Epidemiology of Acute Coronary Syndrome in Azadi Teaching Hospital in Kirkuk Governorate

*Sunbul Adnan Mohammed Baqir, **Suzan Nooraldeen Ibrahim, ***Jameel Ibrahim Azeez

*Department of Family Medicine, Azadi Teaching Hospital, Kirkuk, Iraq

** Department of Medicine, Azadi Teaching Hospital, Kirkuk, Iraq

*** Department of Pediatrics, Azadi Teaching Hospital, Kirkuk, Iraq

Abstract:

Background: Coronary heart disease (CHD), the principal manifestation of cardiovascular diseases, is the leading cause of morbidity and mortality worldwide. The World Health Organization (WHO) predicts that by 2020, CHD will become the world's most important cause of death, disability and premature death. The major factors are an elevated cholesterol level, hypertension, smoking, genetic factors, a sedentary lifestyle, obesity, and diabetes; and the risk increase with age. Adequate control and well awareness of cardiovascular disease risk factors and health habits are important for preventing CHD.
Objective: 1- To make a change of morbidity of CHD by education.
2- To evaluate the health-related quality of life in development of ACS.
Patients and Methods: A hospital based case-control study was conducted in the Coronary Care Unit (CCU), which is located in Kirkuk (Azadi Teaching Hospital); from March 2017 to September 2017. The study included 180 cases of coronary heart disease and 180 age and sex matched controls. All the participants were interviewed with special questionnaire form. In addition, the weight and height were measured and the fasting lipid profile was sent to the laboratory of same hospital for all participants. Statistical Package for Social Science (SPSS) version 20.0 was used for data analysis.
Results: The males accounts two third of cases, 112(62.2%) in comparison to females 68(37.8 %); 63(35 %) of the cases were in the age group (70-79) years. About (54.7%) of all participants were unemployed, (68.3%) had low education and (38.3%) with low income. The study showed a statistical significant association between the following risk factors and educational level: hypertension, diabetes, dyslipidemia, economic level, occupation, and alcohol consumption.
Conclusion: Overall there is a significant relation between educational level and risk of developing CHD. The prevalence of CHD was more common in age group (≥ 60) years and the males were more likely to be affected; hypertension is the most prevalent risk and then diabetes mellitus, occupation respectively.
Keywords: Coronary heart diseases, Myocardial infarction, Kirkuk governorate.

Introduction:

Cardiovascular disease (CVD) is a group of diseases that include both the heart and blood vessels [(1)]. Thereby including coronary heart disease (CHD) and coronary artery disease (CAD), and acute coronary syndrome (ACS) among several other conditions. Although health professionals frequently use both terms CAD and ACS interchangeably, as well as CHD, they are not the same. ACS is a subcategory of CAD, whilst CHD results of CAD. On the other hand, CAD is characterized by atherosclerosis in coronary arteries and

can be asymptomatic, whereas ACS almost always presents with a symptom, such as unstable angina, and is frequently associated with myocardial infarction (MI) regardless of the presence of CAD [2]. Finally, CAD is usually used to refer to the pathologic process affecting the coronary arteries (usually atherosclerosis) whilst CHD includes the diagnoses of angina pectoris, MI and silent myocardial ischemia [3]. In turn, CHD mortality results from CAD. For simplicity purposes, herein we will refer to CAD as CHD. Indeed, the development of novel and more sensitive immunoassays (i.e., defined as "high-sensitivity") for measuring cardiac troponins has contributed to substantially revised this classification, wherein the spectrum of clinical conditions previously defined as "unstable angina" has now been progressively reclassified as either non-MI (non-Myocardial infarction) or MI (myocardial infarction) [4]. Although the mortality for this condition has gradually declined over the last decades in western countries, it still causes about one-third of all deaths in people older than 35 years [5]. The list of non-communicable diseases is becoming larger and more complex. Rapid globalization, urbanization, ageing of society, and an increase in chronic diseases pose new challenges to modern health care systems [6, 7]. (loss of traditional diet habits in new-industrial cultures) are leading to an increase of prevalence in most countries [8]. Further, social inequalities increase CVD-mortality [8, 9] and negative lifestyle influences such as increased physical inactivity in more "obesogenic" environment [9]. The 2016 Heart Disease and Stroke Statistics update of the American Heart Association (AHA) has recently reported that 15.5 million person's ≥20 years of age in the United States of America (USA) have CHD [10]. Although the absolute numbers of CVD deaths have significantly increased since the 1990, the age-standardized death rate has decreased by (22%) over the same period, primarily due to a shift in age demographics and causes of death worldwide [11]. Given the progression of atherosclerosis over decades, patients are typically asymptomatic for years in spite of the evidence of CHD. Despite lack of symptoms, the presence and extent of non-obstructive CHD are associated with a worse prognosis compared with patients with no evidence of CHD [12, 13]. In a retrospective cohort study of 37,674USA veterans (96% male) without prior CHD events who underwent coronary angiography between October 2007 and September 2012 and were followed for one year, the risk of MI increased significantly and progressively in parallel with the extent of both non-obstructive (at least one stenosis ≥20% but <70%) and obstructive CHD (at least one stenosis ≥70%) [12]. Compared with patients without CHD, the risk of MI trended higher for patients with one vessel non-obstructive CHD [hazard ratio (HR) 2.0; (95%) CI: 0.8–5.1] and was significantly greater for patients with non-obstructive CHD involving two (HR 4.6; 95% CI: 2.0–10.5) or three heart vessels (HR 4.5; 95% CI: 1.6–12.5). Finally, patients with non-obstructive CHD should be considered for usual secondary prevention measures [14]. Although many cases of MI appear to occur without warning, there is a large reservoir of detectable advanced silent CHD from which these apparently sudden events evolve. Such patients

frequently have an ominous coronary risk profile and signs of pre-symptomatic CHD. Approximately (2-4%) of the general population has silent coronary ischemia which despite being an asymptomatic condition can be actually detected with an exercise test or ambulatory electrocardiography (ECG) monitoring. The prevalence of this condition might be considerable higher in men with two or more major coronary risk factors (10%), and especially in patients with known CHD, e.g., (25-50%) in those with stable angina detected through exercise testing or ambulatory monitoring [15].

Objectives:

The aim of this study is:

1- To make a change of morbidity of CHD by education.

2- To evaluate the health-related quality of life in development of ACS.

Patients and methods:

Study setting:

The study participates education level was classified in to four groups, group I included those who cannot read or write, group II those with low education (< 6year), group III medium education (6 year < education<12 year) and group VI high education (>12 year). For statistical purposes, the illiterate's participants and those with < 6 year of formal education were considered one category, while those with 7-12 and >12 years were another category. Financial level, the average annual income for single Iraqi subject according to ministry of planning was defined as low (<729 $); moderate (729$-4000$); good (4000$-8000$); very good (>8000$). The income measure used, adjusted household income, is defined as total household income divided by the square root of the number of individuals in each quartile: low income (0-24%); low middle income (25-49%); high middle income (50-75%); high income (75-100%). Alcohol consumption was categorized as nil and yes, regarding those answer yes; the recommended safe limit per week for alcohol are 21 units for men and 14 for women. The study was carried out in CCU in Azadi Teaching Hospital which is located in Kirkuk city/ Iraq. It is receiving patients from all parts of Kirkuk governorate and seen by physician.

Study design:

A prospective hospital based case-control study was conducted during March 2017 to September 2017.

Sampling:

A sample of 360 participants enrolled in the study, 180 cases of coronary heart disease and 180 control individuals, permission were obtained from administrative authorities of hospital. The cases were coronary heart disease patients admitted to coronary care unit, who fulfilled the criteria of World Health Organization (W.H.O.) and American heart association (A.H.A.) for diagnosis of Acute coronary syndrome (A.C.S.), these criteria included two of the following three conditions: ischemic symptoms, electrocardiography (ECG) changes consistent with ischemia and elevated enzyme levels. According to these criteria the ST-elevation myocardial infarction (STEMI) patients are those who present with acute chest pain, persist >20 minutes, ST elevation in the ECGs, rise in troponin level within the 4th hours after symptoms onset and remain elevated for up to two weeks, on the Non ST-elevation myocardial infarction (NSTEMI) or unstable angina group of patients have chest pain but without persist ST

segment elevation in the ECGs, minimal troponin level elevation and usually resolves within 48-72 hours, those patients have rather persistent or transient ST segment depression, T wave inversion or flat T wave, angina at rest within 48 hours.

Exclusion criteria:

-Severely ill patients who could not participate.
-Coronary patients, who died at entry or the day after.
- Stable angina.

The controls subject were patients without any clinical symptoms or prior hospitalization for cardiovascular diseases in their medical history; and they mach the coronary patients by gender and ages (± 5 years). The control subjects were selected from surgical wards (General surgery, orthopedic and urology) of same hospital; data collected from the controls were similar to those collected from cases. Two sample of questionnaire (one for cases and the other for control) was designed by researcher, revised and approved by supervisor, after explanation of the aims of the study and content of the questionnaire to the participant; verbal consent was taken and they were interview in details about socio-demographical information such as age, gender, residency, years of formal education, occupation and household income, medical histories regarded diabetes mellitus and hypertension, information regarding the smoking status, alcohol intake, physical activity, Body mass index (BMI), and nutritional habits. The subjects were classified as hypertensive or diabetes mellitus according to the previous laboratory measurement, as well as any special treatment or information retrieved from their medical records.

Results:

A total of 360 participants were involved in this study, (180 cases, and 180 controls) with a mean ± SD of 62±14 years ranging from 25 to 95 years. The tables (1, 2) shows that the males account 112(62.2 %) of the total cases admitted to the Kirkuk center of CHD in comparison to female cases 68(37.8 %). The highest prevalence of IHD in the cases sample 63(35%), was in the age group (70-79) years.

The males and females account 102(56.7%), 78(43.3%) respectively, in control groups.

The ratio of male to female age specific incidence rate decrease with advancing of age from (6:1) in age group< 45 to (1.41:1) in age group ≥ 60; and the total male to female ratio in all ages is (1.64:1). The mean age for cases was (64) year, and for controls (60) year. There was no significant difference in the age and gender between the participants, because the matching was done for cases and controls by gender and age (± 5).

Table (3) shows some socio-demographic characteristics of study population (education level, occupation, income, household income); the largest proportion of cases and controls were within the group I education; 140(77.8%), 106(58.9%) respectively, and only 21 (11.7%) of cases and 36(20%) of controls were of institute, university or high education. Regarding occupation 197(54.7%) of all participants were housewives or out of work, and only 65(18%) of them were employers; 103(52.3%) of un- employer participants were within cases and 42(64.6%) of employer's participant

were within controls. Two third of the coronary patients had low-moderate income 166(92.2%) while more than half of control individual had low-moderate income 132(73.3%) and 48(26.7%) had good-very good.

Table (4) shows the risk factors distribution for cases and controls: ***smoking status:*** 56(31.1%) of cases were smokers compared with 42(23.3%) of controls; regarding the number of cigarette smoked/ day, 17(9.4%) of cases had high exposure; while only four (2.2%) of controls had high exposure.

Alcohol intake: Among all of the participants only nine were alcohol drinker (three (1.7%) cases, and six (3.3%); three (33.3%) of total nine were with high intake. ***Diabetes mellitus:*** Over all prevalence of diabetes among cases were 56(31.1%), if compared with that of controls 24(13.3%). 45(25%); and 17(9.4%) of cases and controls respectively used oral hypoglycemic drugs (usual dose).

Hypertension: The prevalence of hypertension among cases was 78(43.3%) of total number of cases, while only 24(13.3%) among control. The large proportion of IHD patients and control subjects were receiving antihypertensive drugs.

Dyslipidemia: Most of IHD patients 102(56.7%) were belonging to dyslipidimic group, in compare to 78(43.3%) of controls.

Mediterranean diet: 72(40%) of the patients, and 93(51.7%) of controls were low adherence to healthy diet; and only 35(19.4%), 18(10%) respectively were had information about Mediterranean diet (low fat, high in fruits and vegetables, fish, nuts, cereals and little red meat.

Physical activity: Nearly 301(83.6%) of participial were physically inactive, 22(6.1%) of all participants were doing light irregular exercise.

BMI: The current study results show that 104(57.8%) of cases were overweight or obese (BMI≥25), which was near to control groups 108(60%).

Table (5), illustrates the distribution of study groups according to some demographic characteristics, by education level (occupation, economic status, house hold income); in current study a there was a strong association between economic status and education level for both study groups.

Participants with an academic education in control groups were more likely to be in the upper economic class (good or very good income), 26(14.5%) (P=0.0001); while for coronary patients the larger proportion of their participants (41.7 %) were within the lower economic class (729-4000$), ($P$ =0.0001). In both patient and control groups, education status was significantly related to the occupation level, since unemployment were inversely associated with education level, especially in the coronary group which was 97(53.9%), and 77(42.8%) for control; with P-value (0.0001, and 0.0001) respectively. Adjusted house hold income rates were calculated for cases and controls and stratified by income, educational level and household size, it was lower in case groups that had low education 64(35.4%), while in control groups they were 53(23.4%); there was a significant association between them (p_0,015, 0.0001) respectively.

The distribution of cases and controls according to their health habits by education level are present in the table (6).

Education level was positively related to the current smoking habit in both cases and controls group, they were 40(22.2%); 82(45.6%) respectively in education group I and only 10(5.6%) out of all smokers in education group III; however, when we investigated the differences in the pattern of smoking (pack-year) in cases, 11(6.1%) had highly exposure in group I education and three (1.7%) in both group II, III education, compared with three (1.7%) among controls in group I education, only one participant in group II and no one reported in heavy exposure; there was a statistical significant association between cases (p_0.02), while in the control groups no significant association (p_0.114). Regarding alcohol, six (3.3%) of male controls were alcohol drinker while only three (1.7%) of cases were alcohol drinker; the amount of drinking units/ week was different between cases and controls, one (0.6%) of cases was heavy drinker who was within group II education compared with two (1.1%) heavy drinker among controls, one of them was in group I and the other in group III education, the control group was not achieved statistical significance ($p = 0.382$), inversing the cases group ($p = 0.002$). IHD prevalence was highest among those with low-medium adherence to Mediterranean diet 61(33.9%), 51(28.3%); respectively and they were within group I education followed by lesser between high adherence; while for control participants 60(33.3%) with low adherence and they were within group I education, 35(19.4%), 11(6.1%) respectively had medium–high adherence, however, these variation are not significant, ($p = 0.16,\ 0.39$). Appositive association between physical inactivity and education was also observed in both study participants155(72.8%), 146(53.9%) of cases and controls respectively had sedentary life style and the highest rate being reported in group I education; followed by group II education. The differences between them are statistically significant (p_0.0001, 0.0001) respectively. Educational status association with prevalence of hypertension, diabetes and dyslipidemia, these data present in table (7); as sixty three (35%) of cases were hypertension; and only17(9.4%) of controls had hypertension, they were within group I education; number of cases with diabetes were 43(43.3%), while number of controls 18(13.3%), eighty one (45%) patients have dyslipidemia compared to 52(28.9%) individual among the controls; the differences neither between cases nor controls for association between education and medical history were significant although a higher rates were reported among unschooled and illiterates. The different modes of therapy for hypertension were directly not related to education level of coronary patients; this association was even stronger for the control participants.

Dietary restriction and life style modification: cases (11; 6.1%); controls (3; 1.7%).

Anti-hypertensive drugs (usual doses): cases (66; 36.7%); controls (20; 11.1%).

Non compliances: cases (1; 0.6%); controls (1; 0.6%).

While for diabetes therapy:

Dietary restriction and life style modification: cases (3; 1.7%); controls (3; 1.7%).

Oral hypoglycemic drugs (usual dose): cases (45; 25%); controls (17; 9.4%).

Insulin: cases (3; 1.7%); controls (3; 1.7%).

Noncompliance: cases (5; 2.8%); controls (1; 0.6%); and 53 (29.4%), of cases receiving therapy for lowering lipid compared to 29(16.1%) of control group.

Table (1): Age-sex distribution of study population.

Age group (years)	Cases				Control			
	Male	%	Female	%	Male	%	Female	%
< 29	1	0.6	0	0.0	1	0.6	2	1.1
30-39	3	1.7	1	0.6	7	3.9	6	3.3
40-49	20	11.1	4	2.2	18	10.0	8	4.4
50-59	16	8.9	12	6.7	20	11.1	10	5.6
60-69	25	13.9	13	7.2	24	13.3	21	11.7
70-79	37	20.6	26	14.4	25	13.9	24	13.3
80-89	9	5.0	11	6.1	6	3.3	6	3.3
≥ 90	1	0.6	1	0.6	1	0.6	1	0.6
Total	112	62.2	68	37.8	102	56.7	78	43.3

Table (2): Distribution of CHD cases by age and sex:

Age group	< 45	45-59	60≤	Total
Male	12	28	72	112
Female	2	15	51	68
Male: female ratio	6:1	1.87:1	1.41:1	1.64:1

Table (3): Socio- demographic characteristics of the participants.

Variable	Cases(n=180)		Controls(n=180)	
	No.	%	No.	%
Education				
Group I	140	77.8	106	58.9
Group II	19	10.5	38	21.1
Group III	21	11.7	36	20
Occupation				
Employer	23	12.8	42	23.3
Self-employer	28	15.6	33	18.3
Retired	26	14.4	11	6.1
Un-employer	103	57.2	94	52.2
Income				
Low	75	41.7	63	35
Moderate	91	50.6	69	38.3
Good	12	6.7	43	23.9
Very good	02	1.1	05	2.8
House hold income				
Low income	75	41.7	64	35.6
High income	105	58.3	116	64.4

Table (4a): Distribution of risk factors for study population.

Variable	Cases (n=180)		Controls (n=180)	
	No.	%	No.	%
Smoking				
Non-smokers	124	68.9	138	76.7
Smokers (pack/year)				
Low exposure	39	21.7	38	21.1
High exposure	17	9.4	04	2.2
Alcohol				
Non-alcoholic	177	98.3	174	96.7
alcoholic (unit/week)				
< 21 u /wk	02	1.1	04	2.2
≥ 21 u /wk	01	0.6	02	1.1
Diabetes mellitus				
Non-diabetics	124	68.9	156	86.7
Diabetic				
Drugs	45	25	17	9.4
Insulin	03	1.7	03	1.7
lifestyle modification	03	1.7	03	1.7
Non-compliance	05	2.8	01	0.6
Hypertension				
Non-hypertension	102	56.7	156	86.7
Hypertension				
Drugs	66	36.7	20	11.1
Lifestyle modification	11	6.1	03	1.7
Non-compliance	01	0.6	01	0.6
Dislipidemia				
Non-dislipidemic	78	43.3	102	56.7
Dislipidemic	102	56.7	78	43.3
Mediterranean diet (high in fruits, vegetables, fish, with little red meat)				
Low adherence	72	40	93	51.7
Medium adherence	73	40.6	69	38.3
High adherence	35	19.4	18	10

Table (4b): Distribution of risk factors for study population (Continued).

Variable	Cases (n=180)		Controls (n=180)	
	No.	%	No.	%
Physical activity				
Physically inactive	155	86.1	146	81.1
Physically active	25	13.9	34	18.9
BMI				
Normal	161	89.4	153	85
≥ 25	19	10.6	27	15

Table (5): Distribution of demographic characteristics of participants, by group of educational level.

Demographic Factors	Cases n=180			*p* - value	Controls n=180			*p* - value
	Educational groups				Educational groups			
	I	*II*	*III*		*I*	*II*	*III*	
Occupation								
Employer	5 ; 2.8%	2 ; 1.1%	16;8.9%	0.0001	8 ; 4.4%	6 ; 3.3%	28;15.6 %	0.0001
Self-employer	19;10.6 %	9 ; 5%	0		17 ; 9.4%	16 ; 8.9%	0	
Retired	19;10.6 %	3 ; 1.7%	4 ; 2.2%		4 ; 2.2%	1 ; 0.6%	6 ; 3.3%	
Un-employer	97;53.9 %	5 ; 2.8%	1 ; 0.6%		77;42.8 %	15 ; 8.3%	2 ; 1.1%	
Economic								
Low	64;35.6 %	9 ; 5%	2 ; 1.1%	0.0001	53;29.4 %	9 ; 5%	1; 0.6%	0.0001
Moderate	69;38.3 %	10;5.6 %	12;6.7%		41;22.8 %	19;10.6 %	9;5%	
good	7 ; 3.9%	0	5 ; 2.8%		12 ; 6.7%	10 ; 5.6%	21;11.7 %	
Very good	0	0	2 ; 1.1%		0	0	5;2.8%	
Household income								
Low income	64;35.6 %	9 ; 5%	2 ;1.1%	0.015	53;29.4 %	10;5.6%	1;0.6%	0.0001
High income	76;42.2 %	10;5.6 %	19;10.6 %		53;29.4 %	28;15.6 %	35;19.4 %	

Table (6): Distribution of health habits of participants, by group of educational level.

Health Habits	Cases n=180			ρ - value	Controls n=180			ρ - value
	Educational groups				Educational groups			
	I	*II*	*III*		*I*	*II*	*III*	
Smoking								
Non smokers	100;55.6 %	8;4.4 %	16;8.9 %	0.02	82;45.6 %	25;13.9	31;17.2	0.114
Smokers Low exposure								
High exposure	29;16.1 %	8;4.4 %	2;1.1%		21;11.7 %	12;6.7 %	5;2.8%	
	11;6.1%	3;1.7 %	3;1.7%		3 ;1.7%	1;0.6%	0	0.382
Alcohol								
Non alcoholicAlcoholic	140;77.8	17;9.4 %	20;11.1	0.002	102;56.7 %	38;21.1 %	34;18.9 %	0.394
< 21 u /wk	0	1 ;0.6%	1 ;0.6%		3 ;1.7%	0	1 ;0.6%	
≥ 21 u /wk	0	1 ;0.6%	0		1 ;0.6%	0	1 ;0.6%	
Mediterranean diet adherence								
Low	61;33.9 %	7 ; 3.9%	4;2.2 %	0.165	60;33.3 %	19;10.6 %	14 ; 7.8%	
Medium	51;28.3 %	10;5.6 %	12;6.7 %		35;19.4 %	16;8.9 %	18 ; 10%	
High	28;15.6 %	2 ; 1.1%	5;2.8 %		11 ; 6.1%	3 ; 1.7%	4 ; 2.2%	
Physical activity								
Inactive	131;72.8 %	15;8.3 %	9;5%	0.0001	97;53.9 %	31;17.2 %	18 ; 10%	0.0001
Active	9;5%	4;2.2%	12;6.7 %		9 ; 5%	7 ; 3.9%	18 ; 10%	

Table (7): Distribution of medical history of participants, by group of educational level.

Medical history	Cases n=180			ρ - value	Controls n=180			ρ - value
	Educational groups				Educational groups			
	I	*II*	*III*		*I*	*II*	*III*	
Hypertension								
Yes	63 ; 35%	6 ; 3.3%	9 ; 5%	0.541	17 ; 9.4%	4 ; 2.2%	3 ; 1.7%	0.426
No	77;42.8 %	13;7.2 %	12;6.7 %		89;49.4 %	34;18.9 %	33;18.3 %	0.186
Diabetes				0.970				
Yes	43;23.9	6 ;	7 ;		18 ;	4 ;	2 ;	
No	97;53.9	13;7.2	14;7.8		88;48.9	34;18.9	34;18.9	
Dyslipidemia								
Yes								
No	81 ; 45%	12;6.7 %	9 ; 5%	0.361	52;28.9 %	16 ; 8.9%	10 ; 5.6%	0.083

Discussion:

The study results revealed that cardiovascular events were more common in the age group (70-79) years than in other age groups in both sexes, then it declines; the incidence and prevalence of coronary heart disease was increasing dramatically with advancing age may be due to changes of cardiovascular structure and function [16].

This study is in agreement with the pitsavo CE et al, Waleed MA, Stone PH et al studies, [17, 18, 19] and it was different from Najlaa FJ, Shamoo studies [20, 21] in which the incidence increases until the age of 60 then it begins to decline and common in age group (60-69), while another study reported that IHD was more prevalent in the lower age group (45-59) [16].

The male to female ratio was1.64:1(62.2% of coronary patients was males and 37.8% females) this ratio was near to ratio of Al-Khattabi HA study; [16] and it was different from the results of Stone PH et al study, [20] in which women affected more than men.

The gap between male and female decreases with increasing age starting from 6:1in age group less than 45 to 1.19:1 at age group 65-74; this is similar to almost all studies done before [19, 20].

The mean age of patients in this study was (64) years for males and (61) years for females, which was older than of other study result, (55.6) years for males and (58) years for females [21].

Study in western population has repeatedly found that rates of CHD are higher in lower socioeconomic groups [22]. Statistical significant association was observed in the current study between years of education and prevalence of CHD, as nearly (77.8%) of cases had low education and out of the total coronary heart disease patients

(57.2%) were unemployed and (14.4%) retired, this result coincided with Pitsavo CE et al, Bobak M et al studies worldwide, [17, 22] and differed from Saya HM study [23] in which they founded no significant association in socioeconomic status between cases and controls; these variations in the prevalence of CHD in different countries and within countries might be attributed to the differences in exposure to risk factors, cultural and social habits; variations in age structure of population in sam**.**

Smoking: Is a major preventable cause of premature death and CHD, it estimated that deaths due to smoking are about (20%) in men and (17%) in women [6].

Smokes' risk for developing CHD is 2-4 times more than that of non-smokers; [16, 20] this finding goes in parallel with the result of this study, also in this study participants that had primary education were more likely to be current smokers, this differ from Fong CW et al study done [24] in which patients and controls that had an academic education (group III) were more likely to be current smokers because of the number of cigarette smoked was inversely related to educational level.

Alcohol: Most case control studies all over the world revealed that low to moderate alcohol consumption was associated with reduced mortality, primarily due to a reduction in CHD, as it has been clearly linked to favorable lipid profile especial- ally an increase in HDL and also affected coagulation profile;

In Contrast, heavy drinking substantially increased coronary risk and mortality rates, [17, 19] this result agree with the result of current study; and different from Najlaa FJ, Majeed HJ [20, 25] studies result done may be due to different drinking pattern and lifestyle aspects correlated with drinking e.g. heavy smoking or heavy meals. However, currently advised that regular consumption of between three and four units a day by men and between two and three units a day by women of all ages will not lead to any significant health risk [6, 17].

Diabetes mellitus: The study reported that patients with diabetes were two to four times more liable for cardiovascular disease than non-diabetic; this finding is due to, that people with diabetes are more likely than others to develop additional heart risk factors such as (high blood pressure, obesity, and high cholesterol), induced by hyperglycemia (glucose toxicity), inflammatory and immune mediated mechanism; so that instead of one heart disease risk, they have a collection [6]. (31.1%) of CHD patients were diabetic this prevalence rate was similar to Saya HM, Majeed HJ studies, [23, 25] and unlike the result of Shamoo study [21].

Regarding ***lipid profile***, high serum cholesterol, especially when associated with a low value of HDL, is strongly associated with coronary atheroma. The mean total cholesterol among cases in the present study is 166.84mg/dl. This is considering among lowest mean level obtained in Shamoo, Bobak M et al studies, [21, 22] while it is slightly near to Waleed MA study [18], this relatively low concentration of total cholesterol mean level in this study is partly explained by habitual population diet, and partly by increased awareness about the hard fats or due to treatment.

Conclusion:

1. The overall risk factors, hypertension is the most prevalent risk factors; follows by diabetes.
2. Socioeconomic status (educational level, income, household income, and occupation) was significantly associated with CHD.
3. There is no significant association between BMI, smoking, and physical inactivity and CHD.
4. Poor adherence to Mediterranean diet is observed between participants.
5. Alcohol consumption associated with increased risk for CHD.

References:

[1]. Global Atlas on Cardiovascular Disease Prevention and Control. Geneva: World Health Organization, 2011.

[2]. Lippi G, Sanchis-Gomar F, Cervellin G. Chest pain, dyspnea and other symptoms in patients with type 1 and 2 myocardial infarction. A literature review. Int J Cardiol 2016; 215: 20-2. 10.1016/ j.ijcard.2016.04.045 [PubMed] [Cross Ref].

[3]. Cervellin G, Lippi G. Of MIs and men--a historical perspective on the diagnostics of acute myocardial infarction. SeminThrombHemost 2014; 40: 535-43. 10.1055/ s-0034-1383544 [PubMed] [Cross Ref].

[4]. Cervellin G, Mattiuzzi C, Bovo C, et al. Diagnostic algorithms for acute coronary syndrome-is one better than another? Ann Transl Med 2016; 4:193. 10.21037/atm.2016.05.16 [PMC free article] [PubMed][Cross Ref].

[5]. Nichols M, Townsend N, Scarborough P, et al. Cardiovascular disease in Europe 2014: epidemiological update. Eur Heart J 2014; 35:2929. 10.1093/ eurheartj/ ehu378 [PubMed] [Cross Ref].

[6]. Horton R. Offline: Chronic diseases—the social justice issue of our time. Lancet 2015; 386: 2378 10.1016/S0140-6736(15)01178-2 [Cross Ref].

[7]. Danaei G, Singh GM, Paciorek CJ, et al. The Global Cardiovascular Risk Transition: Associations of Four Metabolic Risk Factors with National Income, Urbanization, and Western Diet in 1980 and 2008.Circulation 2013; 127: 1493-502. 10.1161/ CIRCULATIONAHA.113.001470 [PMC free article] [PubMed][Cross Ref].

[8]. World Health Organisation. World Health Report. 2013. Available online: **http://www.who.int/whr/2013/report/en/**.

[9]. Leischik R, Dworrak B, Strauss M, et al. Plasticity of Health. German Journal of Medicine 2016; 1:1-17.

[10]. Writing Group Members, Mozaffarian D, Benjamin EJ, et al. Executive Summary: Heart Disease and Stroke Statistics--2016 Update: A Report from the American Heart Association. Circulation2016;133:447-54. 10.1161/CIR.0000000000000366 [PubMed] [Cross Ref].

[11]. GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet 2015;385:117-71. 10.1016/S0140-6736(14)61682-2 [PMC free article] [PubMed] [Cross Ref].

[12]. Maddox TM, Stanislawski MA, Grunwald GK, et al. Nonobstructive coronary artery disease and risk of myocardial infarction. JAMA 2014;312:1754-63. 10.1001/jama.2014.14681 [PMC free article][PubMed] [Cross Ref].

[13]. Chow BJ, Small G, Yam Y, et al. Incremental prognostic value of cardiac computed tomography in coronary artery disease using CONFIRM: COroNary computed tomography angiography evaluation for clinical outcomes: an InteRnational Multicenter registry. CircCardiovasc Imaging 2011;4:463-72.

10.1161/CIRCIMAGING.111.964155 [PubMed] [Cross Ref].
[14]. Fleg JL, Forman DE, Berra K, et al. Secondary prevention of atherosclerotic cardiovascular disease in older adults: a scientific statement from the American Heart
Association. Circulation 2013;128:2422-46. 10.1161/01.cir.0000436752.99896.22 [**PMC free article**] [**PubMed**] [**Cross Ref**]
[15]. American Diabetes Association. 8. Cardiovascular Disease and Risk Management. Diabetes Care2016;39 Suppl 1:S60-71. 10.2337/dc16-S011 [**PubMed**] [**Cross Ref**].
[16]. Al-Khattabi HA. Coronary angiographic abnormality in patients suspected of ischemic heart disease: Gender and risk factors differences [FICMS]. Sulaimani. 2000.
[17]. Pitsavo CE, P anagiotakos DB, Chrysohoou A, Skoumas J, StefanadisCh, Toutouzas PK. Education and acute coronary syndromes: results from the CARDIO2000 epidemiological study. Bulletin of the World Health Organization 2002; 80 (5):371-77.
[18]. Waleed MA. Risk factors for CHD in type II diabetes mellitus in Mosul [FICMS]. Sulaimani.1999.
[19]. Stone PH, Thompson B, Anderson HV, Kronenberg MW, Gibson RS, Rogers WJ, et al. Influence of race, sex, and age on management of unstable angina and non-Q-myocardial infarction. JAMA. 1996 Apr; 275(14): 1104-12.
[20]. Najlaa FJ. Risk Factors for Ischemic Heart Disease among Patients Admitted to Coronary Care Unit (CCU) in AL-Hussein Hospital in Karballa [FICMS]. Al-Nahrain College of Medicine. Baghdad. 2010.
[21]. Shamoo. Epidemiological study of acute myocardial infarction [PhD]. Unvirsity of Baghdad. 1986.
[22]. Bobak M, Hertzman C, Skodova Z, Marmot M. Own education, current conditions, parental material circumstances, and risk of myocardialinfarction in a former communist country. J Epidemiol Community Health. 2000; 54:91-96.
[23]. Saya HM. Awareness of Coronary Heart Disease among Patients Attending Ali Kamal Health Center in Sulaimani City [phD thesis]. Sulaimani: Unvirsity of Sulaimani; 2011.
[24].Fong CW, Bhalla V, Heng D, Chua AV, Chan ML, Chew SK. Educational inequalities associated with health-related behaviours in the adult population of Singapore. Singapore Med J 2007; 48(12):1091-98.
[25]. MajeedHJ.Study of risk factors of ischemic heart disease in Sulaimani [PhD]. University of Sulaimani. 2003.