saxagliptin Assessment of Vascular Outcomes Recorded in Patients With Diabetes Mellitus–Thrombolysis in Myocardial Infarction; saxagliptin versus placebo); EXAMINE (The Examination of Cardiovascular Outcomes With Alogliptin Versus Standard of Care in Patients With Type 2 Diabetes Mellitus and Acute Coronary Syndrome; alogliptin versus placebo); TECOS (Trial Evaluating Cardiovascular Outcomes With Sitagliptin; sitagliptin versus placebo); and CARMELINA (Cardiovascular and Renal Microvascular Outcome Study With Linagliptin in Patients With Type 2 Diabetes Mellitus; linagliptin versus placebo), no significant benefits of the DPP-4 inhibitor versus placebo were observed with respect to any component of MACE. It remains uncertain whether this class of agents contributes to increased hospitalization for heart failure; further work will be required to settle that point. (Green JB et al., 2015)

Taken together, unlike the studies testing DPP-4 inhibitors, trials testing GLP-1-RAs revealed unexpected cardiovascular benefits. The reasons for the disparate effects of these 2 agents with distinct mechanisms of action, yet both targeting the GFP-1 RA pathway, on CVD, however, are not clear. Drucker and Nauck20 recently noted that although there do not seem to be substantial differences in the effects of either class of agents on the ability to lower HbA1c (glycosylated hemoglobin), there are notable

distinctions. Whereas weight loss commonly accompanies use of the GLP-1 RAs, treatment with the DPP-4 inhibitors is associated with reduced gain of weight. If and how body weight may be a surrogate for possible broader cardiometabolic benefits of the GLP-1 RAs has not been reported. Furthermore, if and how concerns on gastrointestinal side effects and retinopathy related to the GLP-1 RAs and if and how the possibility of increased hospitalizations for heart failure associated with the use of the DPP-4 inhibitors may affect their long-term usage remains to be determined. (White WB et al., 2013)

The SGLT-2 (sodium-glucose cotransporter-2) inhibitors, which decrease plasma glucose levels by prevention of renal glucose resorption, thereby causing glucosuria, also represent a new class of agents directly targeting hyperglycemia for which CVD benefits have been observed. In the first such study to report findings, EMPA-REG OUTCOME trial (Empagliflozin, Cardiovascular Outcomes, and Mortality in Type 2 Diabetes), empagliflozin was tested in subjects with T2D and established CVD and reported a decreased risk of MACE, as follows.(Zinman B et al., 2018)

Although there were no significant between-group differences in the rates of myocardial infarction or stroke in the empagliflozin versus placebo-treated subjects, empagliflozin was associated with significantly lower rates of death from cardiovascular causes, hospitalization for heart failure, and death from any cause. The CANVAS (Canagliflozin Cardiovascular Assessment Study) reported that treatment with canagliflozin versus placebo significantly reduced the risk of cardiovascular death, nonfatal myocardial infarction, or stroke compared with placebo in T2D subjects; there was no significant reduction in all-cause mortality. (Neal B et al., 2017)

In the DECLARE–TIMI 58 trial (Dapagliflozin Effect on Cardiovascular Events–Thrombolysis in Myocardial Infarction 58), patients with T2D were treated with dapagliflozin versus vehicle. In patients who had or were at risk for atherosclerotic heart disease, treatment with dapagliflozin exerted no significant effect on MACE when compared with placebo; however, this treatment resulted in a lower rate of CVD death or hospitalization from heart failure versus the placebo treatment.(Wiviott SD et al., 2019)

In an additional trial, ertugliflozin is under study for CVD outcomes in patients with T2D. (Scheen AJ., 2018) The first 3 studies noted above have not only established the beneficial effects of SGLT-2 inhibitors in CVD but also showed that there were a number of notable adverse effects that require further consideration, including increased risk of genital mycotic infections, increased fracture risk, diabetic ketoacidosis, and in patients with known peripheral arterial disease, an increased risk of amputation (canagliflozin) was observed. If and to what degree these possible complications affect long-term prospects for this class of agents remains to be determined. Furthermore, at this time, it is not clear why certain of the SGLT-2 inhibitors, but not all, afford benefit for CVD outcomes. It is possible that there are yet-to-be-identified distinct effects of these various agents' specific chemical structures on metabolism and CVD risk factors. It has been reported that among the various agents in this class, there are differences in selectivity for SGLT-1 versus SGLT-2; along with differences in potency and pharmacokinetics. (Isaji M., 2011)

If and how such factors may ultimately impact benefits in CVD, or not, will require further research to address such possibilities. Finally, given the possible complications from the newer classes of ant hyperglycemia agents discussed above, it will be important to outline specific indications and contra-indications for each of these newer agents

that show cardiovascular benefit. In this context, Cosentino et al26 recently published a report from the Cardiovascular Round Table of the European Society of Cardiology to consider potential guidelines for the implementation of these new agents that have shown CVD benefit (Cosentiono F et al., 2018)

Coronary artery disease (CAD) is a major cause of death in Western countries, and it is becoming a major cause of death in developing countries. This increase may be due to the rising prevalence of many CAD risk factors, such as diabetes, which is one of the most important of these risk factors. The prevalence of diabetes is increasing globally, and it has reached pandemic levels in the Middle East and worldwide. (Elhadd, T et al., 2007)

The prevalence of diabetes in patients with CAD is up to 50% in many countries The impact of tighter control of diabetes on cardiovascular morbidity and mortality has been controversial with conflicting results, which attracted special attention in current diabetes management guidelines. The measurement of this impact remains an active area of research. (AlHabib, K et al., 2012)

Type 2 diabetes mellitus (DM) is a strong risk factor for CAD, and experts consider DM an equivalent to established CAD risk. (Grundy, S et al., 2002) Patients with diabetes have 2- to 4-fold greater risk of developing CAD than non-diabetic patients. (Newman, A et al., 2010)

Diabetic patients exhibit an increased risk for development of atherosclerotic CAD for many reasons, including metabolic factors, like hyperglycaemia, dyslipidemia and insulin resistance, which lead to endothelial cell, vascular smooth muscle dysfunction. (Demirtunc, R et al., 2009)

impaired platelet function and abnormal coagulation. Diabetic patients tend to exhibit other risk factors for CAD, like hypertension and

obesity. Patients with diabetes have lipid-rich atherosclerotic plaques, which are more vulnerable to rupture than the plaques seen in non-diabetic patients. Yoo et al. described an overall increase in atherosclerotic burden and a 3.5-fold higher risk of coronary stenosis that was independent of other

cardiovascular risk factors in diabetic patients. Inflammation plays an important role in atherosclerosis. Inflammation activation in type 2 DM results from obesity and insulin resistance, in which an acute phase reaction occur, and a large number of inflammatory and pro-inflammatory cytokines are released from adipose tissue. Endothelial dysfunction is generally present in diabetic patients with CAD, as evidenced by high levels of endothelin 1 and low levels of nitric oxide. Vascular endothelial (VE)-cadherin was identified recently as an updated marker of endothelial function that is well-correlated with endothelin 1 in diabetic patients with CAD.(Atlas, D., 2015)

Enhanced thrombus formation occurs in type 2 DM because of increased platelet activity and blood coagulability. Pathological alterations in fibrinogen and plasminogen activation inhibitors are primarily relevant for the short-term incidence of cardiovascular events in patients with type 2

DM. Notably, not all diabetic patients develop cardiovascular disease despite the presence of the same risk factors. However, recent studies focused on biomarkers of CVD in diabetic patients, such as serum phospholipids and their role in the progression of CVD. Beatriz García-Fontana and colleagues recently found low serum levels of 4 phospholipids in diabetic patients with CVD compared to diabetic patients without CVD. A recent study found a new biomarker in type 2 DM complicated with CAD that was significantly elevated and positively correlated with the degree of CAD stenosis. This new biomarker is called Osteonectin

Secreted Protein Acidic and Rich in Cysteine (SPARC). The mechanism by which SPARC may cause CAD development requires further research. (García-Fontana, B et al., 2016)

International Diabetes Federation (IDF) estimates that worldwide, 415 million people have diabetes, 91% of whom have type 2 diabetes mellitus (T2DM). People with diabetes comprise 8.8% of the world's population, and IDF predicts that the number of cases of diabetes will rise to 642 million by 2040. Te prevalence of T2DM has been steadily increasing over time. Using data from the Framingham Heart Study. (Abraham TM et al., 2015)

Noted that the overall annualized incidence rates of the disease per 1000 persons increased from 3.0 in the 1970s to 5.5 in the frst decade of the 2000s. Tat change represented an increase in the incidence of T2DM of 83.3% and was higher in males than females by a factor of 1.61. Cardiovascular disease (CVD) is a major cause of death and disability among people with diabetes. Adults with diabetes historically have a higher prevalence rate of CVD than adults without diabetes, and the risk of CVD increases continuously with rising fasting plasma glucose levels, even before reaching levels sufcient for a diabetes diagnosis. (Singh GM et al., 2013)

T2DM reduces life expectancy by as much as 10 years, and the main cause of death for patients with T2DM is CVD. (Atlas, D., 2015)

Furthermore, people with T2DM are disproportionately affected by CVD compared with nondiabetic subjects. (Hafner et al). reported death rates due to cardiovascular causes over a 7-year period in patients with and without T2DM. In persons with T2DM, the death rates were 15.4% for those with no prior myocardial infarction (MI) and 42.0% in patients having a history of MI. In contrast, patients who did not have T2DM, the

death rates due to cardiovascular causes were 2.1 and 15.9%, respectively. In the Framingham Heart Study. (Fox CS et al., 2008)

Reported that, along with the increasing T2DM prevalence, the attributable risk of CVD due to T2DM increased from 5.4% in the period 1952–1974 to 8.7% in the period 1975 and 1998. In a longitudinal study of 881 patients with T2DM over 10 years, van Hateren et al. indicated that the hazard ratio for death due to CVD was constantly increasing each year. Tus, an increasing burden of diabetes will likely be followed by an increasing burden of CVD. Given the clinical burden that CVD complications have on T2DM patients, there has been an increased focus on the joint management of T2DM and CVD. Good glycemic control remains the main foundation for managing T2DM. Although the importance of intensive glycemic control for protection against microvascular complications and CVD in people with T1DM is well established, its role for reducing cardiovascular risk has not been established as clearly in people with T2DM. Hence, the most effective approach for prevention of macrovascular complications appears to be multifactorial risk factor reduction (glycemic control, smoking cessation, diet, exercise, aggressive blood pressure control, treatment of dyslipidemia). As a result, diabetes treatment guidelines have been updated to provide guidance on how to prevent and manage the onset of CVD. (ADVANCE Collaborative Group. (2008))

Furthermore, there is increasing pressure from regulatory agencies that antidiabetic treatments demonstrate cardiovascular safety and benefts, especially for major cardiovascular events such as cardiovascular mortality, non-fatal MI, and stroke. Following these regulatory requirements, several cardiovascular outcomes trials (CVOT) have been completed, which demonstrate that certain anti-diabetic treatments are associated with a lower risk of CVD. (Schnell O et al., 2017)

increased focus on adequately treating patients with both CVD and T2DM requires that we have updated prevalence rates of CVD among patients with T2DM. This is especially needed to inform clinical and policy level decision-making by healthcare providers, healthcare policy decision-makers, and health economic analysts. Reviews have been published on the epidemiology of type 1 diabetes (T1DM), and CVD, pre-diabetes and the risk of CVD, or reviews have focused on specifc countries. (Cavan, D et al., 2016)

However, there is no recent global review on the prevalence of CVD among adults with T2DM. Therefore, the objective of this systematic literature review was to quantitatively summarize rates of prevalence of CVD in adults with T2DM in studies published during the past 10 years. Although CVD is an umbrella term that includes coronary artery disease (CAD), cerebrovascular disease (CBV), and peripheral vascular disease, the focus of this review was on CVD outcomes that are relevant to major cardiovascular events. Terefore, the review specifcally focused on the prevalence of CAD and CBV. CAD has many synonyms, including ischemic heart disease, coronary heart disease (CHD), atherosclerotic heart disease, and atherosclerotic CVD Conditions within this category are stable angina pectoris, unstable angina pectoris, MI (also known as heart attack), and sudden cardiac death (SCD). CBV comprises mainly stroke (intracerebral hemorrhage, cerebral infarction, cerebral arterial disease), but also may include transient ischemic attacks. (Boye, K et al., 2019)

For years it has been common knowledge that people who are under a lot of stress have an increased risk of heart disease. Many reports have shown that cataclysmic events might bring about acute myocardial infarction or sudden death; there is inadequate existing evidence from prospective studies that any form of stress anticipates the subsequent development of coronary heart disease (CHD). In the past, it was thought

that psychosocial risk factors accentuated conventional risk factors but had no independent effect. Subsequently, a number of prospective cohort studies have scrutinized associations between various forms of stress and the development and prognosis of CHD; there has also been a multitude of reviews, both narrative and systematic. This study was therefore designed to assess the hypothesis that psychological stress and anxiety are related to the incidence of CHD, after adjusting for known risk factors. (Kuper H et al., 2002)

For many years, the proposed clinical effects of stress on the cardiovascular system have been discussed. However, until recently, only a few studies investigating stress and its impact upon the circulatory system have been conducted and evidence has been relatively weak for a long time. Despite clinical 'intuition', an 'easy and clear' relationship between stress and cardiovascular diseases had not been delineated, and this may have been due to the complexity of the stress phenomenon. The situation changed somewhat when the concept of different behavioral patterns involved in cardiovascular diseases occurred. The introduction of various types – or patterns – of behavior (particularly 'Type A') into the analysis of environment/stressors and its effects upon cardiovascular diseases helped to better explain the nature of stress and stress-related pathophysiological mechanisms - and to find interdependencies or measure a correlation between stress and cardiovascular diseases . (Esch TZ et al., 2012)

Type A behavior, for example, describes people who often get 'stressed out' and irritated or are always 'on the run'. Theses individuals tend to have a higher susceptibility to diseases of the circulatory system. However, the nature of this relationship is not as obvious as it seems prima facie, and recent research has demonstrated that the 'hostility' component - out of the suggested Type A pattern – is especially associated with a

greater cardiovascular risk. Therefore, hostility and anger have become a major focus in the context of ‘stressful’ factors that facilitate cardiovascular problems Although many different types of potential stressors exist (see above), mental and psychosocial stressors are apparently powerful and exert profound effects on the circulatory system. Research on the effects of behavioral phenomena on myocardial ischemia in coronary artery disease patients has provided a pathophysiological model for understanding the mechanisms by which mental stress can trigger clinical cardiovascular events . (Newlin DB and Levenson RW., 2011)

2.3. Previous Study:

Heart disease is one of the major global problems in terms of health, and in our time it is spreading in a large and frightening way, especially in the Arab countries, including the Republic of Egypt. One of the objectives of this study, which was conducted in Egypt, is to identify the lifestyles of the Egyptian citizen and the clinical and psychological risks to which patients are more vulnerable. The heart was used in the design of this study, in which 120 patients were taken to the hospital and they were suffering from coronary heart disease. The information for this study was collected through the interview. The risk factors appeared (high pressure, kidney disease, obesity, physical activity, anxiety, and high cholesterol). and psychological stress) and it has been shown that one of the most important treatment methods that must be started is a change in lifestyle, controlling high pressure and reducing psychological and social pressuresIncreasing patients' knowledge of danger reasons for coronary heart illness. In addition, a live teams increased awareness among people about these risks, which is the routine examination of people over the age

of 41 years in order to improve the prevention and control of coronary heart disease. (Essam A. El-Moselhy et al ., 2018)

A study was conducted in the Islamic Republic of Iran, and the results showed that coronary heart disease is one of the common and main causes of loss of life for many Iranian citizens, and it reached about half of the deaths that occur due to coronary heart disease. After further investigation in this study, I found that a large number of citizens are not knowing danger influences for CHD. A purpose off this study, which was conducted in Iran, is to determine the prevalence of risk factors among citizens. A survey was conducted by taking about 3100 citizens, their ages ranged between 18 and above, and found about more than half of them have risk factors for these diseases, like by way of hypertensive , high cholesterol, &better Weight, mental illness, anxiety and others, and these are risk factors for coronary heart disease The conclusion of the study is that a high percentage of Iranians carry danger reasons intended for CHD, but they do not attach importance to this, and the health authorities must take this issue seriously by providing periodic and educational examinations to the community to reduce these diseases. (Hatmi, ZN, et al., 2007)

There is a study conducted in East Asia, specifically in India, and it showed that the prevalence of coronary heart disease, according to the health registry for two years, is about 17% of deaths, and it was caused by coronary heart disease, but after about ten years, it showed frightening results, reaching 32% of the total deaths and their consequences. financial and human costs Studies have indicated that the incidence of coronary heart disease has increased from 1% to 11% among citizens who live in cities. (Rajeev Gupta and colleagues,. 2016)

Studies around the world have shown that coronary heart disease is uncommon in developing countries A study was conducted among the

Chinese for the purpose of evaluating the prevalence of coronary heart disease between them, especially in the Chinese countryside. About 40,000 members remained taken hip the learning, a forever reached between 18 - 80 an age. The results showed about 1734 of them have coronary heart disease, meaning that the spread of heart disease within the countryside. it is about 4% After verifying more of the risk factors for the infected, it was found that age, gender, HTN, CHOLESTROL, Cigarette and intake alcohol were the factors that increased their infection with these diseases. to heart disease Hence to the loss of life (Tian, Zhongyan, et al., 2020)

In the previous years, specifically the end of the twentieth century, one of the most common causes of death was coronary heart disease, specifically in the United States of America, but at this time or in the last years of the twenty-first century it became a major reason of loss of life is CHD. Because of A danger reasons intended for these diseases, including bad habits, high pressure, smoking, drinking alcohol, obesity and lack of exercise are(James E et al., 2014)

Coronary heart disease is one of the common diseases during the past years and the main cause of death around the world, and there are risk factors for these diseases. The purpose of conducting such studies was in order to verify the relationship between risk factors and coronary heart disease. The study included about 221 patients who had coronary heart disease and who They underwent catheter intervention in cardiology units in Mosul inside Ibn Sina Hospital in 2006 and the study found that family history has a positive relationship with coronary heart disease and diabetes also has a positive relationship with these diseases and HTN, absence of bodily movement, in elevation cholesterol A training presented that here is an significant association among risk factors & coronary heart disease (Ameen Mosa Mohammad et al., 2013)

Chapter Three

Methodology

Chapter three

Methodology

The research methodology generally includes three steps, which are designing, organizing and finally implementing certain procedures in order to collect accurate and reliable data about the problem under study. However, this chapter will demonstrate the overall methods applied, starting by design of study and ending by limitations of current study.

3.1. Design of Study:

The current study used a quasi-experimental study design consist of two assessments (Pre-program, and exams after program) for manipulation and also control group. The study done during the period from (23th December 2020 to 4th April 2022) by applying an educational program on patient's knowledge regarding risk factors of coronary heart disease at al-Najaf center for cardiac surgery and Tran's cardiac therapy

3.2. Administrative Arrangements and Ethical Approval:

The Administrative Arrangements and Ethical Endorsement was fundamental and decisive part of research work, which included:

1- Protocol of research approved by Community Health Nursing Branch, and official permission taken from University of Babylon, College of nursing to conduct the study.

2- The title, constructed educational program and questionnaire were presented to the Ethics Committee formed within the College of Nursing, which reviewed the study tools (program and questionnaire), and therefore agreed to conduct the study. Official letter provided in 15th March 2020 to conduct study.

3- After obtaining the validity of the educational program and questionnaire form which prepared for data collection, three forms which filed for the ethics committee to achieve formal agreement (Appendix A). Official agreement was obtained from AL- Najaf Health Directorate to use (NCCS&TCT) as a proper setting for collecting the data (Appendix B). Oral permission obtained to start data collection from the director of the center after explaining the study purpose and objectives to secure the cooperation of the healthcare provider to facilitate data collection and presentation of the educational program sessions.

3.3. Setting of Study:

AL-Najaf Center for Cardiac Surgery and Trans cardiac therapy. This center started with a simple section within Al-Sadder medical city at 2014 until its independence after few months of expanded functions and services diversified. It included consultants' clinics for adults and children, (CCU) & (ICU), and 4 surgical and catheter operating rooms in addition to electro-catheter room. The center provides services to patients with myocardial infarction, congenital heart disease, coronary diseases and heart valves … etc. At 2021, this center conducted approximately 7 thousand PCI & surgical operations and received more than 11 thousand patients in consultants' clinics 22

3.4. sample of Study:

A purposive, non-probability sample was selected for the patient who was reviewed for the Najaf Center for Cardiac Surgery and Interventional Catheterization. The selected sample of the target population who fulfilled the specified criteria during a specified period of time. The sample consists of 72 patients who attend the periodic treatment schedule at the Najaf Center for Cardiac Surgery and Catheter Intervention, who have previously been diagnosed with coronary artery disease, and who are

subject to continuous treatment and follow-up by the medical and nursing staff in the center. 10 of these patients were selected to assess the patient's needs for this program. And select 10 other patients to work for a pilot study. While 48 patients receiving treatment in the treatment in Najaf were assigned to satisfy the heart and catheter intervention participating in a sample of the experiment sample from 2 divisions: the control involving of 24 participants (control class) and the experimental involving of 24 participants (experimental class) also and 4 samples were excluded The rest of the patients, as follows, two of individuals refused to engage in the program, and two did not finish it. Then the final study sample and completed all the steps of the educational program was 24 samples of an experimental group and 24 samples of a control group and the completion of the participation process. The sample is selected according to the specific characteristic that defines the study population through the following standards:

Included criteria

1- The educational level of patients is to read and write
2- The patients should be from the center’s auditors and from within the city.

Excluded criteria

1- He is infected with Corona virus at the present time
2- He does not constantly return to the center
3- Not to perform catheter insertion in the center.

3.5. Instrument of Study:

In order to achieve present study objectives, an educational program constructed and based on the program also a questionnaire has been created and developed as an instrument for data collection.

Previous studies, guidelines and books were used in development and construction of the educational program on drug addiction and substance abuse.

A-constructed educational program included: patient's knowledge about risk factors of coronary heart disease at Al-Najaf for cardiac surgery and trans catheter therapy

B-He studies constructed instruments involves of the subsequent parts, based on program in order to measure the intended program:

Part I: Demographic data:

This part involves of (10) items on patients that characteristics including gender, residency, age, marital status, level of education, occupational status, monthly income, weight, cigarette smoking and alcohol drinking.

Part 2: patient's knowledge about risk factor of coronary heart disease at (NCCS&TCT)

The measure of knowledge of patients about the risk factors for coronary heart disease contains 21 variable, the answers to which are (I know or I do not know). The questions toward the risk factors, and the first question was (persons always knows when they have CHD, the two question (risk of developing heart disease when they have a family history of CHD), the three question (Smoking is a risk factor for CHD), the four question (the older a person gets, the more likely they are to acquire coronary artery disease.), the

five question (A Person Stopping smoking lowers a danger reason of CHD), the six question(increase of the blood pressure increase a danger reason of CHD), the seven question (Controlling blood pressure lowers a individual's chances from acquiring CHD), the eight question(increase in cholesterol can be risk for CHD), the nine question(You remain at danger for CHD if your good cholesterol (HDL) is high), the ten question(If your You remain at danger for CHD if your bad cholesterol (LDL) is high), the eleven question(Consuming fatty foods has an effect on blood cholesterol levels.), the twelve question(overweight increase a person's risk of CHD), the thirteen question (Physical activity on a regular basis lowers the chance of acquiring heart disease), the fourteen question(First Training in a sports club or taking a bodybuilding class reduces the risk of acquiring heart disease), the fifteen question(Walking and gardening are examples of exercises that can help reduce the chance of acquiring heart disease), the sixteen question(Diabetes increases one's chances of acquiring CHD), the seventeen question(hypercalcemia creates the heart effort stiffer), the eighteen question(If a diabetic person keeps their blood sugar levels under control, they can lower their risk of having CHD.), the nineteen question (Obesity in the abdomen is a danger reason of CHD), the twenty question (Tension can be reason a hypercalcemia, hypertension and hyperlipidemia), the twenty one question (Stress relievers include taking relaxed, profound inhalations, with to ten when dialog, and taking a stride.)

3.6. Scoring- rating system

A system adopted scoring and rating of each item in the prepared questionnaire; the knowledge respondent of each question was rated as yes and no, scored as (1) for correct answers and (0) for a wrong answer.

3.7. Validity of patient's knowledge education program and questionnaire:

Face validity of the study instrument and the educational program determined through a panel of (13) experts from different specialties (They were selected on the basis of having experience more than 5 years in the field of nursing or medicine), related to the field of the study and (8) from the nursing specialties, (5) from the Medicine Specialties.

The process of consulting experts aimed to investigate the current study tool for its efficiency in reaching the objectives set, in addition to the clarity of its components and questions.

They were:

[3] Expert from Nursing Faculty / Baghdad University.

[2] Expert from Nursing Faculty / Kufa University.

[2] Expert from Nursing Faculty / Babylon University.

[1] Expert from Nursing Faculty / University of Al-Ameed.

[1] Expert from Nursing Faculty / University of Warith Alanbiyaa.

[5] Expert from medicine Faculty / Kufa University.

Appendix (C) presents the panel of experts with their specialties and years of experience. The questionnaire and the program are submitted to each one of the experts. After review and evaluation by the experts, reveal that the instrument has adequate content and changes have been done to many items according to their suggestions. In addition, some scale items are modified and some of items are removed from the scale. Also, some changes and modification to the program done according to the experts' comments and correction, to be acceptable, useful and comprehensive content.

3.8. Pilot study:

After accomplishment the content validity for study tool from the experts, the pilot study was conducted among (10) patients in (NCCS&TCT)

over period from 5 December 2021, and ended on 5January 2022. The pilot study purposed to determine the feasibility of the study and to improve the study tool if there any inconsistencies. Initial test was done and data collection was obtained by utilizing a structured questionnaire. One month later, the retest was directed by using the same questionnaire. The pilot sample (selected patients) was excluded from study sample.

3.9. Reliability:

Stability, reliability and consistency of instrument are indicated through reliability. The reliability of the study tool was examined by Pearson correlation coefficient (r) using test-retest technique to determine questionnaire stability and consistency over time. The obtained value for patient's knowledge toward risk factor of coronary heart disease instrument score was (r = 0.96). Therefore, the tools of knowledge are reliable as presented in the following table:

Table () Test-Retest Reliability

Items	N	Mean	SD	r
Test	10	1.28	0.451	0.96
Retest	10	1.32	0.465	

3.10. Data collection

To achieve the main objective of the study which directed to evaluate the effective of an educational program which structured to improve the patient's knowledge toward risk factor of coronary heart disease sessions not less than (6) months, for this reason self-interview method was used as a proper tool to full the first part of the questionnaire which consist the (10) items related to demographical characteristics of the

sample, while individual interview used to complete the second part of the questionnaire which content (21) multiple choices question prepared to evaluated the patient's knowledge toward risk factor of coronary heart disease, the steps of the data collection and presentation of the program performed as the following:

1. Patient who participate select related to special criteria.

2. The total sample number divided to two groups (24) for the experimental group and the remain (24) patients assigned as a control group, (4) patients dropped from the original sample, finally, experimental group member was (24) patient and the control group member becomes (24)

3. All the study sample (experimental and control group) full special questionnaire as pre-test which consider as baseline test, if the patient scored 60 and more he/she excluded from the study sample, all selected patients recoded less than (50)

4. The control group fails the post- test after two weeks of the pre-test, which the post-test collected after two weeks from the pre-test. No interventional activities received by the control group members they only receive their routine treatment session

5. The experimental group members exposed to the pre-test at the same period of the control group, educational session presented by them as a small group to maintain physical distance between person to person which should be not less than (2) meters and wearing masks, maintain the classroom ventilation and cleanliness. The participant receives three sessions which structured to cover all the information related to domains of risk factors for coronary heart disease. The patient attends the sessions according to their visit schedule which assigned by center to have drags

(Plavix tab), all sessions started in the early morning, usually begin at (8.30 am) because it should have finished before (9.30 am), because of the distribution of drugs by the consulting pharmacy. When all sessions finished, they exposed to the post-test, after (15) day.

6- All the patient needs from pen, paper notebooks, masks detergents were prepared drinking water and breakfast was served to patient taking into account that the meal provided was healthy and appropriate to their disease condition to facilitate ongoing sessions.

The presentation of the educational program sessions takes about (23) days, which the total period for data collection takes about (61) days. It started from 15 January to16 march 2022.

3.11. Statistical analysis:

Statistical analysis: Data of study participants in both groups were transferred into computerized database form using Microsoft Excel software version 2019 then “managed and analyzed using the statistical package for social sciences (SPSS) version 26. Descriptive statistics of variables presented as mean, standard deviation, frequencies and percentages. Qualitative variables were compared between both groups using chi square test for independence, as an alternative, Fisher’s exact test was applied when chi square test” was inapplicable. Correct responses of study participants before and after education program regarding their knowledge presented as frequencies and compared using chi square test and Fisher’s exact test when they are applicable. To calculate the mean score of knowledge for each question, a score of one was given to the correct response of a participant and zero score for incorrect response. Then the mean score calculated out of one by division of total scores of participants over their total number. Furthermore, the mean total score of a participant for the total 21 questions

was calculated by summation of scores obtained for the total questions divided by total number of questions and the mean total score calculated out of 21, then the mean total score of all participants was calculated by division of total score of all participants by their number. The mean scores before and after education was compared within each group using paired t test, while the mean scores compared between study group and controls using student's t test for two independent samples. To assess the effect of the education program, effect size was calculated using the standard equation; Cohen's d, (Lakens, 2013) which is calculated as (mean difference in mean score) over the pooled standard deviation. Additionally, the mean difference in the knowledge score before and after education was calculated. Percentage change was also calculated by division of mean difference in mean knowledge score after education by the mean score before education. Moreover, according to the value of mean knowledge score, participants categorized to have either poor, fair or good knowledge when the mean knowledge score out of one at 0.33, 0.34-0.67 and 0.68 – 1.0 , respectively. In other words, participants who were correctly answered ≤ 7 questions was considered to have poor knowledge, 8 – 14 as fair while 15 – 21 questions as good knowledge. Correlation between socio-demographic variables and change in Knowledge scores after education in the study group and controls was assessed using bivariate Kendall's tau b analysis. It is worth mentioned that correlation coefficient (R) value statistically, ranged between zero (complete no correlation) and one (perfect complete correlation), however, R value close to one indicates the stronger correlation, on the other hand negative signed R value indicates inverse (negative correlation). Data and results were summarized using tables and figures. Pie-chart, Bar chart, and Line-Marker chart used for graphical presentation accordingly. All statistical tests and procedures were performed under the assumption of study power of > 0.80 and two tailed significance level (P. value) of ≤ 0.05 to be considered significant difference or correlation

3.12. Assessing the patient need for education program:

Assessing the needs of for patients who have coronary heart disease considers the essential step for carrying out this study, to accomplishing this step special questionnaire form prepared after reviewing related literature. Assessment form which consist (14) multiple choice question distributed among (10) patients who attend in (NCCS&TCT) in Al-Najaf Al-Ashraf city between the period 17 to 26 September 2021(Appendix C2), who selected related to special criteria, oral agreement obtained from the participant after explanation of the study, they need about (10-15) minutes to answer the questions. The result of the needs assessment shows (6) participant recorded less than (50).

3.13. Implementation of the program:

Educational program for patient's knowledge toward risk factors of coronary heart disease prepared to after a comprehensive review of related literatures which contained all the aspects of risk factors patient's knowledge in order enhance patient's condition and improve quality of life

General objectives:

1- Knowing about coronary heart disease.

2- Knowing the high pressure and its effect on coronary heart disease.

3- Knowing the association of family history with coronary heart disease

4- Smoking and its relationship with coronary heart disease

5- Obesity and its effect on heart disease.

The education program was designed to provide the patients with information related to a healthy nutrition pattern, the smoking and effected on al body, physical activity and exercise, family history, ad blood pressure.

First session:

1- Brief introduction to program.

2- Information about the work of the heart

Special objectives:

1. Explain it knows the program and if he is ready to participate in it and he method of giving, time m and place of program.

2. Give proper suggestion for the patients during waiting time to decrease stress.

3. Present the work of heart and effected on the body.

Place

Continuing medical and nursing education classroom in the (NCCS&TCT).

Duration: (one hour)

Teaching strategies:

Teaching method: lecture and discussion

Teaching aid: Computer, power point with data show device, pictures and Whiteboard.

Second session

Blood pressure

Special objective

1. Explanation and clarification of the hypertension, its causes and risk factors for this disease

2. Explanation of what is the relationship between coronary heart disease and hypertension and how it effects on arteries

3. An open discussion with patients about the lecture and confirmation that the information reaches them.

Place

Continuing medical and nursing education classroom in the (NCCS&TCT).

Duration: (one hour)

Teaching strategies:

Teaching method: lecture and discussion

Teaching aid: Computer, power point with data show device, pictures and Whiteboard

Third session

Past history for patient

Special objective

1. Explanation and clarification of the past history, its causes and risk factors on human health
2. Explanation of what is the relationship between coronary heart disease and past history and how it effects on arteries
3. An open discussion with patients about the lecture and confirmation that the information reaches them.

Place

Continuing medical and nursing education classroom in the (NCCS&TCT).

Duration: (one hour)

Teaching strategies:

Teaching method: lecture and discussion

Teaching aid: Computer, power point with data show device, pictures and Whiteboard

Forth session

Smoking

Special objective

1. Explanation and clarification of the smoking, its causes and risk factors on human health
2. Explanation of what is the relationship between coronary heart disease and smoking and how it effects on arteries
3. An open discussion with patients about the lecture and confirmation that the information reaches them.

Place

Continuing medical and nursing education classroom in the (NCCS&TCT).

Duration: (one hour)

Teaching strategies:

Teaching method: lecture and discussion

Teaching aid: Computer, power point with data show device, pictures and Whiteboard

Five sessions

Obesity

Special objective

1. Explanation and clarification of the obesity, its causes and risk factors on human health
2. Explanation of what is the relationship between coronary heart disease and obesity and how it effects on arteries
3. An open discussion with patients about the lecture and confirmation that the information reaches them.

Place

Continuing medical and nursing education classroom in the (NCCS&TCT).

Duration: (one hour)

Teaching strategies:

Teaching method: lecture and discussion

Teaching aid: Computer, power point with data show device, pictures and Whiteboard

Six sessions

Diabetes mellitus

Special objective

1. Explanation and clarification of the Diabetes mellitus, its causes and risk factors on human health
2. Explanation of what is the relationship between coronary heart disease and past history and how it effects on arteries
3. An open discussion with patients about the lecture and confirmation that the information reach them

Place

Continuing medical and nursing education classroom in the (NCCS&TCT).

Duration: (one hour)

Teaching strategies:

Teaching method: lecture and discussion

Teaching aid: Computer, power point with data show device, pictures and Whiteboard

3.14. Limitation

There is no limitation in the true sense that prevent the implementation of the educational program on patients, but there was a difficulty in collecting patients in one place and time, and there were patients who were from governorates who came to the Najaf Center for Cardiac Surgery and Catheter Intervention. From my point of view, this is not considered one of the obstacles to the study.

Chapter four

Results

Chapter Four

Results

4.1. Socio-demographic characteristics of the study group and controls

4.1.1. Gender distribution of the study group and controls:

Gender	experimental group		Control group	
	N	%	N	%
Male	17	70.8	15	62.5
female	7	29.2	9	37.5
Total	24	100.0	24	100.0
X^2 test = 0.375 P. value = 0.540				

A total of 24 patients were included in this trial, with 24 serving as the study group and 24 serving as the control group, making up the study's second hand. Gender dominance of males in the study group and controls, where males represented 70.8 percent and 62.5 percent, respectively, with a male to female ratio of 2.42 to one now the education group & 1.67 now the regulator group, no _statistically important difference in gender distribution was found between both groups, (X 2 test = 0.375, P. value = 0.540, not significant > 0.05) and Figures (4.1 & 4.2).

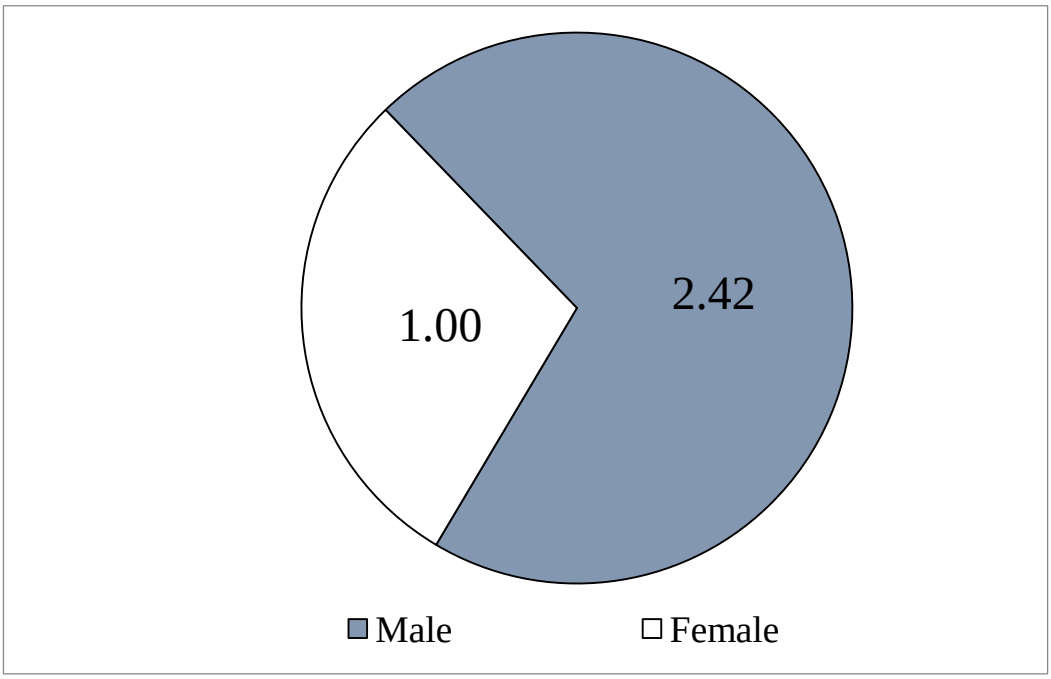

Figure 4.1. Pie-Chart showing Male to Female ratio of the study group

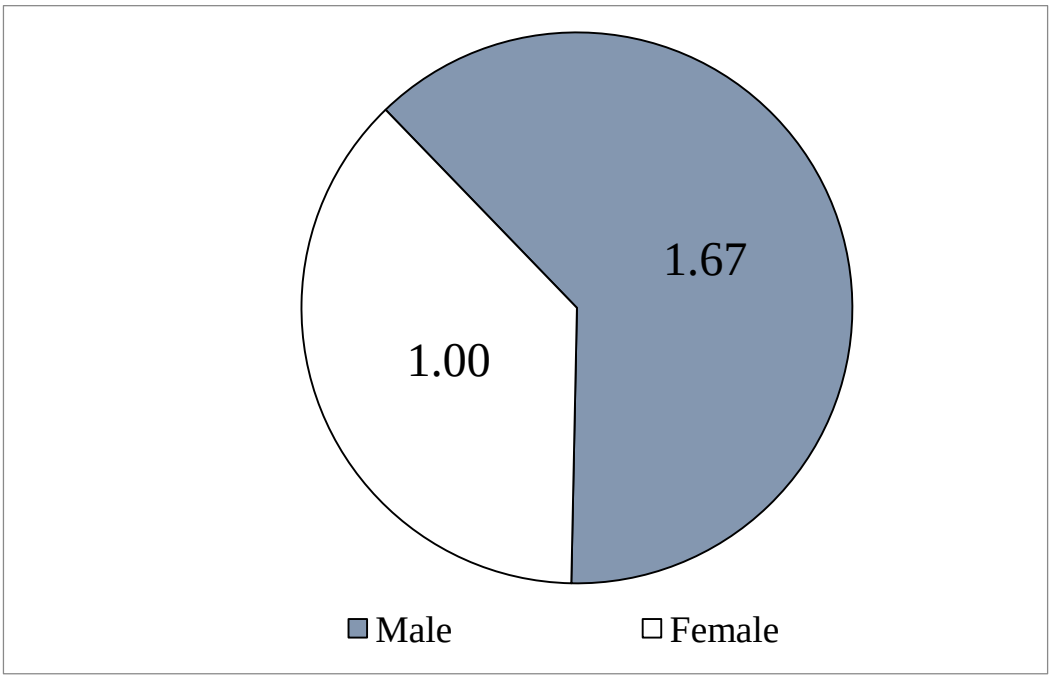

Figure 4.2. Pie-Chart showing Male to Female ratio of the control group

4.1.2. Table the age distribution of the study group

Age group	Experimental group		Control group	
	N	%	N	%
Young adult	5	20.8	3	12.5
Middle age adult	10	41.7	12	50.0
Old age adult	9	37.5	9	37.5
Total	24	100.0	24	100.0
Fisher's exact test = 0.723 P. value = 0.803				

Age distribution of the studied group shows that in the study group, young adult represented 20.8%, middle age adults represented 41.7%, old age adult were 37.5%. In control group the corresponding proportions of these age groups were 12.5%, 50%, 37.5% and no significant difference in age was reported between both groups, (Fisher's exact test = 0.723, P. value = 0.803, not significant > 0.05)

4.1.3 Table. Distribution of the studied groups according to marital status

Marital status	Experimental group		Control group	
	N	%	N	%
Single	2	8.3	3	12.5
Married	21	87.5	15	62.5
Separated	1	4.2	6	25.0
Total	24	100.0	24	100.0
Fisher's exact test = 4.66 P. value = 0.110				

Out of the 24 patients in the study group, 8.3% were single, 87.5% married while only one patient was separated and none were widowed or divorced. In control group, 12.5% were single, 62.5% married and 6 were separated and none was widowed or divorced, there is no discernible change in marital status was found between both groups, (Fisher's exact test = 4.66, P. value = 0.110, not significant > 0.05), (Table 4.3).

4.1.4. Table Distribution of the studied groups according to level of Education

Education	Experimental group		Control group	
	N	%	N	%
Primary school	5	20.8	6	25
Middle school	2	8.3	2	8.3
High school	5	20.8	6	25
Diploma	4	16.7	4	16.7
Graduate	5	20.8	3	12.5
Post graduate	3	12.5	3	12.5
Total	24	100.0	24	100.0
Fisher's exact test = 2.67 P. value =0.913				

In the study group, post graduated patients represented 12.5%, graduated (20.8%), diploma (16.7%), high school (20.8%), middle school (8.3%), primary school (20.8%). In control group, post graduated patients represented 12.5%, graduated (12.5%), diploma (16.7%), high school (25%), middle school (8.3%), primary school (25%). However, there is no discernible change in education between both groups, (Fisher's exact test = 2.67, P. value =0.913, not significant > 0.05), (Table 4.4)

4.1.5. Table Distribution of the studied groups according to occupation.

Occupation	Experimental group		Control group	
	N	%	N	%
Employed	11	45.8	7	29.2
Self-employed	4	16.7	3	12.5
Retired	4	16.7	8	33.3
Housewife	5	20.8	6	25.0
Total	24	100.0	24	100.0
Fisher's exact test = 2.47 P. value = 0.513				

In the study group, employed patients represented (45.8%), self-employed were (16.7%), retired (20.8%), and housewives were (20.8%). In controls' group, employed patients represented (29.2%), self-employed were (12.5%), retired (33.3%), and housewives were (25%) However, there was there is no discernible change in the occupation between both groups, (Fisher's exact test = 2.47, P. value =0.513, not significant > 0.05)

4.1.6. Table Distribution of the studied groups according to Monthly income

Monthly income (1000 IQD)	Experimental group		Control group	
	N	%	N	%
≤ 300	9	37.5	7	29.2
301-600	10	41.7	10	41.7
601-900	1	4.2	4	16.7
> 900	4	16.7	3	12.5
Total	24	100.0	24	100.0
Fisher's exact test = 2.13 P. value =0.608				

Monthly income ranged between less or equal to 300,000 IQD to > 900,000 IQD. In the study group, (16.7%, had a monthly income of > 900,000 IQD, (4.2%) had an income of 601-900 thousand IQD, majority of the study group, 79.2%, had a monthly income of less than 600,000 IQD. In control group, the monthly income was > 900,000 IQD in (12.5%), 601 – 900 thousand in (16.7%), and more than (70%) had an income of less than 600,000 IQD, nonetheless, the monthly income of the two groups did not differ significantly., (Fisher's exact test = 2.13, P. value =0.608, not significant > 0.05)

4.1.7. Table Distribution of the studied groups according to Residence

Residence	Experimental group		Control group	
	N	%	N	%
Urban	17	70.8	18	75.0
Rural	7	29.2	6	25.0
Total	24	100.0	24	100.0
X^2 test = = 0.105 P. value = 0.745				

Majority of study participants in both groups were of urban origin where 70.8% of the study group and 75% of controls were residents of urban region compared to only 29.2% and 25%, respectively in rural residence, there was no discernible difference in residence between both groups, (X^2 test = = 0.105, P. value =0.608, not significant > 0.05)

4.1.8. Table Distribution of the studied groups according to BMI category

BMI category	Experimental group		Control group	
	N	%	N	%
Normal	15	62.5	14	58.3
Overweight	8	33.3	8	33.3
Obese	1	4.2	2	8.3
Total	24	100.0	24	100.0
Fisher's exact test = 0.483 P. value = 1.00				

The distribution the study participants according to BMI showed normal BMI in 62.5% of the study group and 58.3% of controls, 33.3% in each group were overweight. Only (4.2%) of the study group and (8.3%) of controls were obese (Fisher's exact test = 0.483, P. value = 1.00, not significant > 0.05),

4.1.9. Table Distribution of the studied groups according to smoking

Smoking	Experimental group		Control group	
	N	%	N	%
Yes	6	25.0	8	33.3
No	18	75.0	16	66.7
Total	24	100.0	24	100.0
X^2 test = 0.403 P. value = 0.525				

Smoker participants were 25% of the study group and 33.3% of controls with no significant difference between both groups in smoking status, (X^2 test = 0.403, P. value =0.525, not significant > 0.05), None of the study participants was alcohol consumer

4.2. Responses of Study group about the questionnaire of knowledge (Question 1- Question 21):

4.2.1. Table Knowledge about persons always knows when they have CHD

Q1	Experimental group		Control group		p.value
	N	%	N	%	
Pre-test	2	8.3%	2	8.3%	1.000
Post-test	14	58.3%	2	8.3%	0.001
* Fisher's exact test used to compare responses pre-test Chi square test used to compare responses post-test					

As shown in table 4.10, only 2 participants (8.3%) in each group have been correctly responded about the question persons always knows when they have CHD. post-test program the proportion increased in study group to 58.3% while still the same in the control group with Between the two groups, there is an important difference in the average knowledge of patients score.

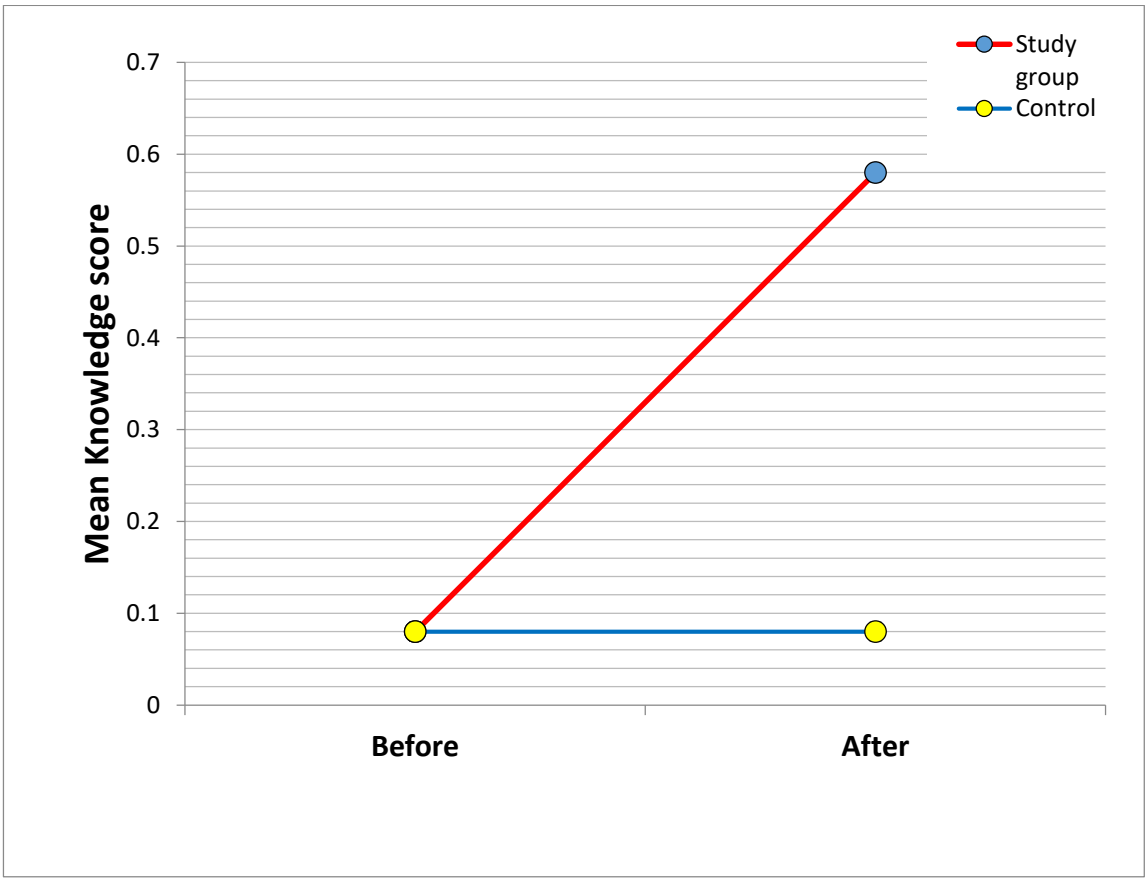

Figure 4.3. Change in mean knowledge score for Q1post-test in study group and controls

4.2.2. Table Correct responses (know) of the participants about risk of developing heart disease when they have a family history of CHD.

Q2	Experimental group		Control group		P. value
	N	%	N	%	
Pre-test	4	16.7	5	20.8	0.712
Post-test	16	66.7	8	33.3	0.001
Chi square test used to compare responses pre and post-test					

As shown in table 4.11, only 4 participants (16.7%) in study group have been correctly responded about the question regarding the When individuals have a developing heart disease when they have a family history of CHD. Post-test program the proportion increased in study group 66.7% while slightly changed among controls with there is an important difference in the average knowledge of patients score.

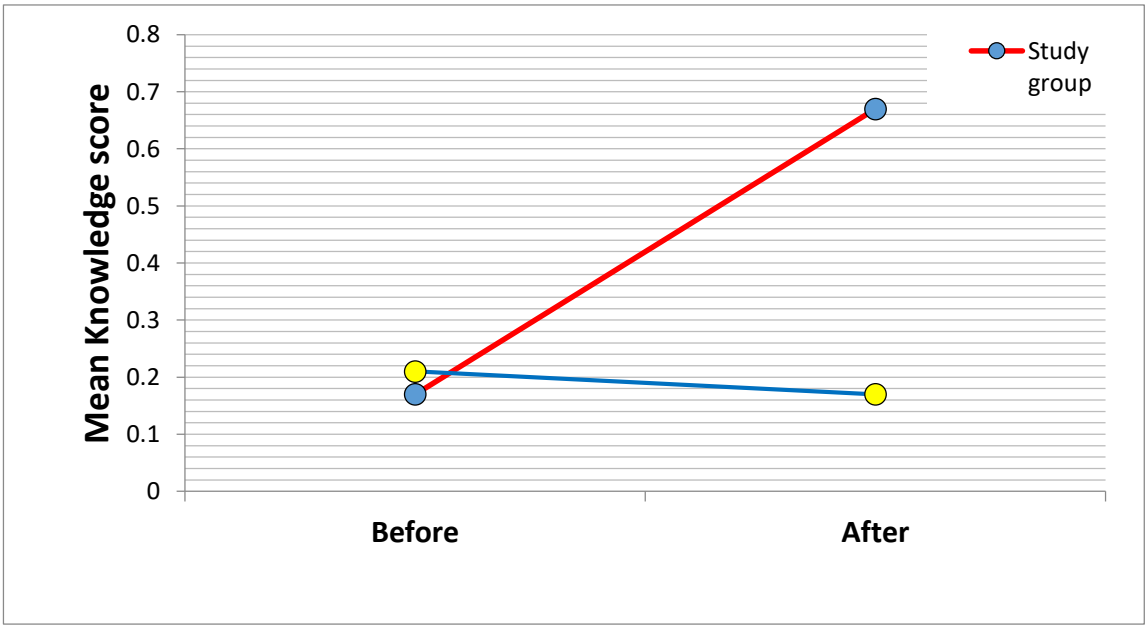

Figure 4.4. Change in mean knowledge score for Q2post-test in study group and controls.

4.2.3. Table correct responses (know) of the participants about Smoking is a risk factor for CHD

Q3	Experimental group		Control group		P. value
	N	%	N	%	
Pre-test	7	29.2	9	37.5	0.540
Post-test	20	83.3	10	41.7	0.003
Chi square test used to compare responses pre and post-test					

As shown in table 4.12, there were7 participants (29.2%) in study group and 9 (37.5%) in control groups have been correctly responded about the question regarding smoking is a risk factor for CHD. Post-test program the proportion increased in study group to 83.3% while slightly changed among controls to 41.7%, with there is a important difference in the average knowledge of patients score, (P<0.05)

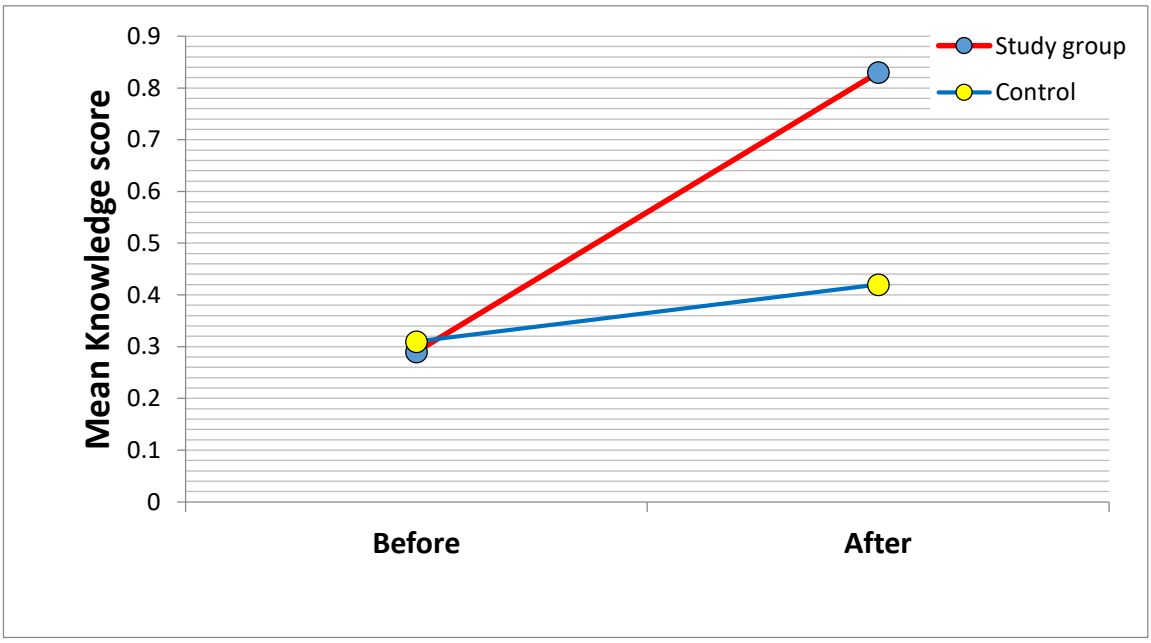

Figure 4.5. Change in mean knowledge score for Q3post-test in study group and controls.

4.2.4. Table Correct responses (know) of the participants about the older a person is, the greater their risk of developing CHD

Q4	Experimental group		Control group		P. value
	N	%	N	%	
Pre-test	6	25.0%	7	29.2	0.745
Post-test	21	87.5%	8	33.3	0.001
Chi square test used to compare responses pre and post-test					

Pre-test program, there were 6 participants (25%) in study group and 7(29.2%) in control groups have been correctly responded about the question regarding older a person gets, the more likely they are to acquire coronary artery disease Post-test program the proportion increased in study group to 87.5% while slightly changed among controls to 33.3%, with there is a important difference in the average knowledge of patients score.

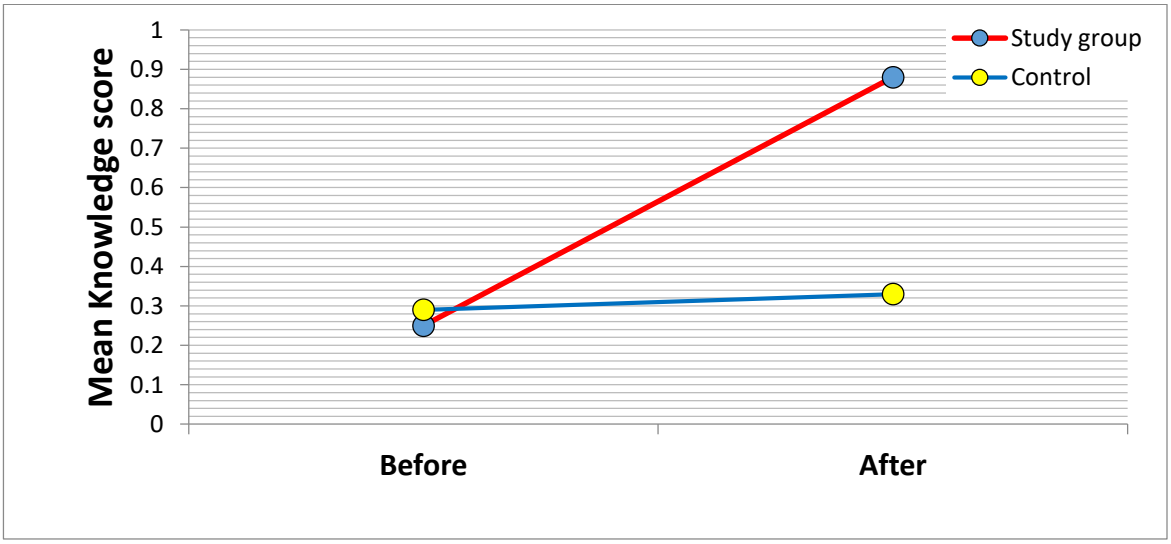

Figure 4. 6Change in mean knowledge score for Q4 post-test in study group and controls.

4.2.5. Table correct responses (know) of the participants about a person who stops smoking will lower their risk of developing CHD.

Q5	Experimental group		Control group		P. value
	N	%	N	%	
Pre-test	9	37.5%	10	41.7	0.082
Post-test	23	95.8%	11	45.8	0.001
((Chi square test used to compare responses pre-test)) ((Fisher's exact test used to compare responses post-test))					

Pre-test program, there were 9 participants (37.5%) in study group and 10 (41.7%) in control groups have been correctly responded about the question regarding A Person Stopping smoking lowers the risk of coronary artery disease. Post-test program the proportion increased in study group to 95.8% while slightly changed among controls to 45.8%, with there is a important difference in the average knowledge of patients score.

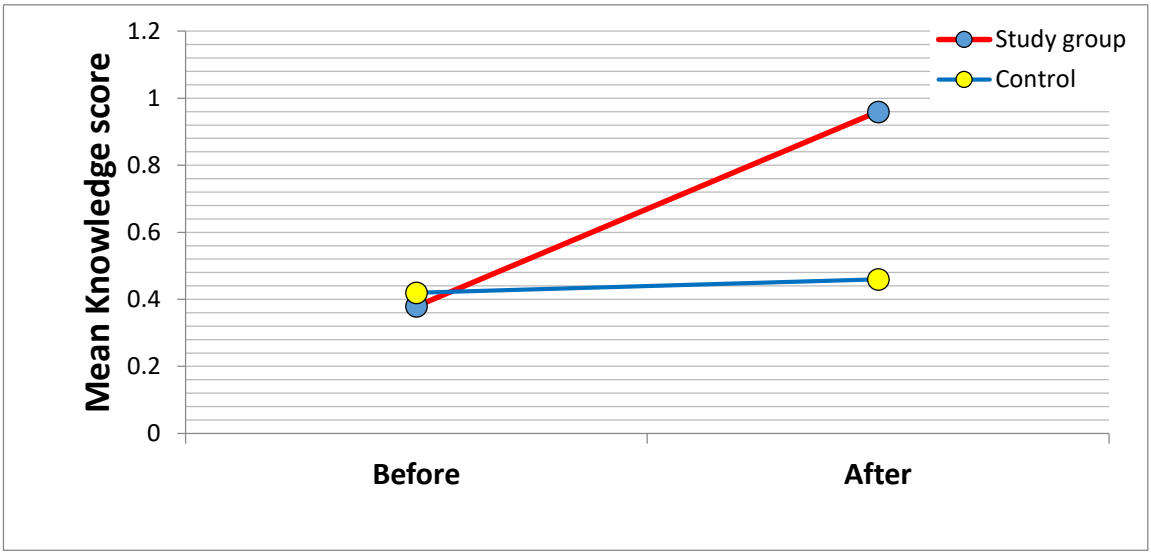

Figure 4.7 Change in mean knowledge score for Q5 post-test in study group and controls.

4.2.6. Table Correct responses (know) of the participants about High blood pressure is a risk factor for developing CHD

Q6	Experimental group		Control group		p. value
	N	%	N	%	
Pre-test	4	16.7%	6	25.0	0.722
Post-test	21	87.5%	7	29.2	0.001
Chi square test used to compare responses pre and post-test					

Pre-test program, there were 4 participants (16.7%) in study group and 6(25%) in control groups have been correctly responded about the question regarding increase of the blood pressure increase risk of CHD.Post-test program the proportion increased in study group to 87.5% while slightly changed among controls to 29.2%, with there is a important difference in the average knowledge of patients score.

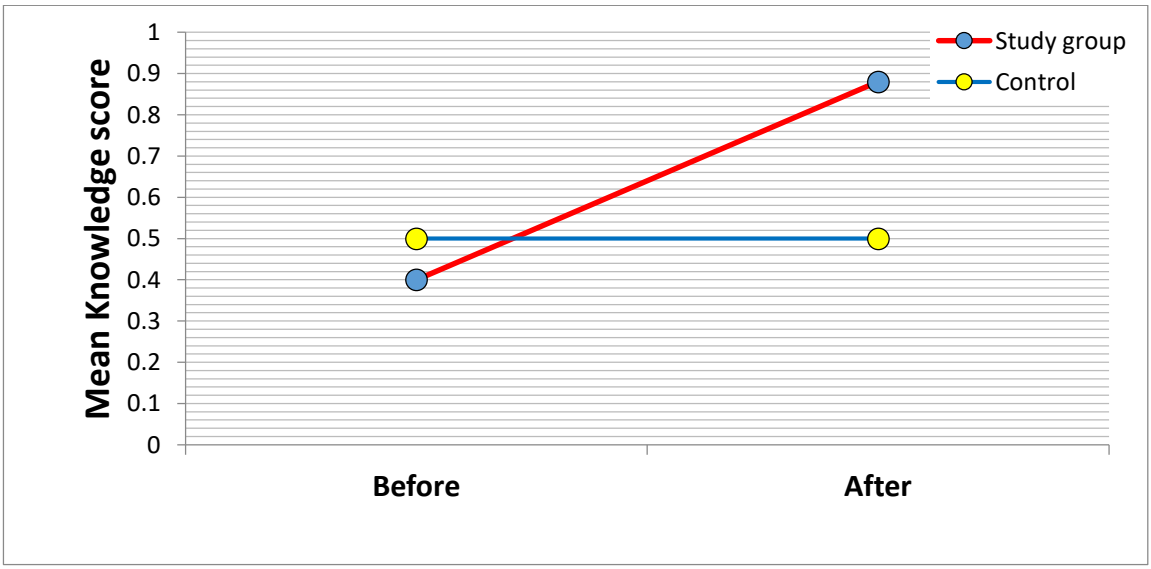

Figure 4.8 Change in mean knowledge score for Q6 post-test in study group and controls

4.2.7. Table Correct responses (know) of the participants about Keeping blood pressure under control will reduce a person's risk for developing CHD.

Q7	Experimental group		Control group		p. value
	N	%	N	%	
Pre-test	9	37.5%	11	45.8%	0.558
Post-test	22	91.7%	11	45.8%	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 9 participants (37.5%) in study group and 11 (45.8%) in control groups have been correctly responded about the question regarding Controlling blood pressure lowers a person's chances of acquiring heart disease. Post-test program the proportion increased in study group to 91.7% while not changed among controls, with there is a important difference in the average knowledge of patients score.

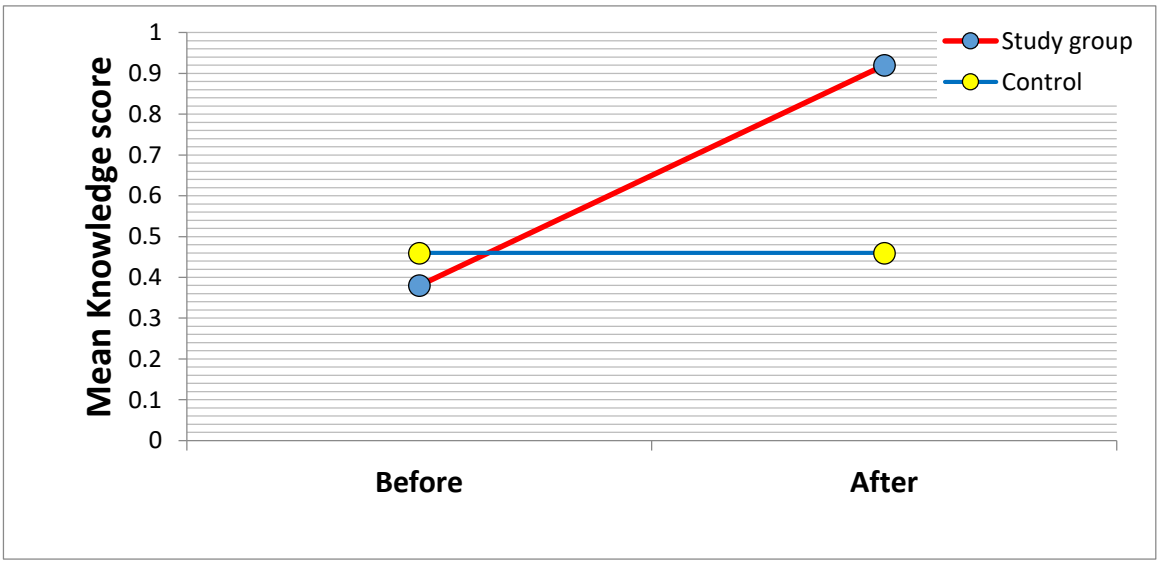

Figure 4.9 Change in mean knowledge score for Q7 post-test in study group and controls.

4.2.8. Table Correct responses (know) of the participants about High cholesterol is a risk for developing CHD

Q8	Experimental group		Control group		p. value
	N	%	N	%	
Pre-test	9	37.5%	7	29.2%	0.760
Post-test	22	91.7%	7	29.2%	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 9 participants (37.5%) in study group and 7 (29.2%) in control groups have been correctly responded about the question regarding increase in cholesterol can be risk for CHDPost-test program the proportion increased in study group to 91.7% while not changed among controls, withthere is a important difference in the average knowledge of patients score.

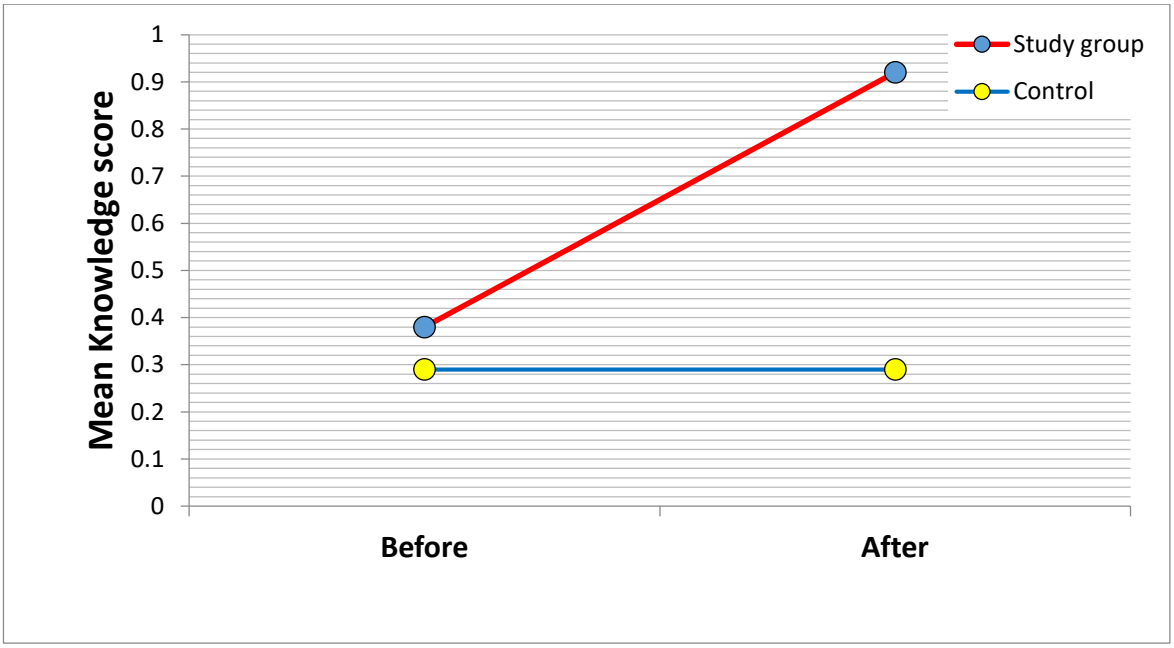

Figure 4.10 Change in mean knowledge score for Q8 post-test in study group and controls.

4.2.9. Table Correct responses (know) of the participants about If your good cholesterol (HDL) is high, you are at risk for heart disease

Q9	Experimental group		Control group		p. value
	N	%	N	%	
Pre-test	3	12.5	2	8.3	0.637
Post-test	15	62.5	3	12.5	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 3 participants (12.5%) in study group and 2 (8.3%) in control groups have been correctly responded about the question regarding If your You're at risk for heart disease if your good cholesterol (HDL) is high. Post-test program the proportion increased in study group to 62.5% while slightly changed among controls to 12.5%, with there is a important difference in the average knowledge of patients score.

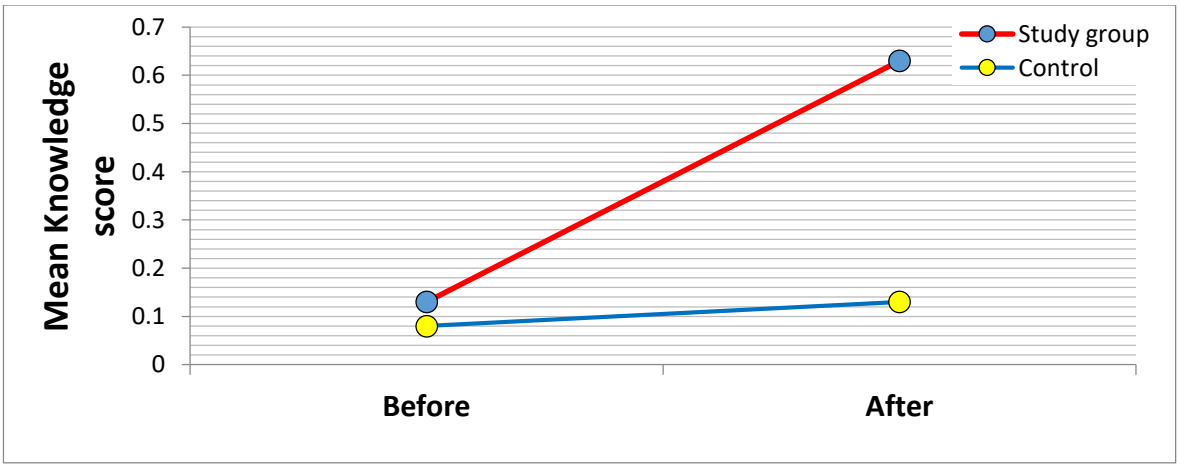

Figure 4.11. Change in mean knowledge score for Q9 post-test in study group and controls.

4.2.10. Table Correct responses (know) of the participants about If your bad cholesterol (LDL) is high, you are a risk for heart disease

Q10	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	3	12.5	2	8.3	0.637
Post-test	13	54.2	2	8.3	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 3 participants (12.5%) in study group and 2 (8.3%) in control groups have been correctly responded about the question regarding If you're at risk for heart disease if your bad cholesterol (LDL) is high. Post-test program the proportion increased in study group to 54.2% while not changed among controls, with there is a important difference in the average knowledge of patients score.

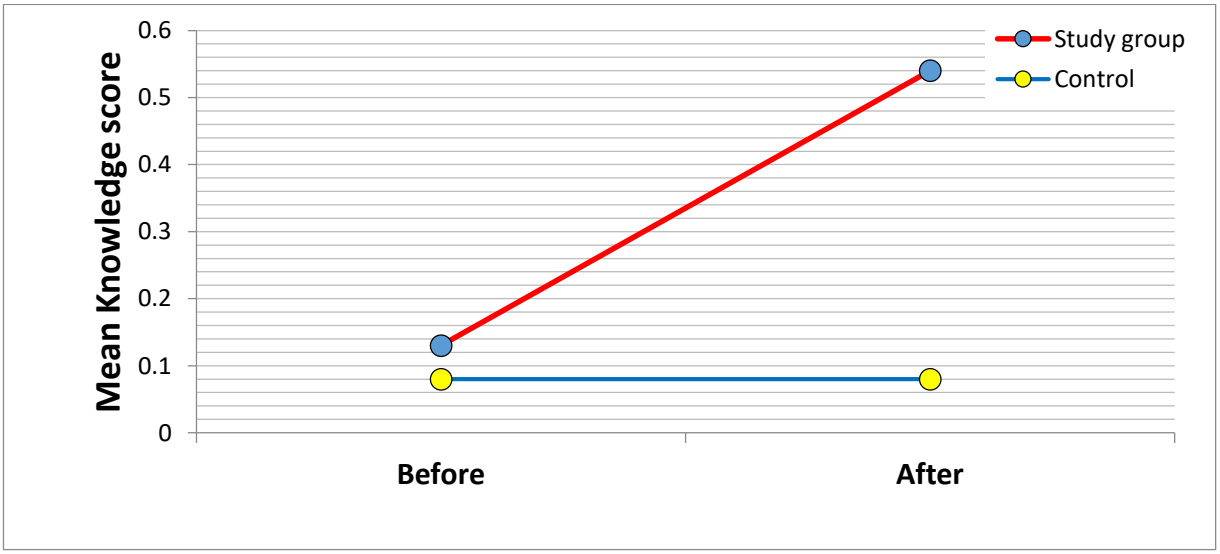

Figure 4.12 Change in mean knowledge score for Q10 post-test in study group and controls

4.2.11. Table Correct responses (know) of the participants about Eating fatty foods does affect blood cholesterol levels.

Q11	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	8	33.3%	12	50.0%	0.380
Post-test	23	95.8%	13	54.2%	0.002
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 8 participants (33.3%) in study group and 12 (50.0%) in control groups have been correctly responded about the question regarding Consuming fatty foods has an effect on blood cholesterol levels. Post-test program the proportion increased in study group to 95.8% while slightly changed among controls to 54.2%, with there is a important difference in the average knowledge of patients score.

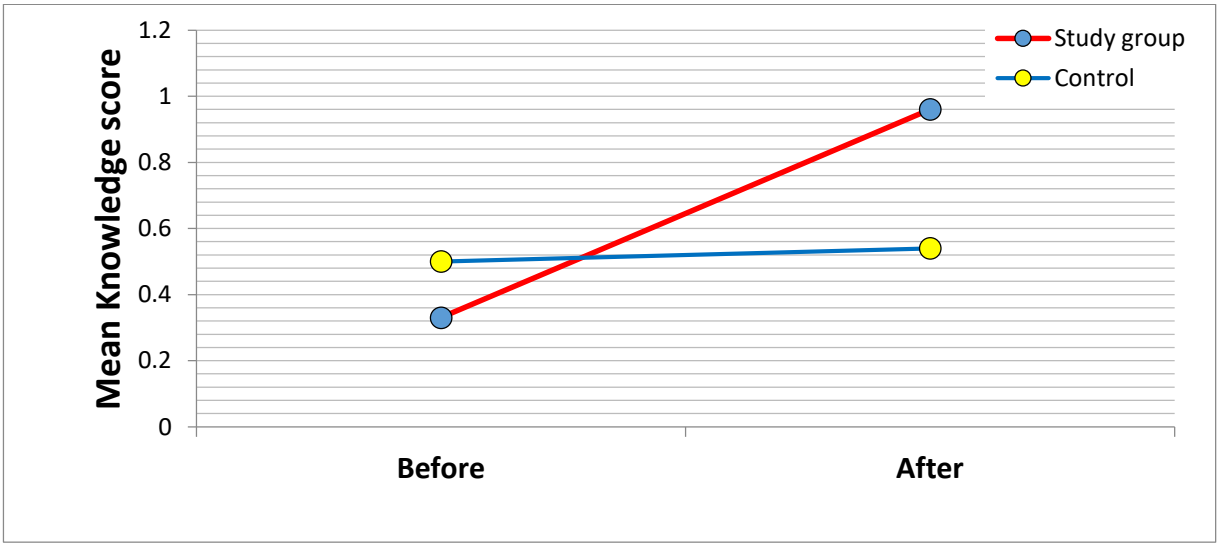

Figure 4.13. Change in mean knowledge score for Q11 post-test in study group and controls

4.2.12. Table Correct responses (know) of the participants about being overweight increase a person's risk of CHD

Q12	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	16	66.7%	14	58.3%	0.766
Post-test	24	100.0%	14	58.3%	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 16 participants (66.7%) in study group and 14 (58.3%) in control groups have been correctly responded about the question regarding overweight increase a person's risk of CHD Post-test program the proportion increased in study group to 100% while not changed among controls, with there is an important difference in the average knowledge of patients score.

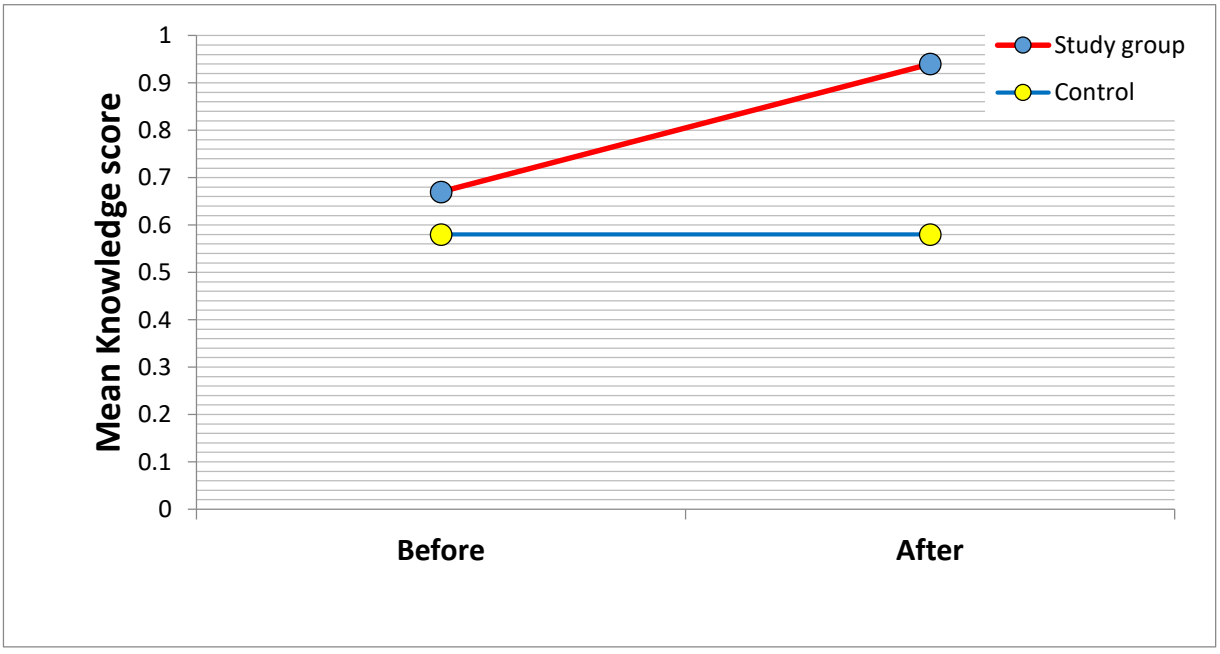

Figure 4.14 Change in mean knowledge score for Q12 post-test in study group and controls

4.2.13. Table Correct responses (know) of the participants about Regular physical activity will lower the risk of developing heart disease

Q13	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	9	37.5%	12	50.0%	0.561
Post-test	24	100.0%	12	50.0%	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 9 participants (37.9%) in study group and 12 (50.0%) in control groups have been correctly responded about the question regarding Physical activity on a regular basis lowers the chance of acquiring heart disease. Post-test program the proportion increased in study group to 100% while not changed among controls, with there is an important difference in the average knowledge of patients score.

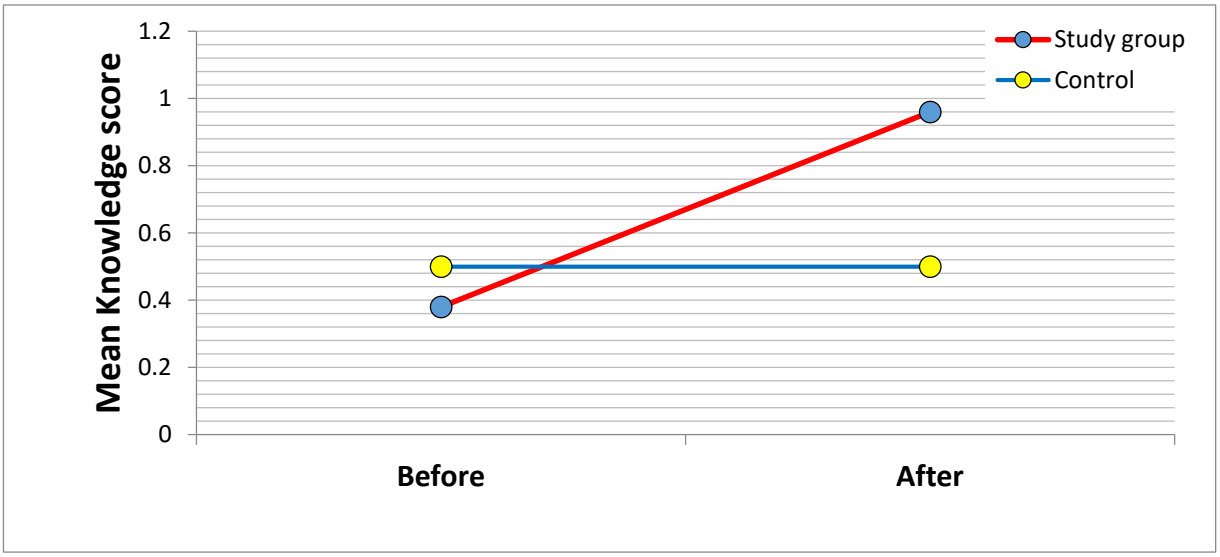

Figure 4.15 Change in mean knowledge score for Q13 post-test in study group and controls

4.2.14. Table correct responses (know) of the participants about only exercising at a gym in an exercise class lowers the risk of developing heart disease.

Q14	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	10	41.7	13	54.2%	0.386
Post-test	21	87.5%	13	54.2%	0.011
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 10 participants (41.7%) in study group and 13 (54.2%) in control groups have been correctly responded about the question regarding First Training in a sports club or taking a bodybuilding class reduces the risk of acquiring heart disease. Post-test program the proportion increased in study group to 87.5% while not changed among controls, with there is an important difference in the average knowledge of patients score.

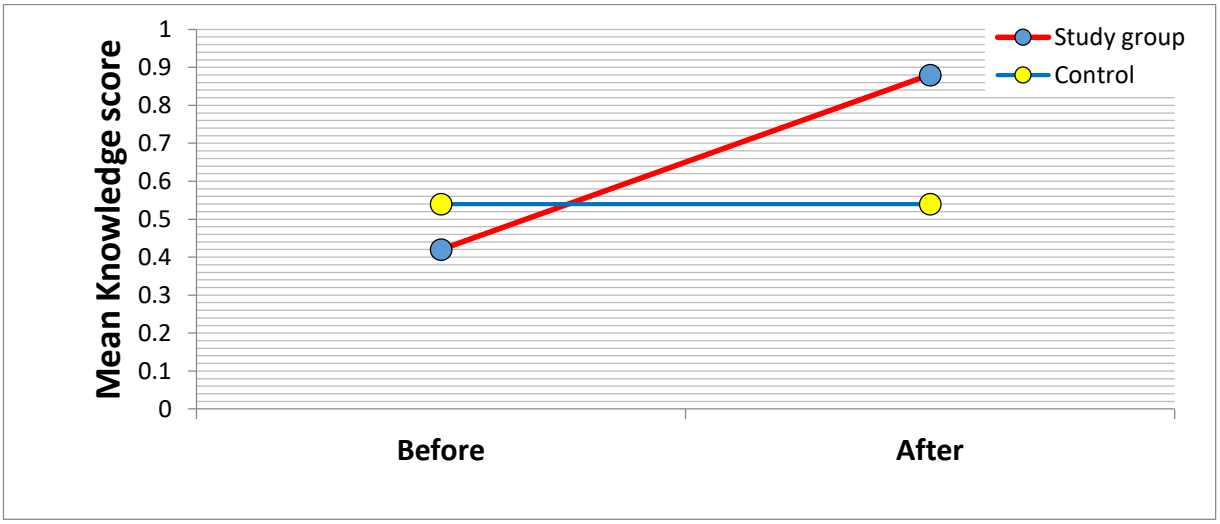

Figure 4.16 Change in mean knowledge score for Q14 post-test in study group and controls.

4.2.15. Table Correct responses (know) of the participants about Walking and gardening are considered exercise that will help lower the risk of developing heart disease

Q15	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	8	33.3%	11	45.8%	0.556
Post-test	23	95.8%	13	54.2%	0.002
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 8 participants (33.3%) in study group and 11 (45.8%) in control groups have been correctly responded about the question regarding Walking and gardening are examples of exercises that can help reduce the chance of acquiring heart disease. Post-test program the proportion increased in study group to 95.8% while slightly changed among controls to 54.2%, with there is an important difference in the average knowledge of patients score.

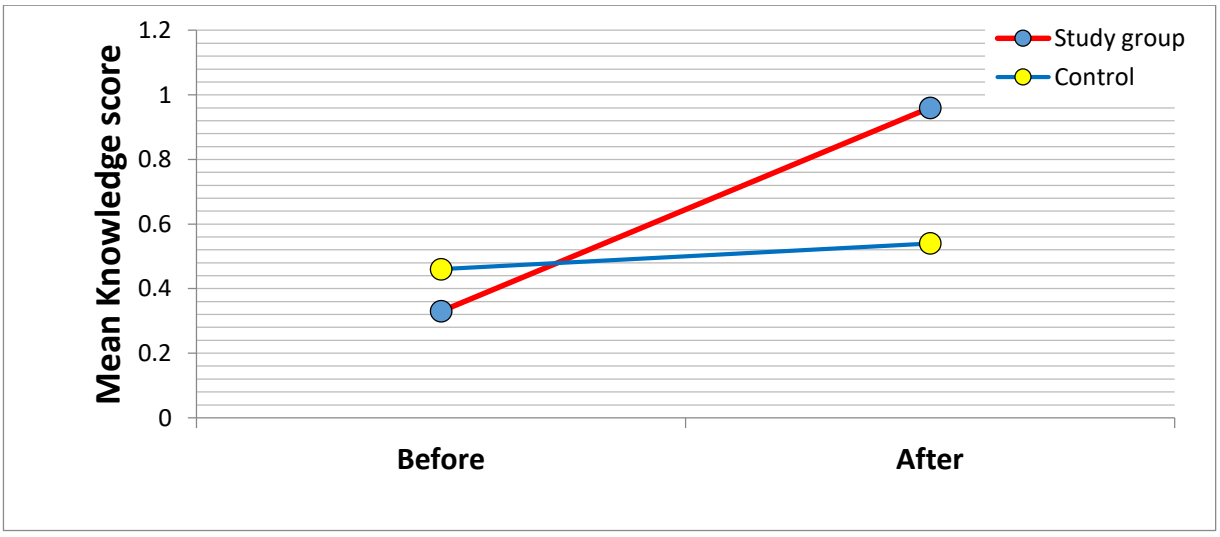

Figure 4.17 Change in mean knowledge score for Q15 post-test in study group and controls

4.2.16. Table Correct responses (know) of the participants about Diabetes is a risk factor for developing CHD

Q16	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	6	25.0%	8	33.3%	0.752
Post-test	23	95.8%	8	33.3%	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 6 participants (25%) in study group and 8 (33.3%) in control groups have been correctly responded about the question regarding Diabetes increases one's chances of acquiring CHD. Post-test program the proportion increased in study group to 95.8% while not changed among controls with there is an important difference in the average knowledge of patients score.

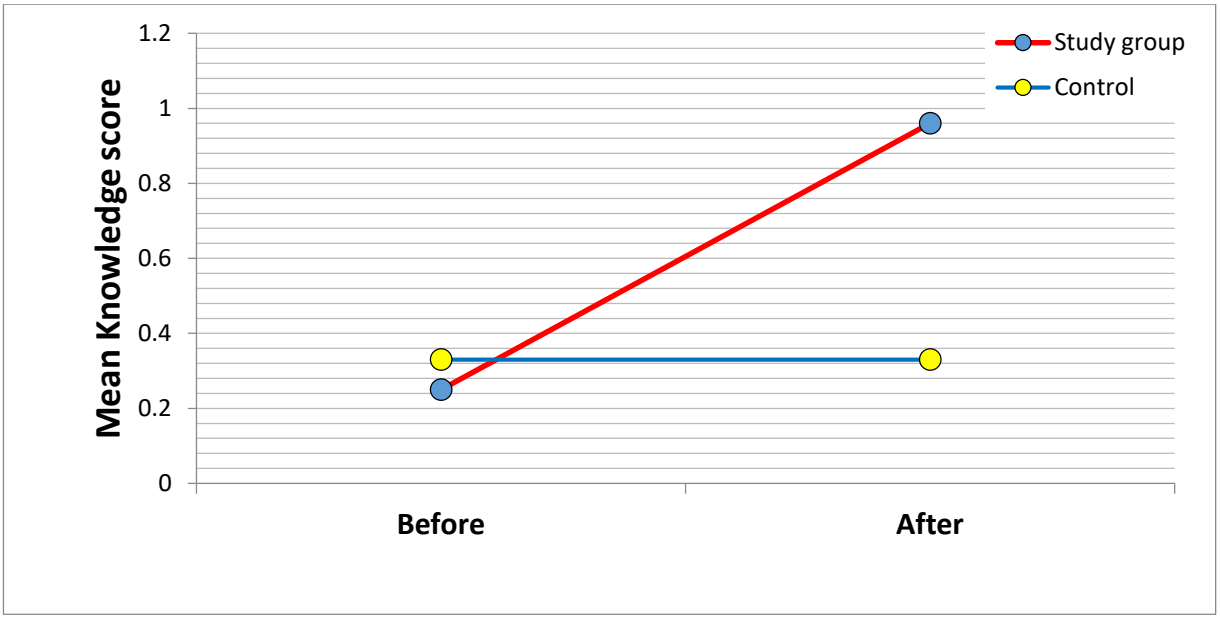

Figure 4.18 Change in mean knowledge score for Q16 post-test in study group and controls

4.2.17. Table Correct responses (know) of the participants about High blood sugar makes the heart work harder

Q17	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	8	33.3%	7	29.2%	1.00
Post-test	23	95.8%	7	29.2%	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 8 participants (33.3%) in study group and 7 (29.2%) in control groups have been correctly responded about the question regarding hypercalcemia creates the heart effort stiffer Post-test program the proportion increased in study group to 95.8% while not changed among controls, with there is an important difference in the average knowledge of patients score.

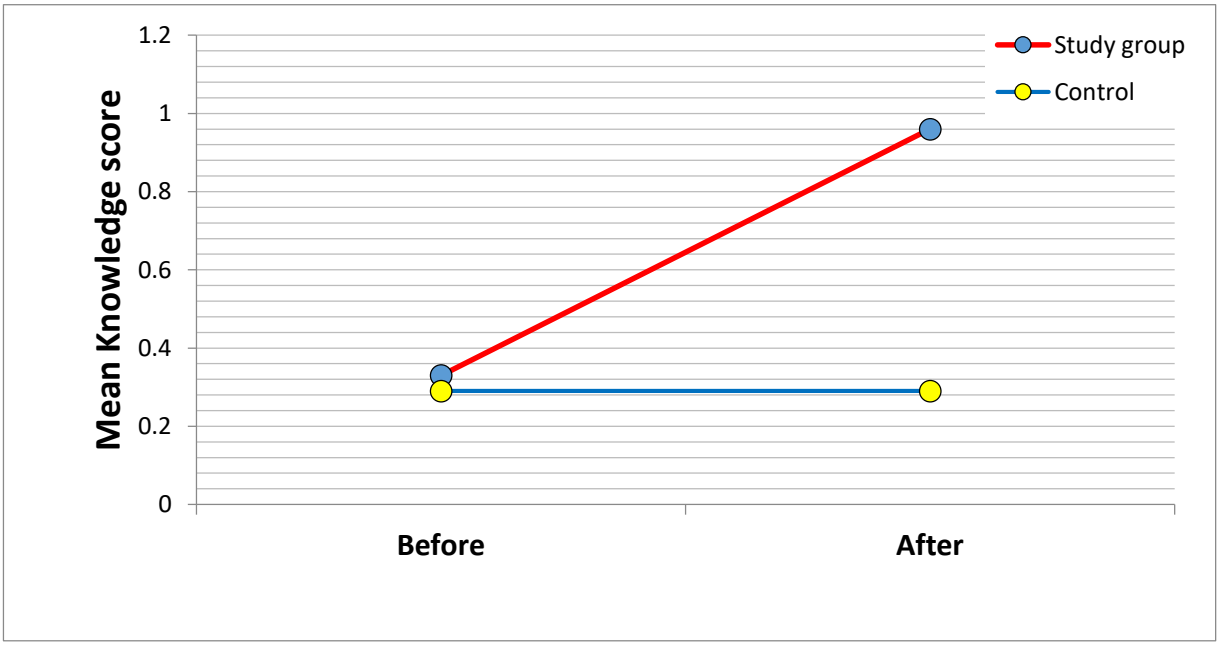

Figure 4.19 Change in mean knowledge score for Q17 post-test in study group and controls

4.2.18. Table Correct responses (know) of the participants about a person who has diabetes can reduce their risk of developing CHD if they keep their blood sugar level under control

Q18	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	7	29.2%	6	25.0%	1.00
Post-test	19	79.2%	6	25.0%	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 7 participants (29.27%) in study group and 6 (25%) in control groups have been correctly responded about the question regarding A If a diabetic person keeps their blood sugar levels under control, they can lower their risk of having CHD.Post-test program the proportion increased in study group to 79.2% while not changed among controls, with there is an important difference in the average knowledge of patients score.

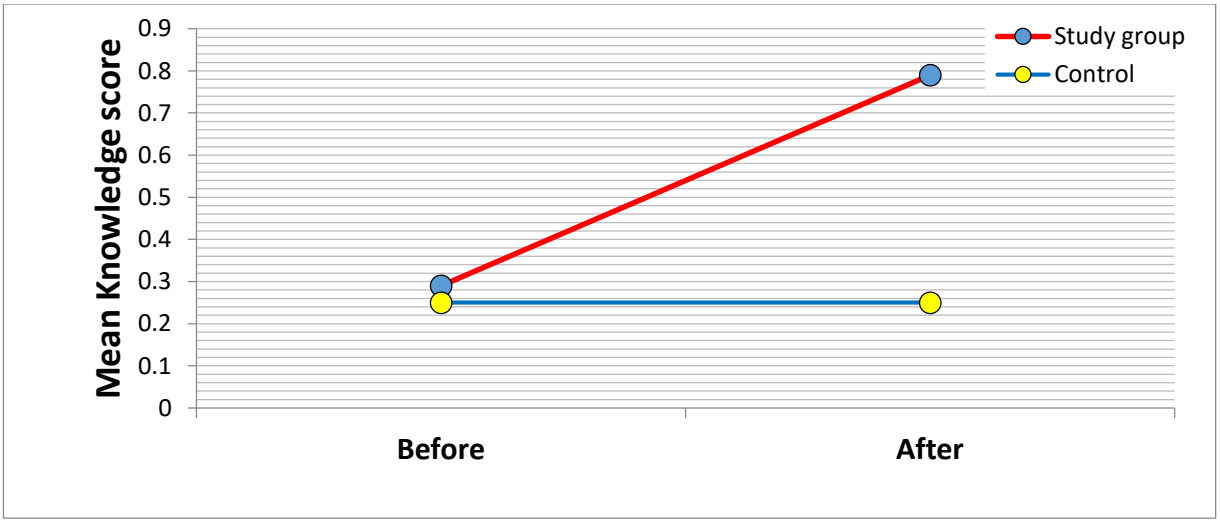

Figure 4.20 Change in mean knowledge score for Q18 post-test in study group and controls

4.2.19. Table Correct responses (know) of the participants about abdominal obesity is a risk factor for developing CHD

Q19	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	13	54.2%	11	45.8%	0.773
Post-test	19	79.2%	11	45.8%	0.017
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 13 participants (54.2%) in study group and 11(45.8%) in control groups have been correctly responded about the question regarding Obesity in the abdomen is a risk factor for coronary artery disease. Post-test program the proportion increased in study group to 79.2% while not changed among controls, with there is an important difference in the average knowledge of patients score.

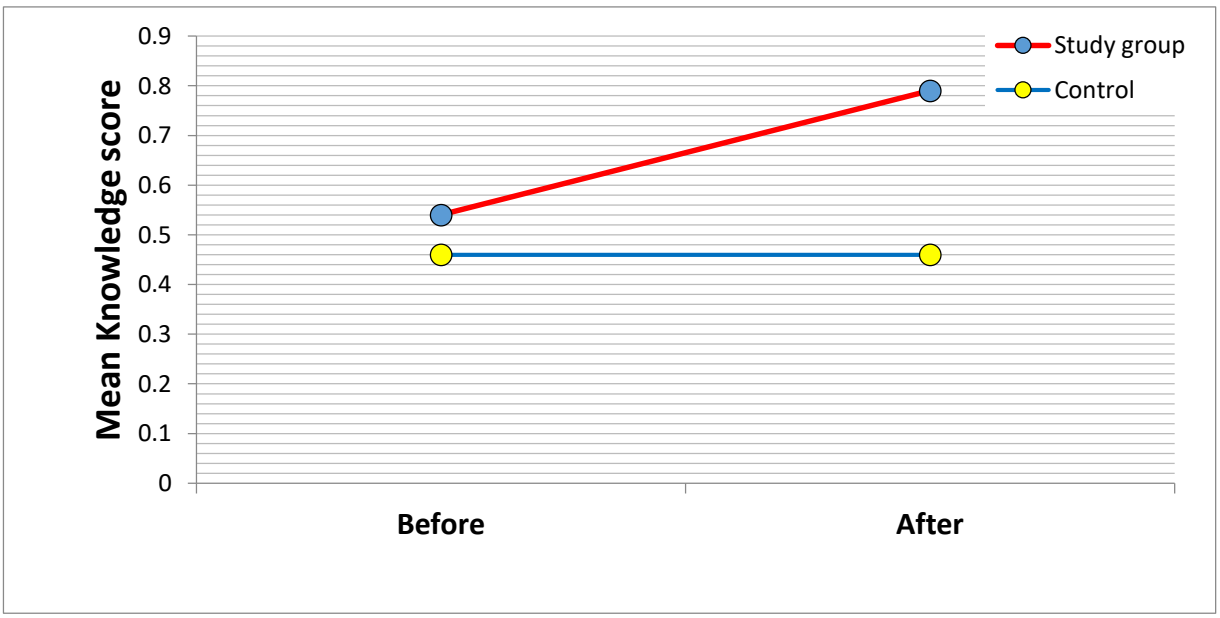

Figure 4.21 Change in mean knowledge score for Q19 post-test in study group and controls

Table (4.2.20) Correct responses (know) of the participants about Stress may cause an increase in blood sugar, blood pressure and cholesterol level.

Q20	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	8	33.3%	8	33.3%	1.00
Post-test	20	83.3%	8	33.3%	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 8 participants (33.3%) in study group and 8 (33.3%) in control groups have been correctly responded about the question regarding Tension can be reason a hypercalcemia, hypertension and hyperlipidemia. Post-test program the proportion increased in study group to 83.3% while not changed among controls, with there is an important difference in the average knowledge of patients score.

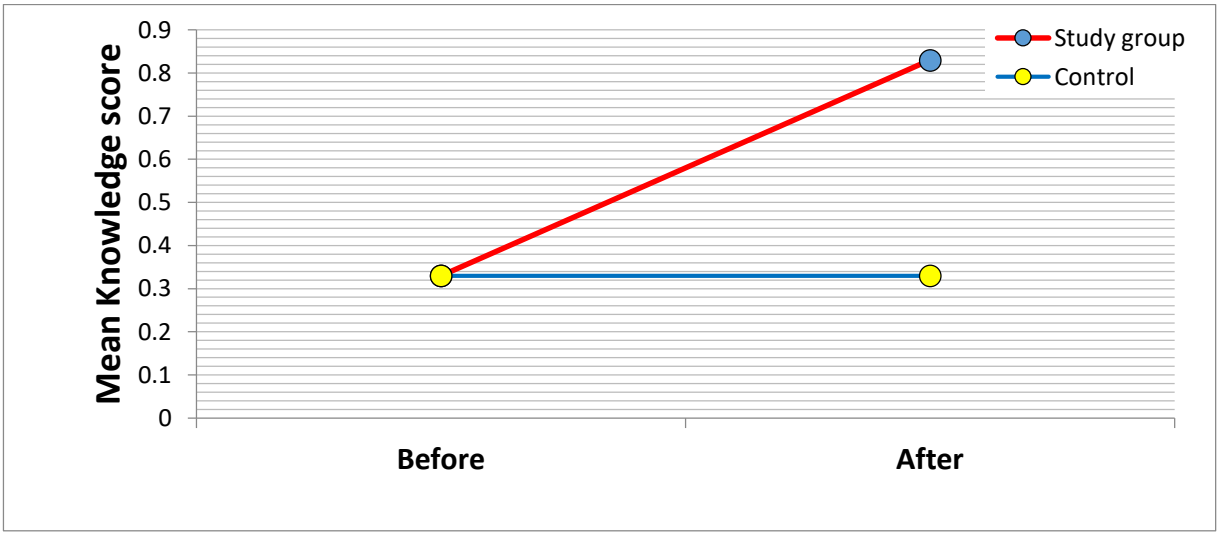

Figure 4.22 Change in mean knowledge score for Q20 post-test in study group and controls

4.2.21. Table Correct responses (know) of the participants about slow deep breath, counting to 10 pre speaking and going for walk are examples of stress inhibitors

Q21	Experimental group		Control group		P. value*
	N	%	N	%	
Pre-test	7	29.2%	7	29.2%	1.00
Post-test	21	87.5%	7	29.2%	0.001
*Chi square test used to compare responses pre and post-test					

Pre-test program, there were 7 participants (29.27%) in each group have been correctly responded about the question regardingStress relievers include taking relaxed, profound inhalations, with to ten when dialog, and taking a stride. Post-test program the proportion increased in study group to 87.5% while not changed among controls, with there is an important difference in the average knowledge of patients score.

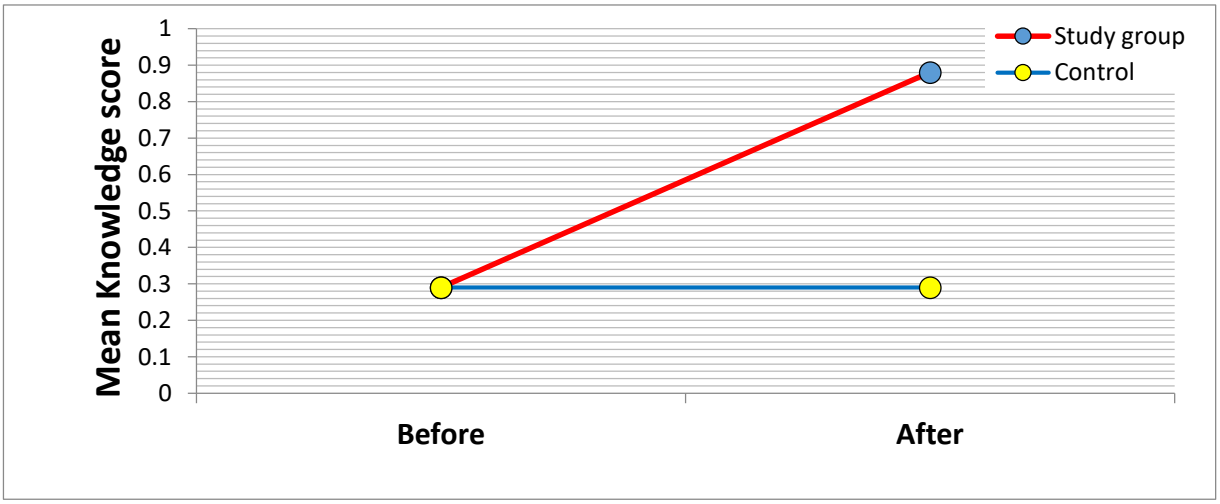

Figure 4.23 Change in mean knowledge score for Q21 post-test in study group and controls

4.3. Mean knowledge score pre and post-test in both study groups

4.3.1. Table Comparison of mean scores of the studied groups regarding the knowledge questions pre-test

Item	Experimental group		Control group		P. value*
	Mean	SE	Mean	SE	
Q1	0.08	0.06	0.08	0.06	1.000
Q2	0.17	0.08	0.21	0.08	0.714
Q3	0.29	0.09	0.38	0.10	0.545
Q4	0.25	0.09	0.29	0.09	0.748
Q5	0.38	0.10	0.42	0.10	0.770
Q6	0.17	0.08	0.50	0.10	0.015
Q7	0.38	0.10	0.46	0.10	0.562
Q8	0.38	0.10	0.29	0.09	0.545
Q9	0.13	0.07	0.08	0.06	0.640
Q10	0.13	0.07	0.08	0.06	0.640
Q11	0.33	0.10	0.50	0.10	0.247
Q12	0.67	0.10	0.58	0.10	0.555
Q13	0.38	0.10	0.50	0.10	0.388
Q14	0.42	0.10	0.54	0.10	0.391
Q15	0.33	0.10	0.46	0.10	0.381
Q16	0.25	0.09	0.33	0.10	0.530
Q17	0.33	0.10	0.29	0.09	0.758
Q18	0.29	0.09	0.25	0.09	0.748
Q19	0.54	0.10	0.46	0.10	0.568
Q20	0.33	0.10	0.33	0.10	1.000
Q21	0.29	0.09	0.29	0.09	1.000

In summary, no significant differences had been found between both groups in mean knowledge scores about all questions pre-test program. Post-test program. There was a statistically significant difference in all questions, ($P<0.05$)

4.3.2. Table Comparison of mean scores of the studied groups regarding the knowledge questions pre-test

Item	Experimental group		Control group		P. value*
	Mean	SE	Mean	SE	
Q1	0.58	0.10	0.08	0.06	0.001
Q2	0.67	0.10	0.17	0.08	0.001
Q3	0.83	0.08	0.42	0.10	0.001
Q4	0.88	0.07	0.33	0.10	0.001
Q5	0.96	0.04	0.46	0.10	0.001
Q6	0.88	0.07	0.50	0.10	0.006
Q7	0.92	0.06	0.46	0.10	0.001
Q8	0.92	0.06	0.29	0.09	0.001
Q9	0.63	0.10	0.13	0.07	0.001
Q10	0.54	0.10	0.08	0.06	0.001
Q11	0.96	0.04	0.54	0.10	0.001
Q12	0.94	0.06	0.58	0.10	0.001
Q13	0.96	0.06	0.50	0.10	0.001
Q14	0.88	0.07	0.54	0.10	0.012
Q15	0.96	0.04	0.54	0.10	0.001
Q16	0.96	0.04	0.33	0.10	0.001
Q17	0.96	0.04	0.29	0.09	0.001
Q18	0.79	0.08	0.25	0.09	0.001
Q19	0.79	0.08	0.46	0.10	0.018
Q20	0.83	0.08	0.33	0.10	0.001
Q21	0.88	0.07	0.29	0.09	0.001

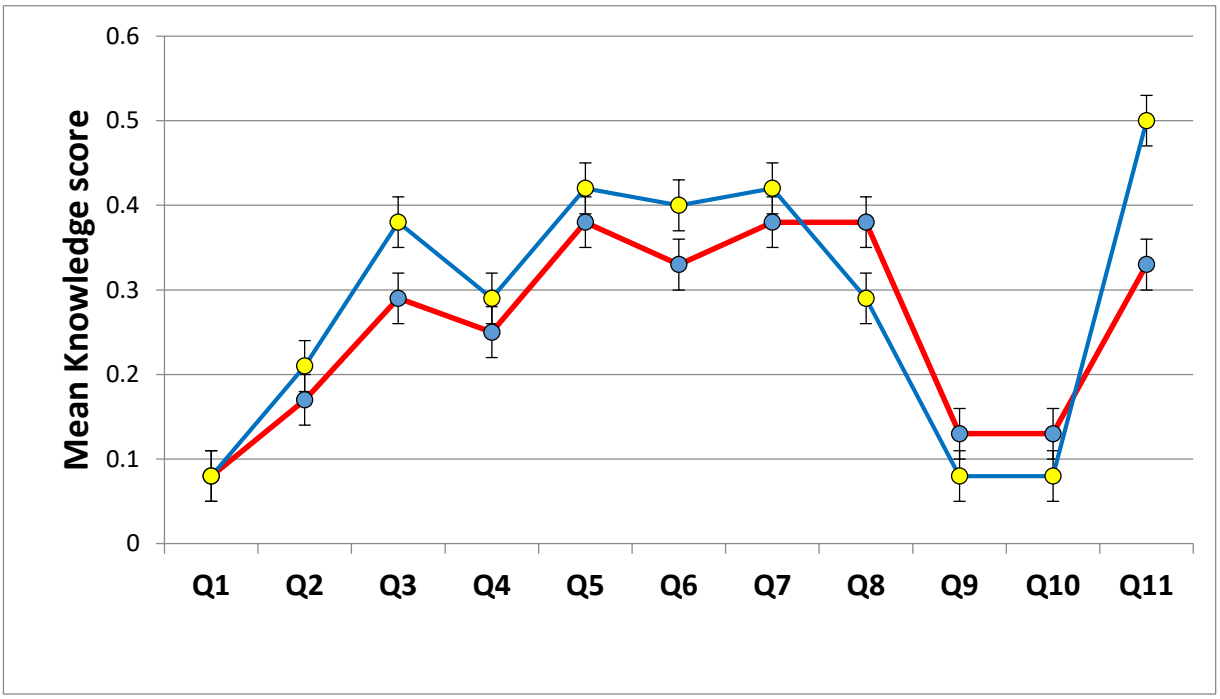

Figure 4.24. Line-Marker chart compare the mean score variation in both groups pre-test program for questionnaire Q1 –Q11.

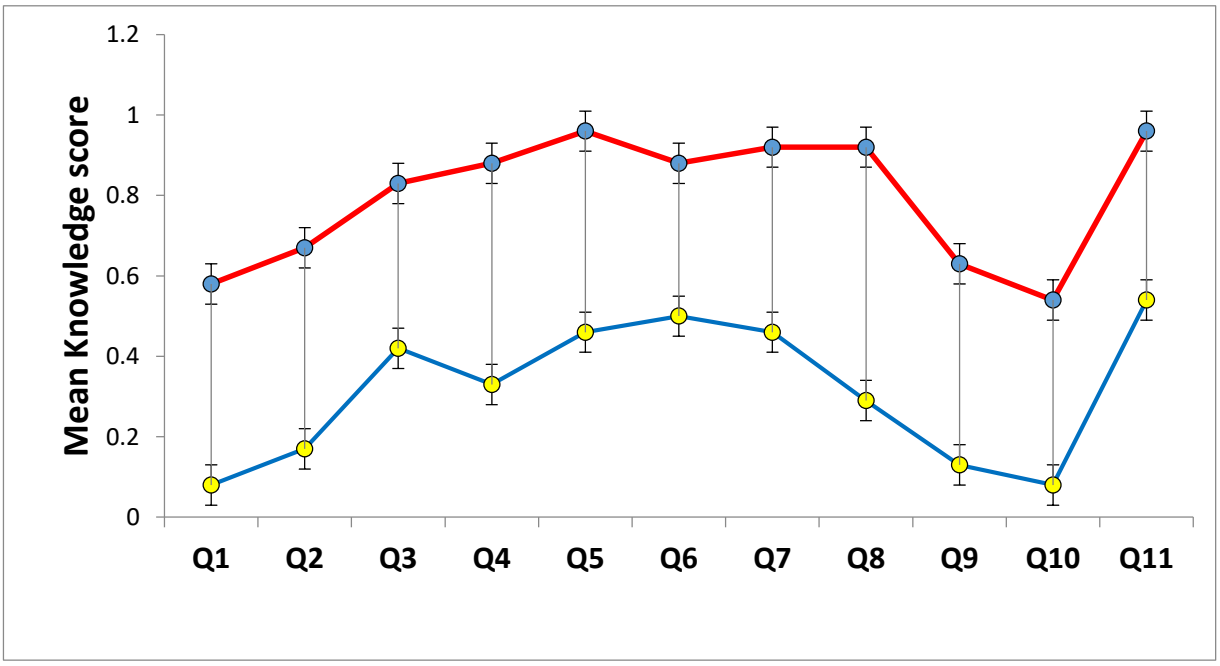

Figure 4.25. Line-Marker chart compare the change in mean knowledge score of both groups post-test program for questionnaire Q1 – Q11.

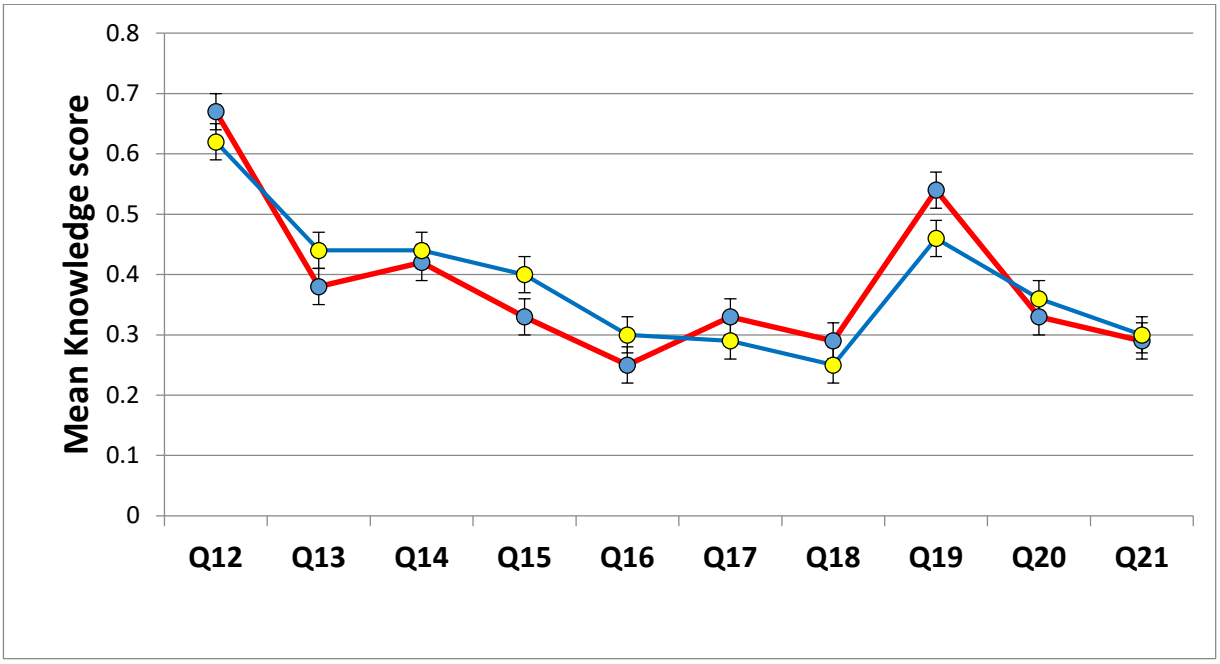

Figure 4.26. Line-Marker chart compare the mean score variation in both groups pre-test program for questionnaire Q12 – Q21.

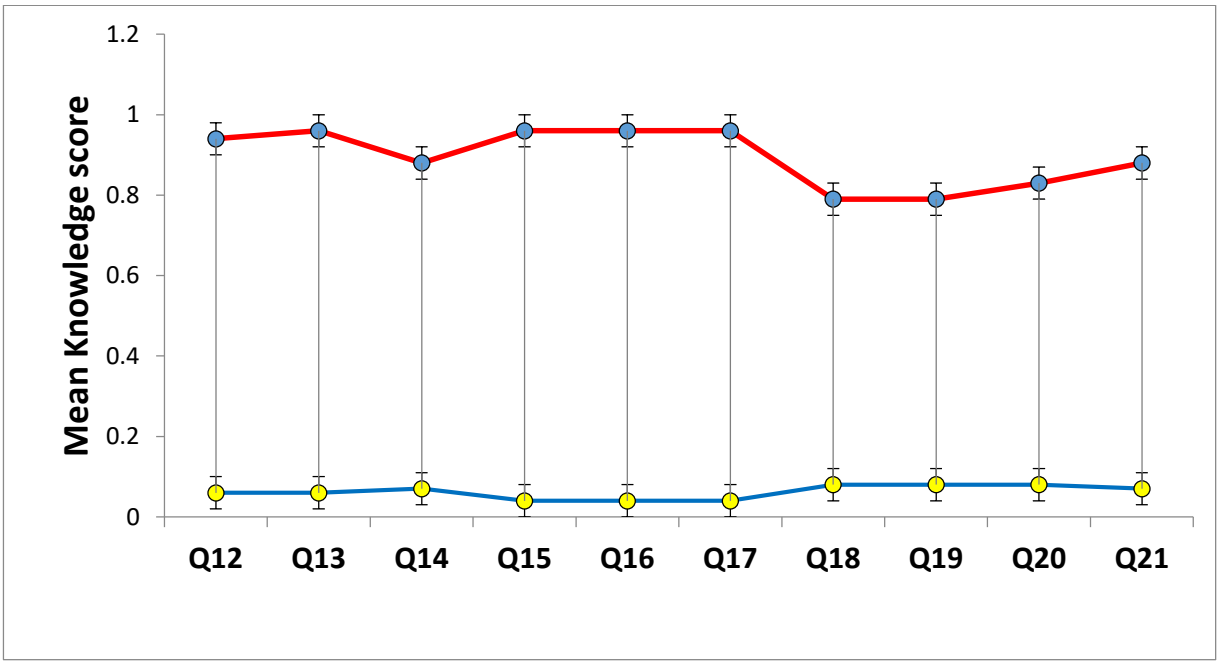

Figure 4.27. Line-Marker chart compare the change in mean knowledge score of both groups post-test program for questionnaire Q12 – Q21.

4.3.3. Table Comparison of knowledge scores of the studied groups pre and post-test

Variable		Experimental group		Control group		Effect size	P. value* between group
		Mean	SE	Mean	SE		
Total knowledge score (out of 21)	Pre-test	6.50	0.94	7.33	1.10		0.563
	Post-test	17.79	0.49	7.58	1.11	**2.61 large**	**0.001**
Mean difference		11.29	2.17	0.25	0.01		**0.001**
Percentage change		173%	38%	3.4%	0.91%		**0.001**
P. value* within group		0.001		0.161			
Mean knowledge score (out of 1)	Pre-test	0.31	0.04	0.35	0.05		0.563
	Post-test	0.85	0.02	0.36	0.05	**2.11 large**	**0.001**
Mean difference		0.54	0.08	0.01	0.002		**0.001**
Percentage change		174%	39%	2.9%	0.72%		**0.001**
P. value* within group		**0.001**		0.161			

Comparison of knowledge scores of the studied groups pre and post-test revealed that the mean total score (out of 21 point) was significantly increased post-test program, from 6.5 to 17.79 in the study group with a mean difference of 11.29 and percentage change of 173%, (P. value, 0.001). No significant change in control group, but slight change with small mean difference of only 0.25 point out of 21 and percentage change of only 3.4%, (P. value > 0.05), the effect of education program was clearly observed in study group where the effect size was large, (effect size = 2.61).

Similarly, the mean knowledge score (out of 1) was significantly increased post-test in study group from 0.31 to 0.85 with a mean difference of 0.54 and percentage change of 174%, (P. value = 0.001) with large effect size of 2.11 compared with the control group, where the average difference is just 0.01and percentage change was 2.9%, (P. value > 0.05, not significant), (Table 4.33and Figures 4.27 and 4.28)

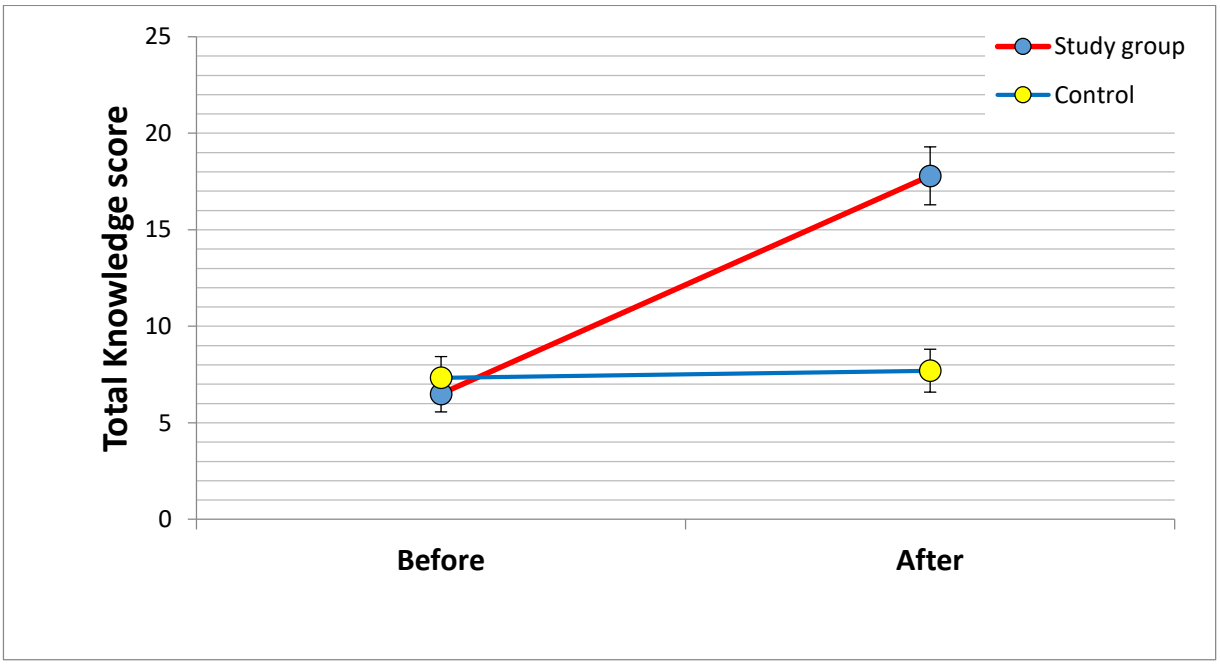

Figure 4.28. Line-Marker chart compare the change in mean total knowledge score pre and post-test in both studied groups.

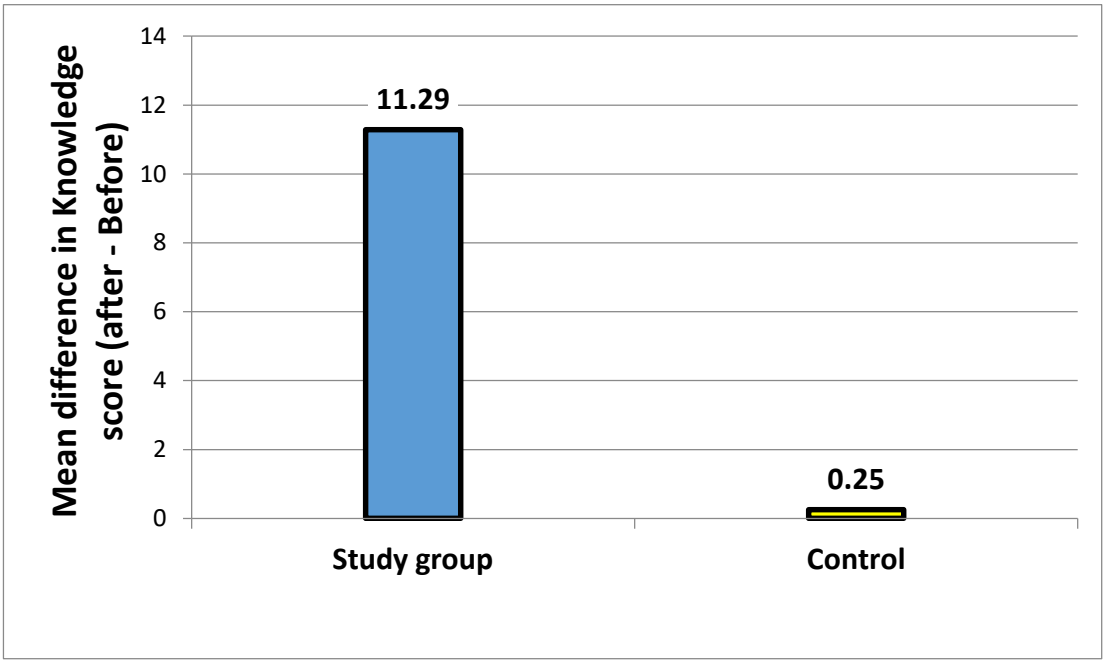

Figure 4.29. Bar- chart compare the mean difference (after – Pre) in total knowledge score of study group and controls

4.4. Level of knowledge pre and post-test in both studied groups

4.4.1. in both Table Comparison of Level of knowledge pre-test

Knowledge	Experimental group		Control group	
	No.	%	No.	%
Poor	16	66.7	15	62.5
Fair	6	25.0	5	20.8
Good	2	8.3	4	16.7
Total	24	100.0	24	100.0
Fisher's exact test = 0.824 P. value* = 0.828				

Level of knowledge pre-test in both studied groups were not significantly different where among the study group, 16 participants (66.7%) had poor knowledge, 6 (25%) had fair and only 2 (8.3%) had good knowledge, among controls, 15 participants (62.5%) had poor, 5 (20.8%) fair and 4 (16.7%) had

good knowledge, the difference between both clusters was not substantial (P>0.05), (Table 4.34 and Figure 4.29).

4.4.2. Table Comparison of Level of knowledge post-test

Knowledge	Experimental group		Control group	
	No.	%	No.	%
Poor	0	0.0	13	54.2
Fair	2	8.3	7	29.2
Good	22	91.7	4	16.7
Total	24	100.0	24	100.0
Fisher's exact test = 30.76 P. value* = 0.001				

Post-test the frequency of good knowledge was much increased to 91.7% in study group while still unchanged in controls, with highly significant difference between both groups.

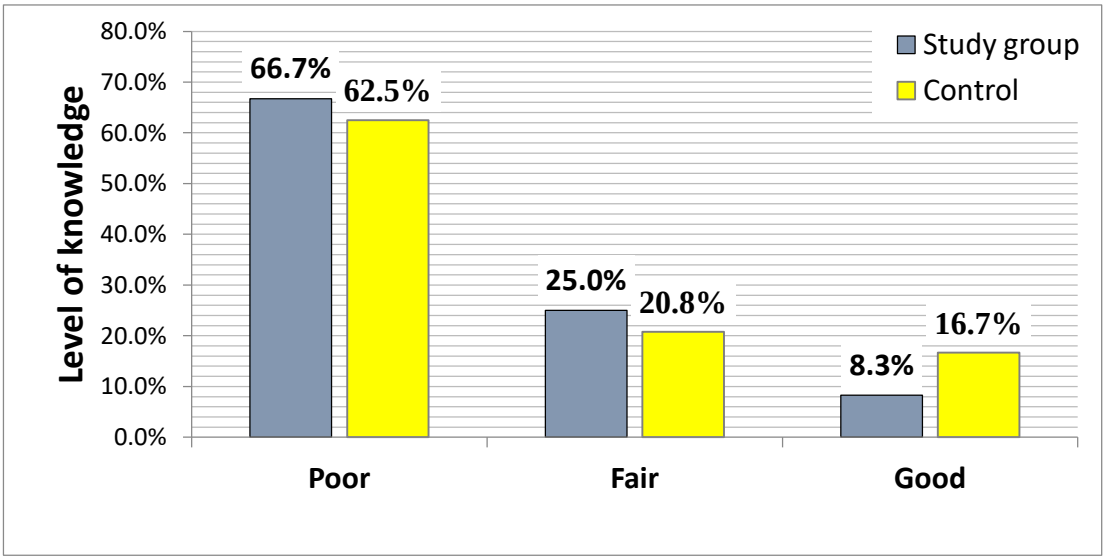

Figure 4.30. Bar-Chart compare the proportions of study participants at each level of knowledge pre-test program

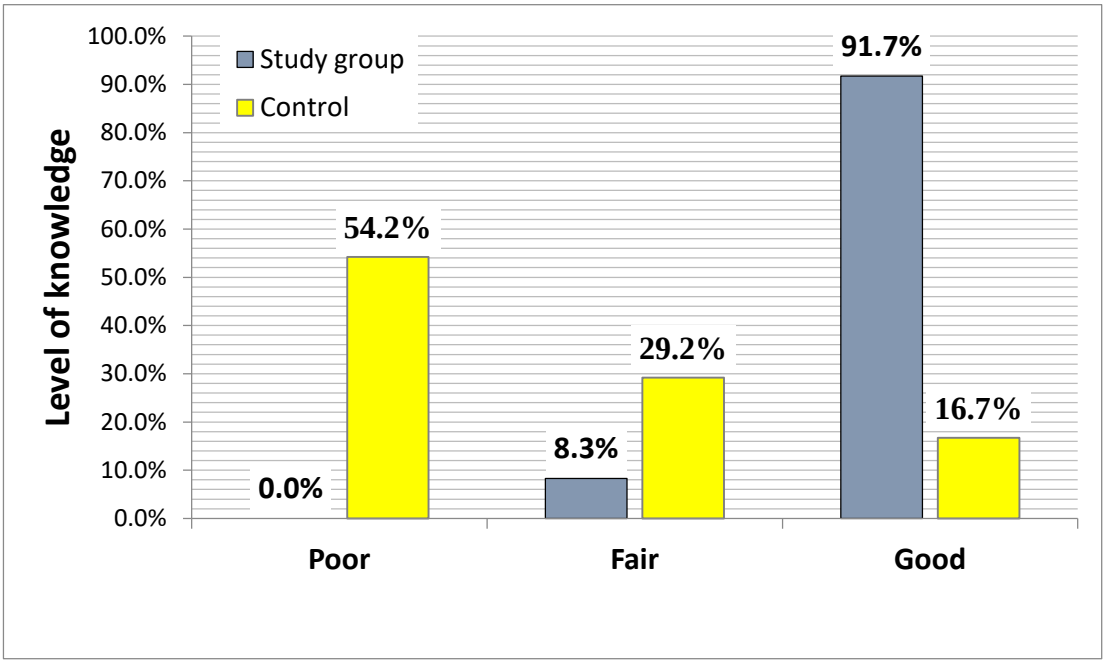

Figure 4.31. Bar-Chart compare the proportions of study participants at each level of knowledge post-test program

4.5. Vicariate correlation analysis between socio-demographic variables and change in Knowledge scores post-test

4.5.1. Results of Spearman's bivariate correlation analysis among the study group

Variable	Statistics for correlation of variable with Change in Knowledge post-test	
	R	P. value*
Gender	0.366	0.078
Age (year)	0.056	0.796
Marital status	0.182	0.221
Education	0.164	0.443
Occupation	-0.097	0.654
Monthly income	-0.148	0.492
Residence	-0.160	0.456
BMI category	0.330	0.116
Smoking	0.266	0.210

As shown in table (4.5.1) no statistically significant correlation had been found between Change in Knowledge post-test in the study group and other variables, in all correlations , P. value > 0.05.

4.5.2. Table Results of Spearman's bivariate correlation analysis among the control group

Variable	Statistics for correlation of variable with Change in Knowledge post-test	
	R	P. value*
Gender	0.101	0.639
Age (year)	0.055	0.799
Marital status	0.043	0.843
Education	0.048	0.823
Occupation	0.157	0.463
Monthly income	0.097	0.651
Residence	0.095	0.658
BMI category	0.216	0.310
Smoking	0.183	0.392

No significant correlation was found between Change in Knowledge post-test in the control group and other variables, in all correlations , P. value > 0.05.

Chapter Five Discussion

“Chapter five”

“Discussion of results”

This chapter discusses the study's findings in relation to the existing literature on an educational program for patients to learn about the danger reasons for CHD. The study's techniques were considered. The discussion opens with a brief summary of the study's methodology and goals. The key findings were then summarized and evaluated. These are offered as part of a patient's education and sentience of the danger reasons for CHD

A discussion of importance of the results will follow, which included a preliminary evaluation for them, and then an educational program was given to them, and then a second evaluation was conducted for them about their sentience of the danger reasons for CHD. Study limitations are discussed along with recommendations for further.

Thus, the current study in tended to implement an educational program to improve patient’s knowledge toward risk factors of coronary heart disease and how to these dangerous factors that can lead to death.

During this chapter, the results of study will be discussed based on main objectives of research and according to study domains, thus to be systematically organized in very well manner.

In spite of late headways in identification and treatment, cardiovascular infection is as yet the significant reason for death and dreariness in created nations. [21} (Economics., 2008)- At a time when a large proportion of Iraqis suffer from heart diseases that no longer differentiate between the young, the young and the old, to the extent that it has become the number one killer of Iraqis, and the first cause of death in Iraq, which calls with him to ask the important question, which is why heart

diseases claim lives Iraqis? What are the causes of injury and why did it affect even young people and children? How does the patient protect himself from the risk of heart disease?

The first leading to mortality is a coronary heart disease and are common among children, young people and the elderly as a result of many factors. The percentage of deaths resulting from heart disease represents from 25 to 40% of the causes of death in Iraq, and the incidence of high blood pressure is about 67% of patients who suffer from problems in the heart and blood vessels, followed by coronary artery diseases by 23%. Percentage of people with heart disease (Michael& Shaughnessy., 2006)

5.1. Discussion of socio-demographic characteristics:

Total of Gender dominance of males in study group and controls where males represented 70.8% and 62.5%, respectively, with a male to female ratio of 2.42 to one in the study group and 1.67 in the control group, no statistically significant difference was found between both groups in gender distribution, (Table 4.1). This finding usually, the incidence of coronary heart disease in men is higher than women, especially when the age is early for men, unlike women, it is at a later age, which result in death in this disease about 23 % in male and 34% in female.

The reason for men's injuries more than women may be due to the lack of symptoms in women or their appearance later than men, or the reason may lie in the no getting of health care services due to the delay in diagnosis. This is due to public campaigns to introduce the dangers of these diseases and the interest of women in them, unlike men who are less interested in this direction, and the reason for this is due to their preoccupation with work and living. ((3,4,25)(Mosca, et al., 2011) (Mosca, et al., 2013) (Shaw, et al., 2009) supported this finding in them.

Concerning Age distribution of the studied group shows that in the study group, young adult represented 20.8%, middle age adults represented 41.7%, old age adult were 37.5% while none at geriatric age. In control group the corresponding proportions of these age groups were 12.5%, 50%, 37.5% in this table (4.1.2.) (Jousilahti, et al., 2009) supported this finding in their educational intervention from The smallest age group among the elderly is between the ages of 25 and 49, and the smallest age group among the elderly is between the ages of 60 and 64. The absolute difference in CHD risk, on the other hand, was larger in the older age group.

The risk of coronary heart disease increases with age, regardless of gender, if it is male or female, and the reason for this lies in the increase in the level of cholesterol in the blood with age, and when a rise in blood cholesterol causes a second risk factor, which is high blood pressure, which makes age develop two other factors in coronary heart disease.

Regarding study sample Out of the 24 patients in the study group, 8.3% were single, 87.5% married while only one patient was separated and none were widowed or divorced. In control group, 12.5% were single, 62.5% married and 6 were separated and none was widowed or divorced, no significant difference in marital status was found between both groups. (Table 4.3).

This is in contrast to our apparent results that the marital status has a reverse role in coronary heart disease, meaning that if a person is married, his exposure to the danger reasons for CHD increases according to A results this research, (Schultz, et al., 2017)

coronary heart disease risk factors increase when you are unmarried or separated and the reason lies in your lack of interest in yourself and you are more likely to smoke and not adhere to the treatments prescribed to you. Presentation of psychological diseases of depression and stress, and these factors may lead to coronary heart disease.

In the study group, post graduated patients represented 12.5%, graduated (20.8%), diploma (16.7%), high school (20.8%), middle school (8.3%), primary school (20.8%) and none was illiterate. In control group, post graduated patients represented 12.5%, graduated (12.5%), diploma (16.7%), high school (25%), middle school (8.3%), primary school (16.7%) and (8.3%) were illiterates. However, no statistically significant difference was found in the level of education between both groups. (Table 4.4).

According to this study, there is no relationship between patients' knowledge the danger reasons for CHD and the educational level. This reason is due to the lack of health education far from their educational level. It is not caring about health culture and it is our last concern especially in our eastern societies, unlike what exists in western societies. (Loucks, et al., 2012) This is inconsistent with the study conducted by the researcher in the city of Rhode Island and Boston, Massachusetts sites (United States) The participants in this sample who had a high level of education are less at danger of developing CHD.

In learning group, employed patients represented (45.8%), self-employed were (16.7%), retired (20.8%), and housewives were (20.8%). In controls' group, employed patients represented (29.2%), self-employed were (12.5%), retired (33.3%), and housewives were (25%) However, no statistically significant difference was found in the level of education between both groups. table (4.1.5)

Several studies in different parts of the world have reported that the relationship between working hours and the danger reasons for CHD is a positive relationship, meaning the longer the work period, the greater its impact on coronary heart disease. From the category of employees, and this is consistent with previous research, including (Ma, et al., 2017).

Monthly income ranged between less or equal to 300,000 IQD to > 900,000 IQD. In the study group, (16.7%, had a monthly income of >

900,000 IQD, (4.2%) had an income of 601-900 thousand IQD, majority of the study group, 79.2%, had a monthly income of less than 600,000 IQD. In control group, the monthly income was > 900,000 IQD in (12.5%), 601 – 900 thousand in (16.7%), and more than (70%) had an income of less than 600,000 IQD, nonetheless, no significant difference was found in monthly income between both groups (Table 4.6)

The results showed something very important, which is the relationship between the living situation and coronary heart disease. The middle and lower classes are more susceptible to these diseases. The reason lies in the inability to prevent diseases early due to the inability to do so due to their financial inability, but we do not deny that the upper classes are also vulnerable to these diseases. Diseases The reason lies in the amount of excessive food and not following a good diet, and this is what studies show is the number of developed countries more susceptible to coronary heart disease. This is what the researcher agrees with me. (Janati, et al., 2011)

Majority of study participants in both groups were of urban origin where 70.8% of the study group and 75% of controls were residents of urban region compared to only 29.2% and 25%, respectively in rural residence, no significant difference was found in monthly income between both groups. (Table 4.7)

The results that appear before you indicate that the largest number of the sample suffering from coronary heart disease are from the urban area, i.e. about 73%, and the remaining percentage of the sample are from the rural population. The countryside and work there are also healthier than cities and there is no polluted environment. This is what the researcher agrees with me (Singh, et al., 2019) that the largest percentage of people with coronary heart disease are urban.

The distribution the study participants according to BMI showed normal BMI in 62.5% of the study group and 58.3% of controls, 33.3% in

each group were overweight. Only (4.2%) of the study group and (8.3%) of controls were obese. (Table 4.8)

We do not deny the direct relationship between BMI and coronary heart disease, meaning that the higher the BMI, the higher the risk of developing these diseases. It has a negative effect on all organs of the body, including the heart and arteries, causing greater effort on them, in addition to high blood pressure, high blood cholesterol and triglycerides, and these are all risk factors for coronary heart disease. But what appeared to us with these results is the opposite of this information, but this does not indicate a denial of the previous information, and what proves this is the incompatibility with the researcher (Canoy, et al., 2013), who showed that the groups most affected by these diseases are the most obese group.

Smoker participants were 25% of the study group and 33.3% of controls with no significant difference between both groups in smoking status. (Table 4.9)

It is taken into consideration that smoking is one of the main causes of coronary heart disease, and this is due to what smoking causes, which has chemicals that cause an increase in the proportion of serum reactive protein and homo-cysitne, which in turn cause high blood pressure and atherosclerosis, and then a heart attack, which lead to death. (Bazzano, et al., 2013) This does not agree with me in my study, this researcher, who found in his study that there is a very strong relationship between smoking and a high incidence of coronary heart disease.

5.2. Discussion Responses of Study group and Controls about the questionnaire of knowledge

As shown in table 4.10, only 2 participants (8.3%) in each group have been correctly responded about the question persons always knows

when they have CHD. after education program the proportion increased in study group to 58.3% while still the same in the control group with Between the two groups, there is an important difference in the average knowledge of patients score.

One of the important factors that can have a direct and strong impact on CHD is smoking, hypertensive and hyper lipid, which was found by researcher Pereira et al. Which made health care providers in all countries work to focus on such factors because of their possible consequences up to death and focus on providing awareness programs for patients about those dangerous factors that can cause coronary heart disease.

Awad &Al-Nafisi., 2014. It was also found in the Kuwaiti society that the levels of knowledge toward the danger reasons for CHD are sufficient, especially about the questions that included the effect of smoking, obesity, unhealthy diet or lack of physical activity as the main causes of these diseases. It is possible that this difference between societies about their knowledge about the danger reasons for CHD is due to the means of education provided by the government towards their citizens in terms of information, clarification and holding educational seminars and workshops whose purpose is to provide enough information regarding these dangerous factors that may threaten the life of a citizen.

Table 4. 10. **Knowledge about persons always knows when they have CHD**

The results showed us in this study that the knowledge of patients when they suffer of CHD in the study group remained only 2 who knew about it and the same number in the control group, but after giving the program and providing sufficient information about knowing the symptoms and signs of coronary heart disease through the lecture presented to them and after Completing the lecture, they were cleared of this information for the study group only, and the result was that the number of patients in that

group increased to 14 patients who had sufficient information, and this result is positive. The same number remained in the control group.

Table 4.11. Correct responses (know) of the participants about risk of developing heart disease when they have a family history of CHD

As shown in table 4.11, only 4 participants (16.7%) in study group have been correctly responded about the question regarding the When individuals have a developing heart disease when they have a family history of CHD. After education program the proportion increased in study group 66.7% while slightly changed among controls with there is a important difference in the average knowledge of patients score.

We see now these results that the knowledge of patients in both groups (study and control), that is, those who had this information in the study group before the program were 4 patients and in the control group are only 5, and it is very low about that family history is one of the danger reasons for CHD. An important role of controlling then reducing this risk by knowing this, that is, taking more caution for those who do not have a family history of these diseases, but he cannot prevent this because the patient's family history is one of the risk factors for uncontrolled coronary heart disease and this is what the researcher found (Ganguly, et al., 2008).

But after presenting the program to them and giving sufficient information about family history and coronary heart disease and its effect on it, the number of patients with that information became 16 after the test, but in the control group the number became 8, and it is possible to attribute this increase in the control group to it when giving them questions in the first test She is the one who motivated them to know the effect of family history that could have caused coronary heart disease by informing them or researching it.

Table 4.12. Correct responses (know) of the participants about Smoking is a risk factor for CHD

As shown in table 4.12, there were7 participants (29.2%) in study group and 9 (37.5%) in control groups have been correctly responded about the question regarding smoking is a risk factor for CHD. After education program the proportion increased in study group to 83.3% while slightly changed among controls to 41.7%, with there is an important difference in the average knowledge of patients score.

Smoking and what do you know what smoking is because of its harmful effects on all parts of the body, in addition to its effect on mental health as well, and there is a warning against smoking. The percentage of smokers reaches about 33% of the total sample in both groups (study and control). The result after the first test for them before giving the program in the study group who knows that smoking causes coronary heart disease is 7 and in the controlling group it is 9, but after giving the program the number in the study group became 20 after the second test and this is a good percentage, and the other group became 10 and this It was also found in the study that was conducted in Kuwait by the researcher (Awad& Al-Nafisi., 2014).

Table 4.13. Correct responses (know) of the participants about the older a person gets, the more likely they are to acquire coronary artery disease.

Before education program, there were 6 participants (25%) in study group and 7(29.2%) in control groups have been correctly responded about the question regarding older a person gets, the more likely they are to acquire coronary artery disease After education program the proportion increased in study group to 87.5% while slightly changed among controls to 33.3%, with there is an important difference in the average knowledge of patients score.

The more a person has sufficient knowledge about the danger reason of CHD, the higher the rate of preventing the disease or reducing its

symptoms will be. This research, we noticed before giving the program that the percentage of knowledge of this information was low, i.e. about 6 in the study group and 7 in the control group, and what the researcher also found (Anand, et al., 2008)) in USA and this is what prompted us to focus on this information and clarify it significantly for patients, and the results were a high number of Patients who have the information that the older the person, the more likely he is in the second exam that took place after the program was given and the number was 21, they know.

Table 4.14. Correct responses (know) of the participants about A Person Stopping smoking lowers the risk of coronary artery disease.

Before education program, there were 9 participants (37.5%) in study group and 10 (41.7%) in control groups have been correctly responded about the question regarding A Person Stopping smoking lowers the risk of coronary artery disease. After education program the proportion increased in study group to 95.8% while slightly changed among controls to 45.8%, with there is an important difference in the average knowledge of patients score.

If a patient has enough information about smoking, his knowledge about stopping smoking will also be an important factor to reduce the risk of the disease, especially coronary heart disease, and here we had an important role when we gave enough information in the smoking lecture and its link with coronary heart disease, and we also made it clear to the patient not to say that I smoke There is no benefit when quitting smoking, but here it plays an important role, but it is less than those who never smoke. Here lies our role, as we are a community health nursing, to include the patient in the prevention of the second type, guide him and support him with instructions and awareness, and this is what we will work on in the future and we see in this study this high It is clear in the number of patients in the study group who were able to know this information, before the

program, about 9 only, but after the second exam. after the program, they became 23 only one patient remained who did not know which, we reached 95.8 of the target. Similar results were found for patients' knowledge toward the danger of smoking on CHD, and A results were a small percentage of patients who knew the risks of smoking on coronary heart disease (Ahmed, et al., 2020).

Table 4.15. Correct responses (know) of the participants about increase of the blood pressure increase risk of coronary heart disease

Before education program, there were 4 participants (16.7%) in study group and 6(25%) in control groups have been correctly responded about the question regarding increase of the blood pressure increase risk of CHD. After education program the proportion increased in study group to 87.5% while slightly changed among controls to 29.2%, with there is an important difference in the average knowledge of patients score.

The learning found, before presenting the educational program for patients, a small percentage who have knowledge that high blood pressure is a danger reason of CHD in both groups (the learning and the control), and it is estimated at about 20%, and this is what the researcher confirms to me (Ahmed, et al., 2020).

that less Half of the sample taken do not have knowledge about high blood pressure, which is a danger reason of CHD. The program then emphasis on it, and the result was the increase in the number of patients who know that high pressure is the danger reasons for CHD, meaning it rose to about 87.5% of the study group.

Table 4.16. Correct responses (know) of the participants about Controlling blood pressure lowers a person's chances of acquiring heart disease.

Before education program, there were 9 participants (37.5%) in study group and 11 (45.8%) in control groups have been correctly responded

about the question regarding Controlling blood pressure lowers a person's chances of acquiring heart disease. After education program the proportion increased in study group to 91.7% while not changed among controls, with there is a important difference in the average knowledge of patients score.

Controlling high pressure means controlling one of the most important risk factors for coronary heart disease, which in turn leads to a high performance of the heart (Ganguly, et al., 2008).

Table 4.17. Correct responses (know) of the participants about increase in cholesterol can be risk for CHD

Before education program, there were 9 participants (37.5%) in study group and 7 (29.2%) in control groups have been correctly responded about the question regarding increase in cholesterol can be risk for CHD After education program the proportion increased in study group to 91.7% while not changed among controls, with there is a important difference in the average knowledge of patients score.

There is no doubt that one of the risk factors for coronary heart disease is high cholesterol in the blood and the consequent risks of several. There are several studies that prove this direct relationship that occurs between high cholesterol and coronary heart disease, and the studies conducted in Jordan and Canada agree with that (Ahmed, et al., 2020). Rather, the doctors predicted coronary heart disease by examining the cholesterol level. If it was high, the patient could be ready for any moment of the disease, and this is also what appeared to us in this study that most patients have no idea that high cholesterol is a risk factor. This may be the reason for their coming to the heart center and being treated there, but after presenting the necessary program to them and clarifying all the details about the results, their knowledge about.

Table 4.18. Correct responses (know) of the participants about If your You're at risk for heart disease if your good cholesterol (HDL) is high.

Before education program, there were 3 participants (12.5%) in study group and 2 (8.3%) in control groups have been correctly responded about the question regarding If your You're at risk for heart disease if your good cholesterol (HDL) is high. After education program the proportion increased in study group to 62.5% while slightly changed among controls to 12.5%, with there is an important difference in the average knowledge of patients score.

We also see now this study that the level of knowledge of the participants that when high good cholesterol in the blood and the effects on coronary heart disease were very few, that is, it reached less than 12.5% of the participants in the two groups, and this is what we found from a result consistent with those that were studied in India (Ammouri, et al., 2018) And after presenting the program and testing them for the study group, the result increased from 62.5%, and this result could change or reduce the risks of coronary heart disease.

Table 4.19. Correct responses (know) of the participants about If your You're at risk for heart disease if your bad cholesterol (LDL) is high.

Before education program, there were 3 participants (12.5%) in study group and 2 (8.3%) in control groups have been correctly responded about the question regarding If your You're at risk for heart disease if your bad cholesterol (LDL) is high. After education program the proportion increased in study group to 54.2% while not changed among controls, with there is an important difference in the average knowledge of patients score.

We also see in this study that the level of knowledge of the participants that when high bad cholesterol in the blood and the effects on

coronary heart disease were very few, that is, it reached less than 12.5% of the participants in the two groups, and this is what we found from a result consistent with those that were studied in India (Ammouri, et al., 2018) And after presenting the program and testing them for the study group, the result increased from 54.2%, and this result could change or reduce the risks of coronary heart disease.

Table 4.20. Correct responses (know) of the participants about Consuming fatty foods has an effect on blood cholesterol levels.

Before education program, there were 8 participants (33.3%) in study group and 12 (50.0%) in control groups have been correctly responded about the question regarding Consuming fatty foods has an effect on blood cholesterol levels. After education program the proportion increased in study group to 95.8% while slightly changed among controls to 54.2%, with there is an important difference in the average knowledge of patients score.

A study found in agreement with what appeared from the results of (Nishikawa., 2020) what was witnessed in this study about the patient's knowledge about the food rich in fat and its effect on high cholesterol and thus the risk of coronary heart disease. About half of the participating sample have no knowledge in both groups and after presenting the program The number in the study group was 95.8%.

Table 4.21. Correct responses (know) of the participants about Being overweight increase a person's risk of CHD.

Before education program, there were 16 participants (66.7%) in study group and 14 (58.3%) in control groups have been correctly responded about the question regarding overweight increase a person's risk of CHD After education program the proportion increased in study group to

100% while not changed among controls, with there is an important difference in the average knowledge of patients score.

It is good to see such a result in patients, and they know that being overweight is one of the danger reasons for CHD, even if it was an effect of a little over half, but it remains good, and this is what we also found in a study (Ammouri, et al., 2016, but this does not prevent infection With coronary heart disease unless it controls all the risk factors, and by presenting the program, their information increased you more until it increased from 66.7%, they had knowledge to 100%, they became.

Table 4.22. Correct responses (know) of the participants about Physical activity on a regular basis lowers the chance of acquiring heart disease.

Before education program, there were 9 participants (37.9%) in study group and 12 (50.0%) in control groups have been correctly responded about the question regarding Physical activity on a regular basis lowers the chance of acquiring heart disease. After education program the proportion increased in study group to 100% while not changed among controls, with there is an important difference in the average knowledge of patients score.

There is a direct relationship between physical inactivity and coronary heart disease or the risk factors for these diseases, meaning that the greater the physical inactivity, the higher the risk factors such as high blood pressure, diabetes, obesity and stress, and this is what we found in the following studies (Raitakari, et al., 2007) Also, what appeared to us in this study is that the results were found by patients who did not know that regulation in physical activity is what reduces or controls coronary heart disease. Information they are only 9, after the program was presented to them, it became 24, which is the required result.

Table 4.24. Correct responses (know) of the participants about Walking and gardening are examples of exercises that can help reduce the chance of acquiring heart disease.

Before education program, there were 8 participants (33.3%) in study group and 11 (45.8%) in control groups have been correctly responded about the question regarding Walking and gardening are examples of exercises that can help reduce the chance of acquiring heart disease. After education program the proportion increased in study group to 95.8% while slightly changed among controls to 54.2%, with there is an important difference in the average knowledge of patients score.

One of important factor that helps prevent or reduce any disease is the psychological factor. When walking for any sick or healthy person, it is beneficial for him in terms of physical and psychological health, no matter how a patient suffers from heart problems, it is necessary that he at least walk in a garden for an hour a day in order to raise of mental health and thus return to it positively, and what we saw in this study is a small percentage of patients who know that walking reduces the risk factors of coronary heart disease, and there are researches that have worked on programs that encourage walking for patients and non-patients (Gordon, et al., 2013)

Table 4.25. Correct responses (know) of the participants about Diabetes increases one's chances of acquiring CHD.

Before education program, there were 6 participants (25%) in study group and 8 (33.3%) in control groups have been correctly responded about the question regarding Diabetes increases one's chances of acquiring CHD.

After education program the proportion increased in study group to 95.8% while not changed among controls with there is an important difference in the average knowledge of patients score.

(Mohamed., 2021) The main cause of death is coronary heart disease, which poses a high risk for diabetic patients compared to the population. What we found in our study is consistent with the results that appeared in the study (Kengne, et al., 2013) is very knowledge There are few patients, and this is what we worked on in our program to raise this knowledge to reduce these risks, which was 25%, and after the program they became 95.8%.

Table 4.26. Correct responses (know) of the participants about hypercalcemia creates the heart effort stiffer

Before education program, there were 8 participants (33.3%) in study group and 7 (29.2%) in control groups have been correctly responded about the question regarding hypercalcemia creates the heart effort stiffer After education program the proportion increased in study group to 95.8% while not changed among controls, with there is an important difference in the average knowledge of patients score.

Here now this question there are questions, what is the difference between a patient with diabetes and a patient with high blood sugar. What is meant here is a patient with diabetes, but it is controlled, here it is less dangerous than the patient who has diabetes but not controlled, which leads to more danger reason of CHD. Some readings take proven that high blood sugar or uncontrolled sugar is a danger reason of CHD, and here the researcher found (Leon& Maddox., 2015) that patients have little knowledge about this question, which they agree with me. After providing

sufficient information about diabetes and the way it affects Those with coronary heart disease, their level of knowledge of this increased from 8 out of 24, now it is 23 out of 24.

Table 4.28. Correct responses (know) of the participants about Obesity in the abdomen is a danger reason of CHD

Before education program, there were 13 participants (54.2%) in study group and 11(45.8%) in control groups have been correctly responded about the question regarding Obesity in the abdomen is a danger reason of CHD. After education program proportion increased in learning group to 79.2% while not changed among controls, with there is an important difference in the average knowledge of patients score.

(Huxley, et al., 2010) proved that the percentage of patients' knowledge about the fat accumulated in the abdominal area is a small percentage, which in turn will be more susceptible to coronary heart disease, and this is also what appeared in our study that a high percentage of our sample in both groups (studied and controlled) and accordingly we Providing all the information about the link between the accumulation of fat in the abdominal area and coronary heart disease.

Table 4.29. Correct responses (know) of the participants about Tension can be reason a hypercalcemia, hypertension and hyperlipidemia.

Before education program, there were 8 participants (33.3%) in study group and 8 (33.3%) in control groups have been correctly responded about the question regarding Tension can be reason a hypercalcemia, hypertension and hyperlipidemia. After education program the proportion increased in study group to 83.3% while not changed among controls, with

there is an important difference in the average knowledge of patients score.

Here, a researcher (Leon& Maddox., 2015) agrees with me that the results he reached that about 30%, they do not have knowledge about stress, is the cause of high blood pressure, high sugar, and high cholesterol level. They have about 83.3%, and this plays an important role in reducing the risk of coronary heart disease when high blood pressure, high cholesterol and high sugar as a result of stress.

The link between stress, high sugar, high pressure and high cholesterol is when a person is exposed to severe stress in many cases, he consumes sugar, fats and salts (Leon& Maddox., 2015), and then he secretes the stress hormone and thus secretes cortisone and it is the main reason for weight gain in people who are exposed to stress Thus, when you gain weight, there is an increase in cholesterol, an increase in blood pressure, and there is an increase in sugar inside the blood.

Table 4.30. Correct responses (know) of the participants about Stress relievers include taking relaxed, profound inhalations, with to ten when dialog, and taking a stride

Before education program, there were 7 participants (29.27%) in each group have been correctly responded about the question regarding Stress relievers include taking relaxed, profound inhalations, with to ten when dialog, and taking a stride. After education program the proportion increased in study group to 87.5% while not changed among controls, with there is an important difference in the average knowledge of patients score.

One of an important factor to get rid of stress is taking a slow and deep breath, counting to the number 10, and walking. This must be known to the patient. As we mentioned in the previous question, what is the effect of stress on coronary heart disease and how it is a risk factor.) (Ammouri, et al., 2016) Here, in this program, we gave this knowledge to the studied group and how to get rid of stress and how they were before the program,

their knowledge reaches about 29%, and now it is 87.5%.

4.3. Discuss the importance of the educational program

Through this part of the study, it will show us the importance of the educational program and whether it is necessary to implement it or not.

Comparison of knowledge scores of the studied groups before and after education revealed that the mean total score (out of 21 point) was significantly increased after education program, from 6.5 to 17.79 in the study group with a mean difference of 11.29 and percentage change of 173%, (P. value, 0.001). No significant change in control group, but slight change with small mean difference of only 0.25 point out of 21 and percentage change of only 3.4%, (P. value > 0.05), the effect of education program was clearly observed in study group where the effect size was large, (effect size = 2.61).

Similarly, the mean knowledge score (out of 1) was significantly increased after education in study group from 0.31 to 0.85 with a mean difference of 0.54 and percentage change of 174%, (P. value = 0.001) with large effect size of 2.11 related to regulator cluster where a mean change was only 0.01 and percentage change was 2.9%, (P. value > 0.05, not significant), (Table 4.33)

5.3. Level of knowledge before and after education in both studied groups

5.3.1. Level of knowledge before education in both studied groups

Level of knowledge before education in both studied groups were not significantly different where among the study group, 16 participants (66.7%) had poor knowledge, 6 (25%) had fair and only 2 (8.3%) had good knowledge, among controls, 15 participants (62.5%) had poor, 5 (20.8%) fair and 4 (16.7%) had good knowledge, the difference between both clusters was not substantial (P>0.05), (Table 4.34 and Figure 4.29)., (Table

4.34)This agrees with the researcher, who found that it is one of the results that match those results that appeared in this research (Anand, et al., 2008)

Table 4. 35. Comparison of Level of knowledge after education in both studied groups

After education the frequency of good knowledge was much increased to 91.7% in study group while still unchanged in controls, with highly significant difference between both groups.

Another researcher (Huxley, et al., 2010) implemented an educational program for patients toward the danger reasons for CHD, and found the total of patients who had knowledge toward the danger reasons for CHD, after applying A program, it rose to about 90.1%.

Chapter Six

Conclusions and Recommendations

Chapter Six

Conclusion and Recommendation

This part will explain the main findings from the present study, as well as the study's recommendations.

6.1 conclusions

1. A majority of patients participating in the program were males,
2. The average age of the participating patients ranges between (young adults and old adults),
3. The highest percentage of the participants was married
4. The percentages were different in terms of the educational level of the participants who have a primary education, higher school education, and who have a bachelor’s degree
5. The highest percentage of the participants were of employees
6. The majority of the study participants were from the urban.
7. The highest percentage of the participants had a normal weight.
8. Majority of the study group, a monthly income of less than 600,000 IQD.
9. The majority of the study participants had no smoker
10. The majority of the study participation low knowledge about risk factors of coronary heart disease before education program
11. The program had a clear effective after its application in improving patients’ knowledge toward the risk factors for coronary heart disease, and this is what we saw in the results after applying the program and testing them later. After education the frequency of good knowledge was much increased to 91.7% in study group while still unchanged in controls, with highly significant difference between both groups.

6-2. Recommendation

The accompanying suggestions have been arrived at in view of the result of the current review:

1 - Giving special workshops and seminars for heart patients in general and heart diseases for a specific coronary illness and a full clarification of the risk factors for these diseases

2 - Guiding patients with coronary heart disease by relying on themselves in the dimensions of risks by raising knowledge about those risks that can be controlled.

3- Increasing awareness campaigns in the community about coronary heart disease because it has an important role in the lives of citizens

4- Is to give similar programs in the future, but on more participants than the patients who participated in this study

5- Expanding the work of the specialist nurse in the family and society in providing services of awareness and knowledge of coronary heart disease and its risk factors to the community through visits

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القران الكريم، سورة الشعراء، جزء من الآية 80.

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Appendices

Appendix – A: Panel of experts.

Appendix – B: Administrative Arrangements.

Appendix – C: Questionnaire in Arabic.

Appendix – D: Questionnaire in English .

خبراء تحكيم استمارة الاستبيان

ت	اسم الخبير	اللقب	مكان العمل	الاختصاص الدقيق
1	د. عبد الكريم عبد الله محمود	أستاذ	جامعة الكوفة كلية الطب	طب المجتمع
2	د. نظيرة حسين علوان	أستاذ	كلية الزهراوي الجامعة	تمريض بالغين
3	د. احمد نعمة رجيب	أستاذ	جامعة الكوفة كلية الطب	اختصاص قلبية
4	د. وسام جبار قاسم	أستاذ	جامعة بغداد كلية التمريض	تمريض صحة المجتمع
5	د. سناء حسن	أستاذ	جامعة رابه رين كلية تمريض	تمريض صحة المجتمع
6	د. صافي داخل نوام	أستاذ مساعد	جامعة كربلاء كلية التمريض	تمريض صحة المجتمع
7	د. كرار ناظم الجبري	أستاذ مساعد	جامعة الكوفة كلية الطب	اختصاص باطنية
8	د. سلمان حسين فارس	أستاذ مساعد	جامعة كربلاء كلية تمريض	تمريض صحة المجتمع
9	د. كافي محمد ناصر	أستاذ مساعد	كلية الطوسي الجامعة	تمريض صحة المجتمع
10	د. احمد كريم الطائي	أستاذ مساعد	كلية الزهراوي الجامعة	تمريض صحة مجتمع
11	د. ياسين الطويل	طبيب اختصاص	م. الصدر الطبية	اختصاص قلبية
12	د. محمد جبر الطائي	طبيب اختصاص	وزارة الصحة	طب مجتمع
13	د. احلام كاظم حسين	دكتوراه	وزارة الصحة	تمريض صحة مجتمع

Ministry of Higher Education and Scientific Research
وزارة التعليم العالي والبحث العلمي
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College of Nursing
جامعة بابل
كلية التمريض
لجنة الدراسات العليا

Ref. No. : العدد : ٣٦٥٤
Date: / / التاريخ : ٢٠٢١ / ١١ / ٢٨

الى / مركز النجف الاشرف لجراحة القللب والتداخل القسطاري
م/ تسهيل مهمة

تحية طيبة :

يطيب لنا حسن التواصل معكم ويرجى تفضلكم بتسهيل مهمة طالب الدكتوراه (علاء صبيح محيل صبير) لغرض جمع عينة دراسة الدكتوراه والخاصة بالبحث الموسوم :

فعالية البرنامج التثقيفي باتجاه معارف المرضى حول مخاطر امراض القلب التاجية في مركز في مركز النجف الاشرف لجراحة القلب والتداخل القسطاري.

Effectiveness of Educational Program on Konwlede Regarding Risk Factors among Patients with Coronary Heart Disease at AL-Najaf Center for Cardiac Surgery and Trans Catheter Therapy.

مع الاحترام ...

المرافقات //
- بروتوكول .
- استبانة .

ا.م.د نهاد محمد قاسم
معاون العميد للشؤون العلمية والدراسات العليا
٢٠٢١/١١/٢٨

صورة عنه الى //
- مكتب السيد العميد للتفضل بالاطلاع مع الاحترام .
- لجنة الدراسات العليا مع الاوليات
- الصادرة .

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Republic of Iraq
ministry of health
najafhelth directorate
AL Najaf Center for Cardiac Surgery and Trans Catheter Therapy

جمهورية العراق
وزارة الصحه
مركز النجف
لجراحة القلب
والتداخل القسطاري

NCC S TCT

العدد/ ١٦٣٩
التاريخ/ ٢٠٢١/١٢/١٥

No.:
date:
مركز النجف لجراحة القلب والتداخل القسطاري
وحدة الادارة
الصادرة

إلى/جامعة بابل /كلية التمريض

م/عدم ممانعة

تحية طيبة:-
كتابكم ذي العدد ٣٦٥٤ بتاريخ ٢٠٢٢/١١/٢٨ والمتضمن تسهيل مهمة طالب الدكتوراة السيد (علاء صبيح محيل) في جمع عينة بحث دراسة الدكتوراة نود اعلامكم بعدم الممانعة من تسهيل مهمة الموما في جمع عينات البحث للتفضل بالاطلاع مع الاحترام

د. خالد ابراهيم عنبر
مدير مركز النجف لجراحة القلب والتداخل القسطاري

الدكتـــور
خـــالد ابراهيم عنبر
مدير المـــركز
٢٠٢١/ ١٢/

نسخة منه الى/
القانونية
الاضبارة الشخصية

Ministry of Higher Education and Scientific Research
University of Babylon
college of Basic Education
جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة بابل
كلية التربية الاساسية

Ref. No.: العدد: ٥٤٤٤

Date: / / التاريخ: ١٥/٥/٢٠٢٢

كلية التربية الاساسية
شعبة الموارد البشرية
الصادرة

الى/ جامعة بابل/ كلية التمريض _ وحدة الدراسات العليا

م/ تقويم لغوي

نهديكم أطيب التحيات ...

كتابكم ذو العدد ١٦٦٩ في ٢٠٢٢/٤/٢١، نعيد اليكم اطروحة طالب الدراسات العليا/ الدكتوراه (**علاء صبيح محيل صبير**) والموسومة بـ (**برنامج تثقيفي فعال حول معرفة المرضى فيما يتعلق بعوامل خطر الاصابة بأمراض القلب التاجية في مركز النجف لجراحة القلب و التدخل القسطاري**) بعد تقويمها لغوياً واسلوبياً من (**ا.م.د. هديل عزيز محمد رضا**) وهي صالحة للمناقشة بعد الاخذ بالملاحظات المثبتة على متنها.

للتفضل بالتسلم ... مع الاحترام

المرافقات //

- اطروحة دكتوراه.
- إقرار المقوم اللغوي.

٥/١٥

أ.د. علي عبد الفتاح الحاج وهود
عميد كلية التربية الاساسية في جامعة بابل

أ.د. فراس سليم حياوي
معاون العميد للشؤون العلمية
٢٠٢٢/٥/

نسخة منه الى //

- مكتب السيد العميد المحترم ...للتفضل بالاطلاع مع الاحترام.
- ا.م.د. هديل عزيز محمد رضا... للعلم لطفاً.
- الشؤون العلمية
- الصادرة

ريام

STARS RATED FOR EXCELLENCE

Questionnaires

Part I: Socio-demographic Characteristics

Not: Please insert (✓) in the appropriate box:

1. Gender: 1-1**:** Male ☐ 1-2: Female ☐

2. Age (Years): ☐

3. Marital Status:

3-1: Single ☐ 3-2: Married ☐

3-3: Divorced ☐ 3-4: Separated ☐

3-5: Widowed ☐

4. Socioeconomic Status:

4-1: Education:

4-1-1: Primary school certificate ☐ 4-1-2: Middle school certificate ☐

4-1-3: High school certificate ☐ 4-1-4: Diploma ☐

4-1-5: Graduate ☐ 4-1-6 Post graduate ☐

4-2: Occupation:

4-2-1: Employed ☐ 4-2-2: Self-employed ☐

4-2-3: Retired ☐ 4-2-4: Housewife ☐

4-3: Monthly Income:

4-3-1: More than 900,000 ID ☐ 4-3-2: 601,000-900,000 ID ☐

4-3-3: 301,000 ID- 600,000 ID ☐ 4-3-4: Less than 300,000 ID ☐

5. Place of Residence:

5-1: Urban ☐ 5-2: Rural ☐

Part 2: Clinical information

1- Weight ☐. KG \ Height .☐CM \ BMI….☐

2- BMI

2-1 Normal ☐ 2-2 underweight ☐

2-3Obeys ☐ 2-4over Weight ☐

3- Smoking: - yes ….. ☐ No ……☐

4- Alcoholism:- yes …..☐ No------☐

Part 2: Patients knowledge about risk factor of coronary heart disease at Al-Najaf center for cardiac surgery and Tran's catheter therapy.

No	Items	I don't know	I know
1	A person always knows when they have CHD		
2	If you have a family history of CHD. You are at risk of developing heart disease		
3	Smoking is a risk factor for CHD		
4	The older a person is, the greater their risk of developing CHD		
5	A person who stops smoking will lower their risk of developing CHD		
6	High blood pressure is a risk factor for developing CHD		
7	Keeping blood pressure under control will reduce a person's risk for developing CHD		
8	High cholesterol is a risk developing CHD		
9	If your good cholesterol (HDL) is high, you are at risk for heart disease		
10	If your bad cholesterol (LDL) is high, you are a risk for heart disease		
11	Eating fatty foods does affect blood cholesterol levels		
12	Being overweight increase a person's risk of CHD		

13	Regular physical activity will lower the risk of developing heart disease		
14	Only exercising at a gym in an exercise class lowers the risk of developing heart disease		
15	Walking and gardening are considered exercise that will help lower the risk of developing heart disease		
16	Diabetes is a risk factor for developing CHD		
17	High blood sugar makes the heart work harder		
18	A person who has diabetes can reduce their risk of developing CHD if they keep their blood sugar level under control		
19	Abdominal obesity is a risk factor for developing CHD		
20	Stress may cause an increase in blood sugar , blood pressure and cholesterol level.		
21	Slow deep breath, counting to 10 before speaking and going for walk are examples of stress inhibitors		

Thank you for your help....

الجزء الأول: المعلومات الديموغرافية

ملاحظة : نرجو وضع علامة (✓) أمام الإجابة المناسبة لكل فقرة

1.نوع الجنس: **1-1: ذكر** ☐
1-2: أنثى ☐

2.المرحلة العمريه: ☐

3.الحالة الزواجية:

3-1: أعزب/ عذراء ☐ 3-2: متزوج/ ــة ☐

3-3: مطلق/ ــة ☐ 3-4: أرمل/ ــة ☐

3-5: منفصل/ ــة ☐

4.الحالة الاقتصادية:

4-1: الحالة التعليمية (التحصيل الدراسي):

4-1-1: خريج الدراسة الابتدائية ☐ 4-1-2: خريج الدراسة المتوسطة ☐

4-1-3: خريجالدراسة الإعدادية ☐ 4-1-4: حاصل علىشهادة الدبلوم ☐

4-1-5:خريج الدراسة الجامعية ☐ 4-1-6: الدراســـات العليا ☐

4-2: المهنة:

4-2-1: موظف/ ــة ☐ 4-2-2: عمل خاص ☐

4-2-3: متقاعد/ ــة ☐ 4-2-4: ربة بيت ☐

4-3: الدخل الشهري:

4-3-1: أكثر من 900 ألف دينار ☐ **4-3-2:** من **601** –900 ألف دينار ☐

4-3-3: من301 –600ألف دينار ☐ **4-3-4**: اقل من300 ألف دينار ☐

5. موقع السكن:

5-1: حضر ☐ 5-2: ريف ☐

الجزء الثاني:المعلومات السريرية

1-الوزن: ☐ كغم / الطول: ☐ سم / معدل الوزن: ☐

2-معدل الوزن**:**

2-1:طبيعي ☐ 2-2: ضعيف ☐

2-3: سمين: ☐ 2-4: سمنه زائدة ☐

3- التدخين:

نعم: ☐ كلا: ☐

4- الكحول:

نعم: ☐ كلا: ☐

الجزء الثالث: قياس مستوى معرفة المريض فيما يتعلق بعوامل الخطورة لإمراض القلب التاجية

نود أن نسألك مستوى معرفتك فيما يتعلق بعوامل الخطورة لإمراض القلب التاجية من

خلال أفضل وصف لك ككل. يرجى وضع علامة (✓) في المربع الذي تراه مناسبا لإجابتك:

1. يرجى تأشير إلى أي مدى توافق أو لا توافق لكل من الأسئلة التالية:
ضع علامة (✓) في المربع المناسب لإجابتك:

ت	الفقـــــــــــرات	لا اعلم	اعلم
1	هل يعرف الشخص دائما متى يكون مصاب بإمراض القلب التاجية		
2	هل كان لديك تاريخ عائلي من إمراض القلب التاجية		
3	التدخين عامل خطورة للاصابة بإمراض القلب التاجية		
4	كلما كان الشخص اكبر عمر زاد خطر للإصابة بإمراض القلب التاجية		
5	الشخص الذي يتوقف عن التدخين سوف يقلل من الإصابة بإمراض القلب التاجية		
6	ارتفاع ضغط الدم هو عامل خطر للإصابة بإمراض القلب التاجية		
7	الحفاظ على ضغط الدم تحت السيطرة سوف يقلل من الإصابة بإمراض القلب التاجية		
8	ارتفاع الكولسترول هو عامل خطر الإصابة بإمراض القلب التاجية		
9	إذا كان مستوى الكولسترول الجيد لديك مرتفع فأنت معرض للإصابة بإمراض القلب التاجية		
10	إذا كان مستوى الكولسترول السيئ لديك مرتفع فأنت معرض للإصابة بإمراض القلب التاجية		
11	تناول الأطعمة الدهنية يوثر على مستوى كولسترول الدم		
12	زيادة الوزن تزيد من خطر الإصابة بإمراض القلب التاجية		
13	النشاط البدني المنتظم سوف يقلل من خطر الإصابة بإمراض القلب التاجية		
14	ممارسة الرياضة في الصالات الألعاب الرياضية سوف يقلل		

	من الإصابة بإمراض القلب التاجية		
15	يعتبر المشي من التمارين التي تساعد على تقليل الإصابة بإمراض القلب التاجية		
16	مرض السكري هو عامل خطر الإصابة بإمراض القلب التاجية		
17	ارتفاع نسبة السكر في الدم يجعل القلب أكثر إجهاد		
18	ممكن للشخص المصاب بمرض السكري إن يقلل من خطر الإصابة بإمراض القلب التاجية إن سيطر على مستوى السكر		
19	السمنة ي منطق البطن هي عامل خطورة للإصابة بالأمراض القلب التاجية		
20	التوتر قد يؤدي إلى ارتفاع نسبة السكر في الدم وضغط الدم ونسبة الكولسترول في الدم		
21	التنفس العميق الهادئ والعد حتى الرقم 10 قبل التحدث والذهاب للمشي هي أمثلة على التخلص من التوتر		

خلاصة

ان امراض القلب التاجي (CHD) سببًا مهمًا للوفاة في جميع أنحاء العالم. قد يكون لمرض القلب التاجي أكثر من سبب، بما في ذلك تراكم اللويحات أو المشكلات التي تؤثر على كيفية عمل الأوعية الدموية في القلب. يرتفع خطر إصابتك بمرض القلب التاجي بناءً على عدد عوامل الخطر لديك ومدى خطورتها. يمكن تغيير بعض عوامل الخطر - مثل ارتفاع ضغط الدم وارتفاع نسبة الكوليسترول في الدم - من خلال تغييرات نمط الحياة الصحية للقلب. وهناك عوامل خطر اخرى لا يمكن تغييرها، مثل الجنس، والعمر الأكبر سنًا، والتاريخ العائلي، والعرق. وقد أظهر الباحثون انخفاضًا في عوامل خطر الإصابة بأمراض القلب التاجية، على سبيل المثال، ارتفاع النبض، وارتفاع مستويات الدهون، والوفرة من حجم الجسم، يمكن أن يؤدي غياب السجائر أيضًا عن النشاط إلى تقليل معدل الوفيات بأمراض القلب التاجية بحوالي 40-60٪.

اجريت دراسة شبه تجريبية يتكون من تقييمين (قبل البرنامج، وبعد البرنامج) للدراسة وكذلك للمجموعة الضابطة. تم إجراء الدراسة خلال الفترة من (23 ديسمبر 2020 إلى 4 ابريل 2022) من خلال تطبيق برنامج تعليمي حول معرفة المريض بعوامل خطر الإصابة بأمراض القلب التاجية في مركز النجف لجراحة القلب والتداخل القسطاري في مدينة النجف الأشرف. تم اختيار عينة هادفة غير احتمالية للمريض الذي تمت مراجعته لمركز النجف لجراحة القلب والقسطرة التداخلية، وتتكون العينة من 72 مريضا يحضرون جدول العلاج الدوري في مركز النجف لجراحة القلب والتدخل القسطرة، والذين سبق أن تم تشخيص إصابتهم بمرض الشريان التاجي، ويخضعون للعلاج والمتابعة المستمرة من قبل الطاقم الطبي والتمريضي في المركز. تم اختيار 10 من هؤلاء المرضى لتقييم احتياجات المريض لهذا البرنامج. واختيار 10 مرضى آخرين للعمل في دراسة تجريبية. بينما تم تكليف 48 مريضا يتلقون العلاج في النجف الاشرف المشاركة في عينة من عينة التجربة من قسمين: الضابطة التي تضم 24 مشاركًا (فئة التحكم) والتجريبية التي تضم 24 مشاركًا (فئة تجريبية) أيضًا و4 عينات تم استبعاد باقي المرضى على النحو التالي، رفض اثنان من الأفراد المشاركة في البرنامج، واثنان لم يكملوه. ثم كانت عينة الدراسة النهائية وأكملت جميع خطوات البرنامج التعليمي 24 عينة من مجموعة تجريبية و24 عينة من مجموعة ضابطة وتم الانتهاء من عملية المشاركة. يتم اختيار العينة وفقًا للخاصية المحددة التي تحدد مجتمع الدراسة من خلال المعايير التالية. غالبية المرضى المشاركين في البرنامج كانوا من الذكور، حوالي 70.8٪. يتراوح متوسط عمر المرضى المشاركين بين (الشباب وكبار السن)، وكانت أعلى نسبة من المشاركين متزوجين، ومعظم المشاركين في الدراسة لم يكن مدخنين 70٪. غالبية المشاركين في الدراسة لديهم معرفة منخفضة حول عوامل الخطر لأمراض القلب التاجية

قبل الاختبار القبلي. كان للبرنامج بعد تطبيقه أثر واضح في تحسين معرفة المرضى بعوامل الخطر لأمراض القلب التاجية، وهذا ما رأيناه في النتائج بعد تطبيق البرنامج واختبارها لاحقًا. بعد البرنامج، زادت المعرفة إلى 91.7 ٪ في مجموعة الدراسة بينما لا يزال دون تغيير في المجموعة الضابطة، مع وجود فرق كبير بين المجموعتين.

ومن التوصيات التي يمكن اعطاءها ورش عمل وندوات خاصة لمرضى القلب بشكل عام وامراض القلب التاجية بشكل خاص وتوضيح كامل لعوامل الخطورة لهذه الامراض. إرشاد مرضى الشريان التاجي للقلب من خلال الاعتماد على أنفسهم في أبعاد المخاطر من خلال زيادة المعرفة بتلك المخاطر التي يمكن السيطرة عليها.

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة بابل- كلية التمريض

فاعلية برنامج تعليمي على معارف المرضى فيما يتعلق بعوامل الخطر لأمراض القلب التاجية في مركز النجف لجراحة القلب والتداخل القسطاري

أطروحة مقدمة الى

مجلس كلية التمريض جامعة بابل

من قبل

علاء صبيح محيل الخزعلي

كجزء من متطلبات نيل

درجة الدكتوراه فلسفة في علوم التمريض

بأشراف

أ. د. امين عجيل الياسر

رمضان 1443 هجرية **ابريل 2022 ميلادية**