

## Prevalence and Risk Factors of Ischemic Heart Disease among Patients Undergoing Coronary Angiography

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### Abstract

**The Aim of the study** was to identify the prevalence and risk factors of ischemic heart disease among patients undergoing coronary angiography. **Subjects and Method:** A descriptive exploratory research design was utilized. This study was carried out in the cardiovascular medicine department at Assiut University Hospital. The study sample consisted of all patients attended to the cardiovascular medicine department and underwent coronary angiography within 6 months period from October 2016 to April 2017 500 patients (317 males and 183 females). A structured interview sheet was utilized to collect data includes Data related to socio-demographic characteristics, medical data and risk factors of ischemic heart disease. **Results:** Incidence of ischemic heart disease among patients underwent coronary angiography at Assiut University Hospital over six months was 398 patients out of 500 patients (79.6%). Most of the studied patients were males and their age ranged from 40-65 years. Smoking, obesity, hypertension, diabetes and family history were the major risk factors for IHD respectively. **Conclusion:** There was highly significant statistical relationship between the age, sex, diabetes and smoking and the prevalence of IHD with a p-value of (0.001). **Recommendations:** Screening of those living in rural areas for IHD, and application of life style modification programs for the modifiable risk factors which leading to IHD.

**Key words:** *Coronary Angiography, Ischemic Heart Disease & Prevalence.*

### Introduction

Ischemic heart disease (IHD), also called coronary heart disease (CHD) is defined as the presence of atherosclerotic plaques in one or more of the major coronary arteries that supply blood to the heart muscle. Ischemia refers to an imbalance between myocardial oxygen supply and demand that is most commonly caused by plaques that impede blood flow to tissue distal to the stenosis (Bonow et al., 2015)

Coronary artery disease (CAD) caused about 1 of every 6 deaths in the United States in 2010. Also in the same year, there were 379,559 deaths in the United States attributed to CHD. Each year, about 620,000 Americans experience either a first hospitalized myocardial infarction or die secondary to CHD, and about 295,000 have a recurrent hospitalized myocardial infarction. Furthermore, it is estimated that an additional 150,000 silent first MI occur each year which is associated with a poorer long-term prognosis (Wong et al., 2015)

The risk factors for developing ischemic heart disease are generally divided into two categories; non modifiable risk factors including age, sex, and family history of premature coronary heart disease. While modifiable risk factors include smoking or other tobacco use, diabetes mellitus (with or without insulin resistance), obesity, hypertension,

hypercholesterolemia, hypertriglyceridemia, including inherited lipoprotein disorders, dyslipidemia, sedentary lifestyle and/or lack of exercise and psychosocial stress (Yusuf et al., 2008) Invasive coronary angiography is the gold standard in diagnosing coronary artery disease and is indicated in symptomatic patients at high risk of CAD Coronary angiography gives information about the anatomy of the coronary arteries and the lesions present in them. However, it does not give information related to the viability of the myocardium if it is akinetic i.e. when the myocardium is still alive and would benefit from coronary artery revascularization. Such information is usually obtained by stress echocardiography or cardiovascular magnetic resonance imaging (Seong & Meng, 2016)

Nurses play a very important role in identifying patients through careful history taking and identifying early signs and symptoms of ischemia. Early intervention of establishing and restoring coronary blood flow will salvage myocardium and save the patient's short-term and long-term post infarction complications. Nurses can help patients to identify risk factors that can be modified and promote positive outcomes and responses which lead healthy and productive lives (Woods et al., 2010)

### Significance of the study

From the researcher's clinical experience it has been observed that IHD has many risks and complications which increase morbidity and mortality of patients and from the researcher's review of the registered data reports of patients who had coronary angiography during the year (2015) it was found that the number of patients who underwent coronary angiography was about 1500 patients out of this number about 1000 were ischemic and had coronary intervention and about 500 were for medical treatment or Coronary Artery Bypass Graft (CABG). Therefore this study was carried out in an attempt to collect data that might help in planning and implementing further nursing studies for such group of patients in an attempt to reduce or eliminate risk factors for IHD.

### The Aim of the study

The aim of this study was to identify the prevalence and risk factors of ischemic heart disease among patients undergoing coronary angiography at Assiut University Hospital.

### Research questions

- What is the prevalence of ischemic heart disease among patients undergoing coronary angiography at Assiut University Hospital?
- What are the risk factors of ischemic heart disease among patients undergoing coronary angiography at Assiut University Hospital?

### Subject & Methods

#### Research design

A descriptive exploratory research design was utilized to conduct this study.

#### Setting

This study was conducted in the cardiovascular medicine department at Assiut University Hospital.

#### Subjects

The study sample consisted of all patients attended to the cardiovascular medicine department and underwent coronary angiography within 6 months period from 20/10/2016 to 20/4/2017 (317 males and 183 females), age ranges between 18- 65 years and agreed to participate in the study.

#### Study tools

A structured interview questionnaire comprises of three parts was used in this study. It was developed by the researcher to collect the necessary data for this study after reviewing the national and international literature under the guidance of the supervisors.

#### Part (1): Included items related to demographic data of the study sample

It was developed to assess the patients' socio-demographic characteristics; such as (age, gender,

marital status, residence, level of education and occupation)

#### Part (2): Medical data

This part was developed to identify the patients' medical diagnosis, medications, laboratory tests, diagnostic tests including ECG and result of coronary angiography.

#### Part (3): Risk factors assessment

This part was developed by the researcher based on national and international literature review to assess risk factors for ischemic heart disease as (family history, hypertension, diabetes, vascular disease, obesity and smoking)

#### Methods of data collection

- An official letter was issued from the Dean of the Faculty of Nursing to the Head of cardiovascular department soliciting the necessary approval to conduct the present research after explaining the aim and nature of the study to them to obtain their cooperation.
- Review of the national and international related literature in the various aspects of the problem using books, articles, periodicals, and magazines was done.
- Content validity for the data collection tools was established by panel of 5 expertises of cardiovascular medicine and medical surgical nursing at Assiut University, who reviewed the tools of data collection for clarity, relevance, comprehensiveness, understanding, applicability and easiness.
- Reliability of tool was ensured as , the researcher followed test/retest technique. The researcher applied it to a pilot sample of (10%) patients. The reliability of the test was calculated by using correlation coefficient and it was estimated by Alpha Cronbach's test for this study.
- A pilot study was carried out to test the feasibility and applicability of the study tools on 10% of the sample (about 50 patients). It also provided to estimate the time needed to fill out the tools, and those patients were included in the main study as there were no modifications in the data collection tools.
- Data were collected from cardiovascular department and catheterization unit at Assiut University Hospital during the period from October 2016 to April 2017. Using interviewed technique individually each patient was interviewed to fill the study tools and to assess risk factors of ischemic heart disease after fully explaining the aim and nature of the study to them.
- Data were collected every day for six months either from catheterization unit in the morning shift or from cardiovascular medicine department at afternoon shift.

- Each patient was interviewed for 10 minutes either before or after the angiography.
- The number of patients differs from day to day depending on the number of coronary angiography patients in the operations list as ranged from 0 to 15 patients per day.

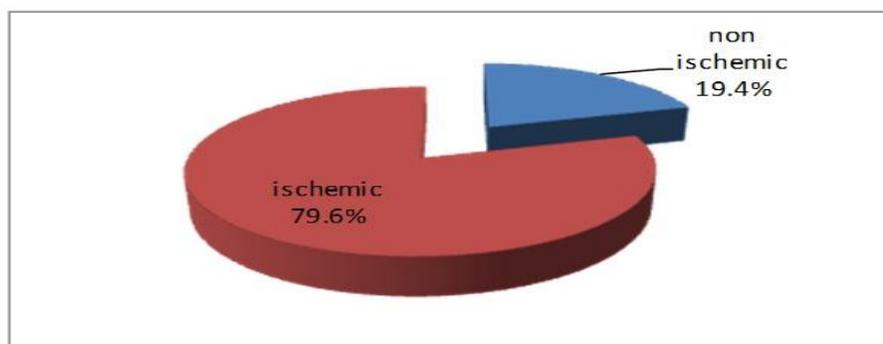
### Statistical design

Data entry and data analysis were done using SPSS version 19. Data were presented as number, percentage, mean, standard deviation. Chi-square test was used to compare between qualitative variables. P-value considered statistically significant when  $P < 0.05$ .

## Results

**Table (1): Frequency distribution of the studied sample according to demographic characteristics (n=500)**

| Items                          | N              | %    |
|--------------------------------|----------------|------|
| <b>Age group</b>               |                |      |
| 18-<29 years                   | 7              | 1.4  |
| 29-<40 years                   | 30             | 6.0  |
| 40-65 years                    | 463            | 92.6 |
| <b>Range</b>                   | 18-65          |      |
| <b>Mean <math>\pm</math>SD</b> | 53.5 $\pm$ 8.9 |      |
| <b>Sex</b>                     |                |      |
| Male                           | 317            | 63.4 |
| Female                         | 183            | 36.6 |
| <b>Marital status</b>          |                |      |
| Single                         | 5              | 1.0  |
| Married                        | 446            | 89.2 |
| Divorced                       | 4              | .8   |
| Widow/er                       | 45             | 9.0  |
| <b>Residence</b>               |                |      |
| Urban                          | 168            | 33.6 |
| Rural                          | 332            | 66.4 |
| <b>Educational level</b>       |                |      |
| High education                 | 95             | 19.0 |
| Secondary school               | 113            | 22.6 |
| Read and write                 | 72             | 14.4 |
| Illiterate                     | 220            | 44.0 |
| <b>Occupation</b>              |                |      |
| Professional work              | 115            | 23.0 |
| Manual work                    | 92             | 18.4 |
| Not working                    | 293            | 58.6 |



**Fig. (1): Prevalence of ischemic heart disease among patients undergoing coronary angiography.**

**Table (2): Relation between non ischemic & ischemic patients regarding the risk factors.**

| Variable                  | Non ischemic |      | Ischemic |      | P. value |
|---------------------------|--------------|------|----------|------|----------|
|                           | N            | %    | N        | %    |          |
| <b>Risk factors</b>       |              |      |          |      |          |
| Positive Family history   | 31           | 20.1 | 123      | 79.9 | 0.5      |
| Hypertension              | 42           | 17.9 | 193      | 82.1 | 0.1      |
| Diabetes                  | 24           | 13.3 | 156      | 86.7 | 0.001**  |
| Vascular disease          | 4            | 12.5 | 28       | 87.5 | 0.1      |
| Previous cardiac catheter | 16           | 16.7 | 80       | 83.3 | 0.1      |
| Smoking                   | 23           | 13.5 | 147      | 86.5 | 0.001**  |
| Obesity                   | 50           | 20.3 | 196      | 79.7 | 0.52     |

\*significant at  $p < 0.05$  \*\*highly significant at  $p \leq 0.01$

**Table (1):** Shows that the highest percent of the studied sample were male (63.4%), their age range between 40-65 years old (92.6%), married (89.2%), living in rural areas (66.4%), illiterate (44.0%) and not working (58.6%).

**Fig. (1):** Shows that (79.6%) of the studied sample with ischemic heart disease comparing to 19.4% were non ischemic patients.

**Table (2):** Illustrates that there was a high statistical significant difference between patients who have IHD and those patients who didn't have IHD regarding the risk factors of diabetes and smoking while there was no statistically significant difference regarding family history, hypertension, vascular disease or obesity as a risk factors .

## Discussion

Regarding the demographical data, more than half of the studied patients were males. This study finding was in line with a study conducted at department of Medical Genetics, at Shiraz University of Medical Sciences, Shiraz, Iran entitled "non-modifiable Factors of Coronary Artery Stenosis in Late Onset Patients with Coronary Artery Disease in Southern Iranian Population" which revealed that; the number of males who suffered from coronary artery disease was higher in CAD group. There is a possible explanation for gender differences or genetic factors as changes in lipid profile, obesity, hypertension, glucose intolerance, diabetes mellitus type II and environmental factors such as anger, aggression, and addiction. Also it may be due to severe economic problems of our society account for differences in the percentage of gender in developing CAD. On the other hand the protective action of the sex hormones (Estrogen and progesterone) has been observed in young women (Bager et al., 2014).

Regarding the study group age, this study revealed that the mean age of patients was about fifty years old. This result agree with (Samad et al., 2016) who carried out a systematic review and meta-analysis on

20 studies including 139957 patients most of the studies were conducted in the U.S.A., which revealed that the mean age of the patients was fifty years old. As age increases, the risk of coronary atherosclerosis and vein problems increases (Bager et al., 2014). Also there was a highly statistically significant difference in patients who developed IHD regarding their age and sex as the risk of ischemic heart disease increased with old age and male patients. This result agrees with (Soofi & Youssef, 2015) who found that the coronary disease risk progressively increased with old age male patients. According to Ford et al., (2007), who reported that men had a higher risk for IHD than women and also the risk increased with age. As well Chiha et al., (2017), found that male predominance in there study with an average age of 59.3 years old.

The result of the present study explored that incidence of ischemic heart disease among patients undergoing coronary angiography at Assiut University Hospital over six months period was 398 patients out of 500 patients (79.6%). This study finding was in line with a study conducted at the department of cardiology, faculty of medicine, Ilam University of Medical Sciences, Ilam, IR Iran. by (Bidel et al., 2016) that entitled "Prevalence and Risk Factors of Abnormal Coronary Angiography Findings" which found that of the 2046 studied subjects, 791 patients (38.66%) had normal coronary angiography and 1255 patients (61.34%) had abnormal angiographic findings. Also, Mohammad et al., (2015), examined in a cross sectional study of 445 clinically diagnosed CAD patients who underwent coronary angiography at Duhok Heart Center, Kurdistan, Iraq in the period between March and September 2014 and found that a total of 348 patients (78.2%) had CAD and 97 patients (21.8%) had normal angiograms.

This study revealed that about half of the sample were hypertensive or obese and about one-third were diabetics, had a positive family history of IHD or

smokers with high significant statistical relationship between IHD and diabetes mellitus, as well as with smoking. These results were supported by (Turin et al., 2017), who observed through a cohort study of cardiovascular diseases that diabetes has a significant effect on the residual life time risk of CHD among both men and women of middle age. As the following implications that insulin resistance, visceral adiposity, and excess inflammation are characteristic of pathophysiology of thrombogenesis. Besides, a complex mix of mechanisms such as oxidative stress, enhanced atherogenicity of cholesterol particles, abnormal vascular reactivity, increased haemostatic activation, and renal dysfunction which considered as feature characteristics of type 2 diabetes mellitus that may allow excess risk of CHD (Kumar, 2014). In addition, this study finding was supported by Mohamed & Elsayed, (2014) who carried out a retrospective study at the outpatient in diabetes clinics at the state of Kuwait during 6 months period; data collected regarding age, gender, smoking status, duration of DM, BMI, blood pressure, HbA1c, lipid profile, and the presence of CAD, found that patients with CAD were significantly older, and had a longer duration of DM. Moreover, patients with CAD were using insulin and antihypertensive therapy more than those without CAD. Other studies by American Diabetes Association, (2007) & Asia Pacific Cohort Studies Collaboration, (2008) based on two different ethnic groups, namely Asian and Non-Asian peoples. The results of these studies showed that most traditional cardiovascular risk factors, including high blood pressure, obesity, and cigarette smoking. Also those risk factors were highly associated with heart diseases in both ethnic groups, despite the differences in ethnicity status.

The present study showed that, there was a high statistically significant difference between patients with IHD and those patients without IHD regarding smoking with P-value= (0.001). This was supported by Samad et al., (2016) who proved that smoking was the most important risk factor attributed to MI. Also, Malik et al., (2016), confirmed that cigarette smoking is one of the major risk factors for IHD. As smoking adversely affects all phases of atherosclerosis given that it speed thrombotic process, foster endothelial dysfunction, increase inflammatory effects, and induces coronary vasoconstriction even in patients with normal coronary arteries.

Although premature coronary vascular disease occurs in families with the history of CAD, especially in people who have parents or siblings with artery disease or death in the family because of a history of CAD (Nasir et al., 2007), The present study revealed that there was no statistical significant difference

regarding family history. This study finding was in line with a study done by Bager et al., (2014), which was conducted on 200 patients with positive angiography and 200 control subjects with negative angiography. Positive angiography was defined as coronary diameter cut greater than 50% to determine the impact of age, gender, family history, and consanguinity on the risk of stenosis which found that family history of myocardial infarction did not show a significant effect on the artery stenosis. Also Gomesa et al., (2017), found that the prevalence of positive family history was 43% in the sample, but there was no statistical significance with the outcome. But, this study finding disagree with the study by Oommen et al., (2016), who found that family history of premature heart disease was significantly associated with CHD.

### Conclusion

Incidence of ischemic heart disease among patients who underwent coronary angiography at Assiut University Hospital over six months was (79.6%). Smoking, obesity, hypertension, diabetes and family history were the major risk factors for IHD respectively. There was a high statistically significant difference between patients who developed IHD and those patients who have not developed IHD regarding their age and sex with P-value= 0.001, also there was a high statistical significant difference (a P-value 0.001) between patients who developed IHD and those patients who haven't developed IHD regarding diabetes and smoking as risk factors.

### Recommendations

- Screening of those living in rural areas especially males for IHD is highly indicated.
- Applications of life style modification programs for modifying risk factors which lead to IHD are recommended.

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