

## Knowledge, Attitude and Practice of coronary heart disease among population in Kirkuk city

Ass. Prof. Dr. Mohammed Ali khalaf<sup>(1)</sup>, Ass. Prof. Dr. Abdullah Adil Raaf<sup>(2)</sup>,  
Dr. Ahmed Ibrahim Shuker<sup>(3)</sup>.

<sup>(1)</sup>Department of Medicine/ College of Medicine / Kikuk University.

<sup>(2)</sup>Department of Medicine/ College of Medicine / Kikuk University.

<sup>(3)</sup>Department of Medicine/Azadi Teaching Hospital.

### ABSTRACT:

**Background:** "Coronary heart disease" (CHD), "also known as coronary artery disease is a narrowing of the blood vessels (coronary arteries) that supply oxygen and blood to the heart". "Coronary heart disease (CHD) is the most common form of heart disease and the single most important cause of premature death in Europe, the Baltic states, Russia, North and South America, Australia and New Zealand. By 2020 it is estimated that it will be the major cause of death in all regions of the world". **Aims of study (objectives):** The aim of this study is to identify the attitude of Kirkuk city people toward CHD, determining their level of knowledge about its symptoms and categorize its risk factors.

**Patients & methods:** This is a cross sectional study done in Kirkuk city based on direct face to face interviews using a questionnaire. This questionnaire was developed by the lead researcher to identify people's knowledge, attitude and practices toward CHD. A total of 375 sample of male and female of different educational level and of age starting from 15 year and above were selected randomly from Puplic Kirkuk hospital, Azadi hospital attainers, patients and visitors.

A cross sectional study depend on direct face to face interviews using a questionnaire, several testes were used to determine the presence of selected factors and what can affect people's knowledge (example: the symptoms of CHD), attitude (by Having CHD risk factor or not) and the practices (what would be the patients choice when he have the attack) of the CHD.

**Results:** of the 375 people sampled, 235 were male and 140 were female. Smoking, hypertension and high blood cholesterol; were the most popular risk factors that most of the patients mentioned it spontaneously. The educational level significantly associated with knowledge and attitude for CHD. Emergency management had significant value. The degree of knowledge about the risk factor of coronary heart disease in comparative way between male and female in Kirkuk city was significant. Knowledge of people about the practice of coronary heart disease is 72%; of this 71% male and 78% female. Percent of knowledge about the practices of coronary heart disease in Kirkuk city by gender was not significant.

**Conclusions and recommendations:** Findings from this study suggest that middle and older aged people in Kirkuk city have only limited knowledge regarding CHD risk factors. Therefore, people living in this City may need even more attention and a resource regarding CHD symptoms, risk factors and treatment options as it is a common cause of mortality.

**Key wards:** "coronary heart disease" (CHD), knowledge, Risk factors, attitude and practice.

## Introduction:

Non-communicable diseases (NCDs) pose increasingly important public health problems in low-income and middle-income countries (LMICs). In 2008, 80% of global NCD deaths occurred in LMICs;1 NCDs recently accounted for 7.9 million of 14.5 million deaths (54%) in Southeast Asia<sup>2</sup> and were responsible for two of every three deaths (34.5 million) worldwide in 2010.<sup>3</sup> Poverty, illiteracy, poor-health infrastructure and demographic transition, including increasing life expectancy, are major contributors to the rising burden of NCDs in LMICs. Other postulated causes include poor fetal and childhood nutrition.<sup>4 5</sup> A similar pattern is evident in South Asian countries like Nepal, where NCDs currently occur more frequently than communicable diseases and behavioural risk factors such as tobacco smoking are high.<sup>6</sup>

Cardiovascular disease (CVD) is the commonest cause of morbidity and mortality with an estimation of 17.3 million deaths worldwide annually<sup>7,8</sup>. According to WHO, "CVD is a group of disorders of heart and blood vessels including coronary heart disease (CHD) & cerebrovascular disease (manifested by stroke and transient ischemic attack)"<sup>9</sup>. CHD alone

accounts for almost half of the total cases of CVD. CVD is considered as a degenerative and progressive disease which originates from early childhood<sup>10</sup>. Hereditary plays an important part in CVD occurrence; however behavior related factors like cigarette smoking, alcohol, obesity, physical inactivity, stress and other unhealthy lifestyle practices can greatly accelerate its development<sup>11</sup>. Early recognition of risk factors of CVD is considered to be an important step in preventing such events<sup>12</sup>. The INTERHEART study has shown that around 90% of first event of heart attack could be prevented through the diet and lifestyle modifications<sup>13</sup>. Studies have been conducted to assess the knowledge of risk factors (modifiable) of CVD among different population groups<sup>14-17</sup>. The findings of such studies could assist in developing the programs aimed to reduce the disease burden. Awareness of the risk factors and the perceived self vulnerability can influence prevention seeking actions<sup>18</sup>. Lack of CVD knowledge could result into inadequate behavioral changes and eventually poor clinical outcomes. So addressing knowledge and perceptions regarding CVD will be helpful in prevention, early diagnosis and management of these disorders.

Eventually, this would provide impetus for improvement of the current and future programs devoted to public education for understanding of CHD.<sup>18</sup>

According to the World Health Organization, Coronary Heart Disease (CHD) is the leading cause of death globally and one of the major health burdens worldwide<sup>19</sup>. "In the UK, 1 in 3 men and 1 in 4 women die from CHD, an estimated 330 000 people have a myocardial infarction each year, and approximately 1.3 million people have angina. The death rates from CHD in the UK are among the highest in Western Europe (more than 140 000 people) but are falling, particularly in younger age groups; in the last 10 years CHD mortality has fallen by 42% among UK men and women aged 16-64. However, in Eastern Europe and much of Asia, the rates of CHD are rapidly rising".<sup>20</sup>

A heart attack commonly occurs when a blood clot develops in one of the coronary arteries. The clot, if it is big enough, can stop the supply of blood to the heart. During a heart attack the patient may experience: Chest discomfort, mild pain, Coughing, Crushing chest pain, Dizziness, Dyspnea (shortness of breath), Face seems gray, A feeling of terror that your life is coming to its

end, Feeling really awful (general feeling), Nausea, Restlessness, The person is clammy and sweaty and Vomiting<sup>21</sup>

A person who is having a heart attack usually feels the pain in his/her chest first. This pain then spreads to the neck, jaw, ears, arms, and wrists. With some patients, the pain also makes its way into the shoulder blades, the back, and the abdomen<sup>24</sup>. The pain does not feel any better if the patient changes position, rests, or lies down. Often it is a constant pain, but it can come and go. Patients describe the pain as one of pressure, something squeezing. The pain can last from a few minutes to many hours<sup>31</sup>. People with diabetes, and/or those over the age of 75 may experience a "silent heart attack". This one occurs with no pain at all<sup>20</sup>.

A heart attack is a medical emergency - it can result in permanent damage to the heart muscle if not treated immediately. Lack of prompt treatment can also result in death. People who think they are having a heart attack should call the emergency services immediately<sup>16-13</sup>. Risk factors for coronary heart disease: Age - as people age their risk of developing narrowed arteries, or having some kind of damage in the arteries is great<sup>25</sup>. Sex - although the risk for women is

still significant, especially after the menopause, males are at greater risk of developing coronary heart disease <sup>26</sup>. Genetics - people who have a parent who developed coronary heart disease before the age of 60 years have a higher risk of developing it themselves, compared to other individuals <sup>26</sup>. Smoking - carbon monoxide, which is present in tobacco smoke, can damage the inner lining of blood vessels, increasing the risk of atherosclerosis. Nicotine constricts the blood vessels (makes them narrower).<sup>27</sup>

A 20-per-day regular female smoker is 6 times as likely to develop coronary heart disease compared to women who have never smoked. Male regular smokers generally are three times as likely to develop the condition compared to male lifetime non-smokers<sup>28</sup>. Uncontrolled hypertension (high blood pressure) - the lumen (the channel through which blood flows in the blood vessels) becomes narrower as the arteries thicken and harden <sup>19</sup>. High blood cholesterol - high blood cholesterol levels makes the build-up of plaques and consequent atherosclerosis more likely. High cholesterol can be caused by high LDL (low-density lipoprotein) levels or low HDL (high-density lipoprotein) levels. LDL is also known

as the bad cholesterol, while HDL is also known as the good cholesterol. <sup>30</sup>. Diabetes - both types of diabetes are linked to a higher risk of developing coronary heart disease, especially Diabetes Type II, which is often caused by obesity <sup>37</sup>. Obesity - obese people have a higher risk of developing coronary heart disease <sup>29</sup>. Lack of exercise - people who lead very sedentary lives have a higher risk of developing coronary heart disease <sup>25</sup>.

Diet - researchers found that eating processed meat is linked to cardiovascular disease risk and premature death; Certain other foods, if eaten regularly and in large quantities can increase the risk of coronary heart disease, examples include trans fats and fast foods <sup>28</sup>. Emotional/mental stress – there is a link between chronic (long-term) emotional/mental stress and damage to arteries <sup>6</sup>. Previous studies in other cities such as Karbala, Basra and Erbil found that lay people have only limited knowledge of CHD risk factors; these studies also revealed that awareness of risk factors for CHD varies considerably across societies<sup>12</sup>. Treatment options: Lifestyle - some specific lifestyle changes can significantly improve the health of the arteries .these include

(Stop smoking, Eat a healthy and well balanced diet, Exercise regularly, Reduce emotional/mental stress) <sup>29</sup>.

Medications - Medications to modify cholesterol levels - these include: statins, fibrates and bile acid sequestrants, these drugs reduce the main material that deposits on the coronary arteries, they lower LDL levels <sup>30</sup>. Low-dose aspirin <sup>29</sup>. Beta blockers - they reduce blood pressure as well as the heart rate, resulting in a lower demand of oxygen by the heart <sup>36</sup>. Nitroglycerin- control chest pain by reducing the heart's demand for blood and opening up (widening) the coronary arteries <sup>35</sup>. ACE (angiotensin-converting enzyme) inhibitors - they lower blood pressure and also help slow down or stop the progression of coronary artery disease. Calcium channel blockers - these drugs widen the coronary arteries, resulting in greater blood flow to the heart <sup>20</sup>.

Surgery - if fatty deposit build-up has left the blood vessels very narrow, or if symptoms are not responding well enough to medications, surgery may be required to open up or replace blocked arteries, these surgeries include: Percutaneous coronary revascularization (angioplasty and stent placement), Coronary bypass

surgery, Laser surgery, Heart transplant <sup>35</sup>.

#### **Aims of study (objectives):**

The aim of this study is to identify the attitude of Kirkuk city people toward CHD, determining their level of knowledge about its symptoms and categorize its risk factors.

#### **Patients and methods:**

This is across sectional study done in Kirkuk city based on direct face to face interviews using a questionnaire. This questionnaire was developed by the lead researcher to identify people's knowledge, attitude and practices toward CHD a questionnaire was including questions about (rest, stop smoking, eat healthy and diet, exercise regularly, reduced emotion, take medication(HT,DM), emergency management ). A questionnaire was including questions to identify awareness and knowledge of CHD and its risk factors,( age, sex, smoking, hypertension, lack of exercise, diet hyperlipidemia, diabetes mellitus, emotional stress, genetic and educational levels. A total of 375 sample of male and female of different educational level and of age starting from 15 year and above were selected randomly from, Puplic Kirkuk hospital, Azadi hospital attenders, patients and visitors. College students of Kirkuk University (agricultural,

college of engineering and college of science).

The research starting from the 1<sup>st</sup> of October 2013 to 25<sup>th</sup> of March 2014 by taking the participant's name, age, sex, educational level and by explaining to them the aim of this study. These people were asked if they had ever been diagnosed with heart disease, hypertension, diabetes or hyperlipidemia and whether they had a family history of CHD or not.

In addition to these inclusion criteria; the people were asked to answer by either yes, no or I don't know on the underling choices of the three main divisions, the 1<sup>st</sup> was knowledge about CHD symptoms, the 2<sup>nd</sup> was CHD risk factors and finally practices and it's treatment options.

People's answer were listed and numbered by order in tables; several testes were used to determine the presence of selected factors that can affect people's knowledge (example: the symptoms of CHD), attitude (example: Having CHD risk factor or not) and the practices (what would be the patients choice when he have the attack) of CHD.

Chi-square tests and the P-value in the form of significance test were used to explore what would affect people's knowledge, attitudes and practices towards CHD. By having different sources of information, a lot of experiences help, medical and non medical back ground in order to ensure that the questions were clear and elicited the appropriate information.

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## Results:

**Table (1):** Shows the difference in educational level between male and female. The largest population from who we obtained our information were of educational level: primary school by forming 49.6% of the total percentage, The second largest group were of high school and the minor proportion were uneducated thus forming 12%. Thus the educational level significantly associated with knowledge and attitude for CHD.

**Table (2):** demonstrate the percent of relation of gender to the symptoms of coronary heart disease in Kirkuk city. About 54.9% answered by yes on the age as a risk factor for CHD, It is significant this improves the strong association and the positive co-relation between the age and CHD. Also the smocking had large agreement from the people by which 50.4% agree on it as a huge predisposing factor and most of them mentioned it spontaneously. It is significantly associated with knowledge and attitude for CHD.

Figure (1): Shows the knowledge about coronary heart disease in comparative way between male and female. The females formed the major proportion about 62.3% as compared to males' knowledge about CHD symptoms which formed the rest 42.4%.

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Figure (2): Shows the percentage of the CHD risk factors in comparative way between male and female.

**Table (3):** shows the symptoms of CHD in male and female and the P-value of the significant symptoms. Crushing chest pain had large agreement from the people by which obtained about 63% of the total people percent, it was significant. Similar percent were obtained on the following symptoms: chest discomfort, associated with vomiting epigastric pain and restlessness. While pain radiated to the left arm, association with coughing, sweating and feeling clammy was no significance. There is also strong association between hyperlipidemia and CHD, what reflects the people's knowledge that 62.6% answered by yes, although 12% answered by they do not know on this factor specifically. This factor is also significant

**Table (4):** Practice of coronary heart disease by gender. 85% of patients answered by yes on the CHD practice. Emergency management had significant value. To lesser extent regular exercise, reduce emotional stress and stop smoking. Knowledge of people about the practice of coronary heart disease is 72%; of this 71% male and 78% female.

**Table (1): The difference in educational level between male and female.**

Educational level	Male No.	%	Female No.	%	Total No.	%
Uneducated	24	10.9%	21	13.5%	45	12%
Primary	122	55.4%	64	41.2%	185	49.6%
High school	46	20.9%	47	30.3%	93	24.8%
post graduate	28	12.7%	23	14.8%	51	13.6%
Total	220	58.6%	155	41.3%	375	100%

Collected out of 375, P value < 0.05,  $X^2=7.9$ , DEGREE OF FREEDOM = 3.

**Table (2): Demonstrate the percent of relation of gender to the symptoms of coronary heart disease in Kirkuk city.**

Symptom	Sex knowledge%		Total knowledge %	P value	Significance test
	Male	Female			
Chest discomfort	60	62.6	61	0.0037	* $X^2=11.2$ **d.f=2
Crushing chest pain	62	64.7	63	0.0025	$X^2=12.01$ d.f=2
Radiated to the left arm	58.7	48.5	54.8	-----	***n.s
Jaw pain	26.6	25.3	26.9	-----	n.s
Epigastric pain	55.6	60.5	57.5	0.0078	$X^2=9.6$ d.f=2
Associated with vomiting	60.9	67.3	63.5	0.0078	$X^2=9.6$ d.f=2
Associated with restlessness	55.2	57	56	0.0117	$X^2=8.9$ d.f=2
Associated with coughing	42	28	36.6	-----	n.s
Clammy and sweaty	39.8	27.4	35	-----	n.s

\* $X^2$ : chi square, \*\*d.f: degree of freedom, \*\*\*n.s: non significance.

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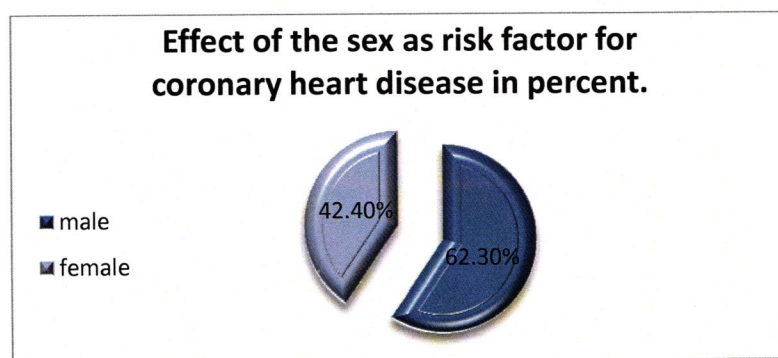
**Table (3):** Shows the degree of knowledge about the risk factor of coronary heart disease in comparative way between male and female in Kirkuk city.

Risk factors	Male knowledge		Female knowledge		Total knowledge		P value
	No.	percent	No.	percent	No.	Percent	
<b>Age</b>							
Yes	127	54%	96	68.5%	223	59.4	<b>0.0059</b>
No	75	31.7	37	26.4%	112	29.8	
I don't know	33	14%	7	5%	40	10.6	
<b>Smoking</b>							
Yes	135	60%	99	64.2%	234	62.45	
No	48	21.7	37	24%	85	22.6	<b>0.0035</b>
I don't know	38	17.1	18	11.6%	56	14.9	
<b>Hypertension</b>							
Yes	111	48.6%	78	53%	189	50.4	
No	79	34.6%	46	31.2%	125	33.3	<b>0.0061</b>
I don't know	38	16.6%	23	15.6%	61	16.2	
<b>Lack of exercise</b>							
Yes	133	57%	86	60.5%	219	58.4	
No	87	37.3%	49	34.5%	136	36.2	<b>0.0224</b>
I don't know	13	5.5%	7	4.9%	20	5.3	
<b>Diet</b>							
Yes	118	53.3	94	61%	212	56.5	
No	75	33.9	38	24.6%	113	30	<b>0.0193</b>
I don't know	28	12.6	22	14.2%	50	13.4	
<b>Sex</b>							
Yes	76	32.3	59	42.1%	135	36	
No	126	53.6	73	52.1%	199	53	<b>Ns.</b>
I don't know	24	10.2	17	12.7%	41	10.9	
<b>Hyperlipidemia</b>							
Yes	149	63.4	86	61.4%	235	62.6	
No	49	20.8	46	32.8%	95	25.3	<b>0.0037</b>
I don't know	29	12.3	16	11.4%	45	12%	
<b>Diabetes mellitus</b>							
Yes	148	62.9	66	47.2%	214	57%	
No	48	20.4	67	47.8%	115	30.6%	<b>0.0096</b>
I don't know	33	14%	13	9.2%	46	12.2%	
<b>Emotional stress</b>							
Yes	125	53.2	62	44.2%	187	49.8%	
No	81	34.4	75	53.5%	156	41.6	<b>Ns</b>
I don't know	15	6.3	17	12.2%	32	8.5%	
<b>Genetic</b>							
Yes	134	57%	87	62.2%	221	58.9	
No	76	32.3%	34	24.2%	110	29.3	<b>0.0393</b>
I don't know	17	7.2	27	19.2%	44	11.7	

Table (4): Shows percent knowledge about the practices of coronary heart disease in Kirkuk city by gender.

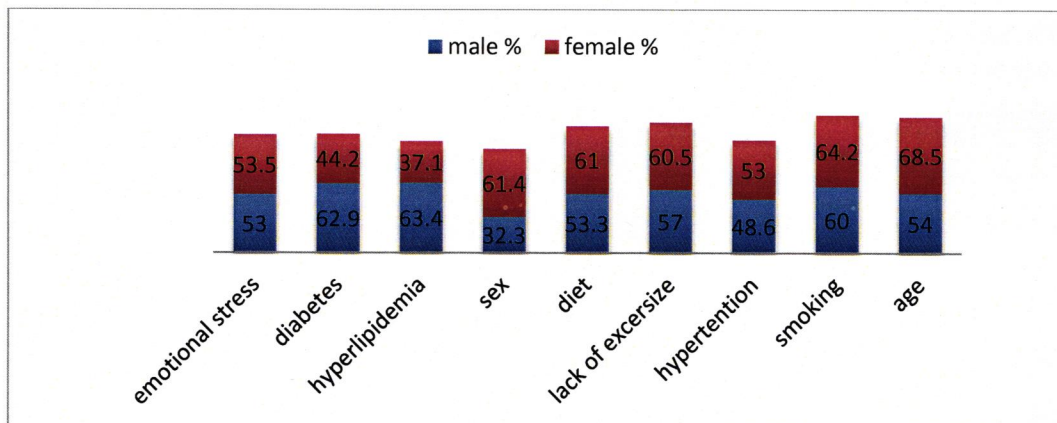
Practice	Sex		Total no.	%	Significance test* X <sup>2</sup>
	Male	Female			
<b>Rest</b>					
Yes	194	120	314	84%	10
No	26	22	48	13%	
I don't know	1	2	3	3%	
<b>Stop Smoking</b>					
Yes	152	110	262	70%	9.8
No	51	21	72	19%	
I don't know	18	11	29	8%	
<b>Eat healthy and diet</b>					
Yes	92	82	174	47%	5.7
No	108	54	162	43%	
I don't know	20	6	26	7%	
<b>Exercise regularly</b>					
Yes	174	104	282	76%	14.2
No	29	29	58	16%	
I don't know	14	9	24	6%	
<b>Reduced emotion</b>					
Yes	140	130	270	72%	13.2
No	66	8	74	20%	
I don't know	15	4	19	5%	
<b>Take medication(HT,DM)</b>					
Yes	181	120	301	81%	18.9
No	14	6	20	5%	
I don't know	26	16	42	11%	
<b>Emergency management</b>					
Yes	168	109	277	74%	17.6
No	18	23	41	11%	
I don't know	32	10	42	11%	

\* X<sup>2</sup>: chi square.

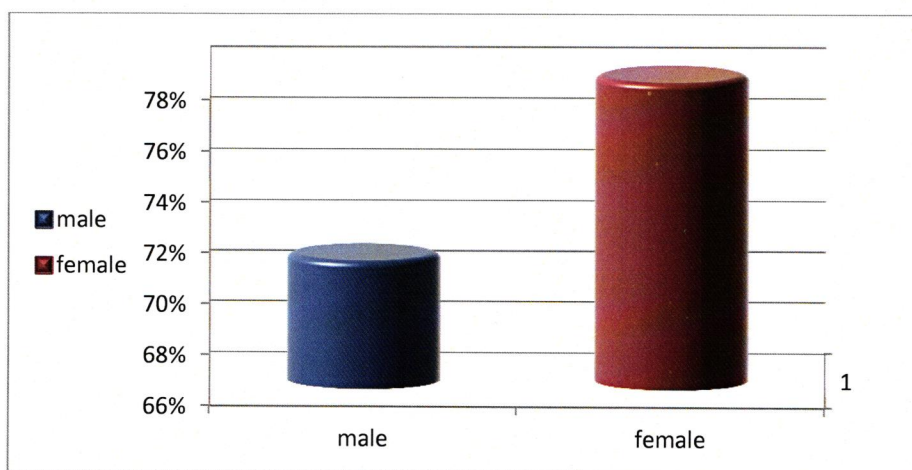


Figure(1): Shows the effect of the sex as a risk factor for CHD on both male and female.

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**Figure(2):**Frequencies of risk factors of CHD identified by participants.



**Figure (3):** The percent answer by emergency management for the practice of CHD by gender.

**Discussion:**

To develop effective educational programs accurate assessment of the baseline knowledge of a population is required <sup>(38)</sup>. This study is designed to specifically examine the baseline knowledge of risk factors and prevention regarding CHD and stroke among the different population subgroups of Kirkuk city.

Findings from this study suggest that middle and older aged people in Kirkuk city have only limited knowledge regarding CHD risk factors, although majority of patients already have predisposing ability for CHD and are most likely to have more than one underlying risk factor for CHD.

The explanation for this puzzled case is that Iraqi people suffering continuous and chronic stresses including, social, economic, political, panics, wars, Terrorism, problems confirming that nobody out of Iraq can easily understand the severity of this stress on Iraqi people for more than 3 decades reaching to the USA-led invasion till now that distributed deeply in the Iraqi life mostly inflict males as they have been facing all types of stresses leading to high prevalence of CHD (76%) due to stressful condition which like the study done in UAE <sup>39</sup>.

The degree of knowledge about the risk factor of coronary heart disease in comparative way between male and female in Kirkuk city, There is also significant association between hyperlipidemia, hypertension, DM, genetic, diet, sedentary life style and emotional stress and CHD, which reflects the people's knowledge that 62.6% answered by yes, although 12% answered by they do not know on this factor specifically. Which like the study done in UAE. <sup>39</sup>

Percent knowledge about the practices of coronary heart disease in Kirkuk city by gender, practice of coronary heart disease by gender. 85% of patients answered by yes on the CHD practice. Emergency

management had significant value. To lesser extent regular exercise, reduce emotional stress and stop smoking. Knowledge of people about the practice of coronary heart disease is 72%; of this 71% male and 78% female. This is same result of study done in UAE. <sup>39</sup>

The importance of the present prospective study is that it is unique in Iraqi people that correlate between emotional stress and CHD in relation with other coexisting risk factors. In our study the mean age of CHD was ( $56 \pm 12$  year), in comparison with other studies in Europe (60, 68, 69 year) (76-86 year) while similar result appeared in study done in same CCU in Hussin hospital in Karbala (mean age 54 year) <sup>24</sup>.

The results showed that the males were at higher risk than females to be affected by CHD (76% males, 24% females), Although it is known that in Iraqi people, females numbers are more than males ( $\geq 60\%$ ) due to the frequent wars and terrorism victims who are mainly men.

### Conclusion and Recommendations:

Findings from this study suggest that middle and older aged people in Kirkuk city have only limited knowledge regarding CHD risk factors. Therefore, people living in this

City may need even more attention and a resource regarding CHD symptoms, risk factors and treatment options as this disease is a common cause of death. In conclusion, the knowledge gap between lay people and health professionals needs to be bridged with carefully planned health education and individualized

counseling. Also, the health behavior, education, edification and instructions towards CHD should start as early as possible, in order to promote people's heart health and in their old age. Promoting the educational programs for making the people understanding the risk factors for CHD

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### References:

- 1-Alwan A. Global status report on noncommunicable diseases 2010. Geneva: World Health Organization, 2011.
- 2-World Health Organization. Noncommunicable diseases in the South-East Asia Region: situation and response 2011. New Delhi: World Health Organization, Regional Office for South-East Asia, 2011.
- 3-Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012; 380:2095–128.
- 4-Reddy KS. Cardiovascular diseases in the developing countries: dimensions, determinants, dynamics and directions for public health action. *Public Health Nutr.* 2002; 5:231–7. 5.
- 5-Reddy KS, Yusuf S. Emerging epidemic of cardiovascular disease in developing countries. *Circulation.* 1998; 97:596–601.
6. Engalgau MM, El-Saharty S, Kudesia P, et al. Capitalizing on the demographic transition: tackling noncommunicable diseases in South Asia. Washington, DC: World Bank Publications, 2011.
- 7.Laslett LJ, Alagona P Jr, Clark BA 3rd, et al. The worldwide environment of cardiovascular disease: prevalence, diagnosis, therapy, and policy issues: a report from the American College of Cardiology. *J Am Coll Cardiol.* 2012; 60:S1.)
8. Rosamond W, Flegal K, Friday G, et al. Heart disease and stroke statistics–2007 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation.* 2007; 115:69-171.

9. [www.euro.who.int/en/what-we.../cardiovascular-diseases/definition](http://www.euro.who.int/en/what-we.../cardiovascular-diseases/definition)).
10. Wannamethee SG, Shaper AG, Whincupb PH, et al. Migration within Great Britain and cardiovascular disease: early life and adult environmental factors *Int. J. Epidemiol.* 2002; 31(5):1054-1060. .
11. Pearson TA, Blair SN, Daniels SR, et al. AHA guide lines for primary prevention of cardiovascular disease and stroke: 2002 update: consensus panel guide to comprehensive risk reduction for adult patient without coronary or other atherosclerosis vascular disease. *Circulation.* 2002; 106:388–91.
12. Schenck-Gustafsson K. Risk factors for cardiovascular disease in women. *Maturitas.* 2009;63:186–90.
13. Yusuf S, Hawken S, O unpua S, et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case\_ control study. *Lancet.* 2004; 364:937-952.
14. Winham DM, Jones KM. Knowledge of young African American adults about heart disease: a cross-sectional survey. *BMC Public Health.* 2011; 11: 248.
15. Christian AH, Rosamond W, White AR, et al. Nine-year trends and racial and ethnic disparities in women’s awareness of heart disease and stroke: An American Heart Association National Study. *Journal of Women’s Health.* 2007;16:68-81.
16. Sug Yoon S, Heller RF, Levi C, et al. Knowledge of stroke risk factors, warning symptoms, and treatment among an Australian urban population. *Stroke.* 2001;32:1926–30.
17. Potvin L, Richard L, Edwards AC. Knowledge of cardiovascular disease risk factors among the Canadian population: relationship with indicators of socioeconomic status. *CMAJ.* 2000;162:S5–11.
18. Thanavaro JL, Moore SM, Anthony M, et al. Predictors of health promotion behavior in women without prior history of coronary heart disease. *ANR.* 2006;19:149–55.
19. Mackay J, Mensah GA: The atlas of heart disease and stroke. Geneva:World health Organisation, 2004. [Oct 2, 2009 accessed].
20. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston ;Davidson’s Principles and Practice of Medicine ,chapter 5 , Cardiovascular disease, Elsevier Limited , 21st edition , 2018, p; 506-525.

21. Shepherd J, Alcalde V, Befort BA, et al: International comparison of awareness and attitudes towards coronary risk factor reduction: the HELP study. Heart European Leaders Panel. *J Cardiovascular Risk* 1997; 4: 373-84.
22. Jafary F, Aslam F, Mahmud H, et al: Cardiovascular health knowledge and behavior in patient attendants at four tertiary care hospitals in Pakistan – a cause for concern. *BMC Public Health* 2005; 5: 124.
23. Greenland P, Knoll MD, Stamler J, et al: Major risk factors as antecedents of fatal and nonfatal coronary heart disease events. *JAMA* 2003; 290: 891-7.
24. Angus J, Evans S, Lapum J, et al: "Sneaky disease": the body and health knowledge for people at risk for coronary heart disease in Ontario, Canada. *Soc Sci Med* 2005; 60: 2117-28.
25. Hasse A, Steptoe A, Sallis JF, Wardle J: Leisure-time physical activity in university students from 23 countries: associations with health beliefs, risk awareness, and national economic development. *Prev Med* 2004; 39: 182-90.
26. Baba S, Iso H, Mannami T, et al: Cigarette smoking and risk of coronary heart disease incidence among middle-aged Japanese men and women: the JPHC Study Cohort I. *Eur J Cardiovasc Prev Rehabil*. 2006; 13: 207-13.
27. Strong J, McGill HJ: The natural history of coronary atherosclerosis. *Am J Pathol* 1962; 40: 37-49.
28. Chan JM, Rimm EB, Colditz GA, Stampfer MJ, Willett WC. Obesity, fat distribution, and weight gain as risk factors for clinical diabetes in men. *Diabetes Care*. 1994; 17: 961-9.
29. Ali NS: Prediction of coronary heart disease preventive behaviors in women: a test of the Health Belief Model. *Routledge*. 2002; 35: 83-96.
30. Lee RT, Libby P. The unstable atheroma. *Arterioscler Thromb Vasc Biol*. 1997; 17: 1859–1867.
31. Lawrence M. Fierrey J.R., Stephent Maxin. Blood vessels and lymphatics. Current medical diagnosis and treatment . International edition :2005.
32. Volpi et al . Ventricular Fibrillation was associated with high mortality rates. *American journal of Cardiology myocardial – infarction* .1998; 82 : 265\_271 .
33. Chan .T.T Tran PHD .Andreas Lanpacis MD SC Muhammad Mamdanpharm D. *American heart journal –effect of age on the use of evidence – based –*

- therapies for acute MI-posted 12/3/2004 .
34. Riwm ES , stamp for M), Dietary antioxidant intake and risk coronary heart disease among men .N. Enql med.1993.
35. Eyben FE, Mouritsen E, Holm J, MontvilasP,*et al* .Intra-abdominal obesity and metabolic risk factors: a study of young adults. Int. J ObesRelatMetabDisord. 2003-Aug;27(8):941-9.
36. Li G, Chen X, Jang Y, *et al* : Obesity, coronary heart disease risk factors and diabetes in Chinese: an approach to the criteria of obesity in the Chinese population. Obes Rev. Aug2002;3:167-72.
37. Wei-Chien Chen<sup>1</sup>, Yi-Cheng Yu<sup>2</sup>, Karen Glaser<sup>1</sup>.The Knowledge and Attitudes of Coronary Heart Disease Prevention among Middle and Older Aged People in a Community in Taipei. *Taiwan Geriatrics & Gerontology* :2009; 4(4): 251-262.
38. Yoon SS, Heller RF, Levi C, et al. Knowledge of stroke risk factors, warning symptoms, and treatment among an Australian urban population. Stroke. 2001;32:1926-1930.
39. Nelofer Khan<sup>1\*</sup>, K.G.Gomathi<sup>1</sup>, et.al, Knowledge of cardiovascular disease risk factors among the non-medical staff of a medical university in UAE, GMJ, ASM. 2013; 2: 147-152.