“Retrospective Study on the Effect of Comorbid Conditions and Prevalence of Ischemic Heart Disease in Quaternary Care Hospital.”

Tejal Hiremath, Pavan Kumar R Y, Vaishali Saha, Navya N Daniel And Dr. Sanjay Sharma
Department of Pharmacy Practice, PES College of Pharmacy, Rajiv Gandhi University of Health Sciences, India.
Corresponding Author: Tejal Hiremath

Abstract: The coronary arteries supply blood to the heart muscle and no alternative blood supply exists, so a blockage in the coronary arteries reduces the supply of blood to heart muscle. Most ischemic heart disease is caused by atherosclerosis, usually present even when the artery lumens appear normal by angiography. Most patients have more than one health condition, and therefore the assessment of comorbidity is important for patient care, for quality assurance, and for the evaluation of therapy. Comorbid diseases may affect multiple clinical outcomes, including mortality, functional capacity, quality of life, and cost. Clinical intuition tells us that diabetes, for example, has a strong effect on all of these outcomes and thus that the presence or absence of diabetes should be considered in the management of patients with coronary disease. Other comorbid conditions, such as chronic lung disease or renal insufficiency, probably have detrimental effects on outcome. Comorbid conditions in a patient with coronary disease may affect outcome directly or indirectly by reducing the patient’s physiologic reserve and thereby increasing the risk of adverse outcome of coronary disease.

Keywords: Hypertension, Diabetes Mellitus, Hyperlipidemia, Alcoholism, Smoking.

I. Introduction

Ischemic Heart Disease, also known as Coronary Artery Disease, is a condition that affects the supply of blood to the heart. The blood vessels are narrowed or blocked due to the deposition of cholesterol on their walls. This reduces the supply of oxygen and nutrients to the heart muscles, which is essential for proper functioning of the heart. This may eventually result in a portion of the heart being suddenly deprived of its blood supply leading to the death of that area of heart tissue, resulting in a heart attack. [1]

Eliminating obesity, unhealthy diets, and physical inactivity could prevent up to 80% of heart disease, stroke, and diabetes mellitus. Multiple longitudinal, epidemiological studies have provided valuable insights into the natural history and risk factors associated with the development and prognosis of CHD, and have provided the foundation for intervention studies and clinical trials aimed at primordial, primary, or secondary prevention of CHD. Ischemic Heart Disease is the most common cause of death in many countries around the world.

Job stress appears to play a minor role accounting for about 3% of cases. In one study, women who were free of stress from work life saw an increase in the diameter of their blood vessels, leading to decreased progression of atherosclerosis. In contrast, women who had high levels of work-related stress experienced a decrease in the diameter of their blood vessels and significantly increased disease progression. Having a type A (personalities that are more competitive, highly organized, ambitious, impatient, highly aware of time management and/or aggressive) behavior pattern, a group of personality characteristics including time urgency, competitiveness, hostility, and impatience is linked to an increased risk of coronary disease. [2]

Coronary artery disease has a number of well determined risk factors. The most common risk factors include smoking, family history, hypertension, obesity, diabetes, lack of exercise, stress, and high blood lipids. Smoking is associated with about 36% of cases and obesity 20%. Lack of exercise has been linked to 7–12% of cases. [3] Exposure to the herbicide Agent orange may increase risk. Both rheumatoid arthritis and systemic lupus erythematosus are independent risk factors as well. The Current study aims to increase the awareness of the association of risk factors with CVD and its increased chances of causing stroke in stroke-prone and healthy individual.
II. Materials And Methods

Study Design: Retrospective Study.
Study Duration: 6 Months
Sample Size: 209

Study Location: Medical Record Department, BGS Gleneagles Global Hospitals, Kengeri, Bengaluru.

Sample Size Calculation: Cases collected from the patients who are newly diagnosed with IHD or admitted with the previous history of stroke. Study was designed to collect the IHD cases of patients who were admitted from the month of June 2015 to December 2016 that is patients who were admitted in the time period of 16 months. The collected data were entered into the MICROSOFT EXCEL and the data was categorized according to the risk factors with respect to the disease condition. The patients were categorized based on the comorbid condition, and past medical history.

Inclusion Criteria:
1. Patients who are having IHD
2. Patient who were admitted to hospital from June 2015 to December 2016

Exclusion criteria:
1. Patient who were having any other cardiac disorder other than IHD

Methodology.
Patients meeting the study criteria were enrolled into the study and were followed on daily basis from the day of hospital admission till discharge. Relevant details of these patients such as demographic variables, medical history medications details, diagnosis and co morbidity conditions, medications prescribed at admission and during hospital were recorded in the data collection form.

The enrolled patients were then followed and the case notes were reviewed on daily basis for medications prescribed for the patients. Any change in the prescribed drug during the hospital stay of the patient or addition of any new drug was discussed with the concerned clinician and the details of the drug were recorded in the data collection form. The name of the medication, dose, route and frequency, duration of therapy were recorded in the data collection form.

Patients characteristics: The patients were categorized based on the comorbid condition, and past medical history.

Data Analysis: To calculate the prevalence of IHD from the obtained data. Chi Square test was used to check the relation of the risk factors with the disease condition.

III. Results

A total number of 209 patients were enrolled into the study as per the inclusion and exclusion criteria as stated in the protocol and the required data were collected from medical record files. There were 166 (79.4%) Male and 43 (20.5%) Female patients in the study.

Maximum patients were within age interval of 61-70 years i.e. total 30 patients in which 27 were males and 3 were female patients (table no. 1) and minimum were 81-90 years i.e. only one.

Table No.1  Number of people who were admitted during the study of period.

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-20</td>
<td>1</td>
<td></td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>21-30</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>1.91%</td>
</tr>
<tr>
<td>31-40</td>
<td>11</td>
<td>2</td>
<td>13</td>
<td>6.22%</td>
</tr>
<tr>
<td>41-50</td>
<td>42</td>
<td>2</td>
<td>44</td>
<td>21.05%</td>
</tr>
<tr>
<td>51-60</td>
<td>48</td>
<td>15</td>
<td>63</td>
<td>30.14%</td>
</tr>
<tr>
<td>61-70</td>
<td>40</td>
<td>15</td>
<td>55</td>
<td>26.31%</td>
</tr>
<tr>
<td>71-80</td>
<td>15</td>
<td>8</td>
<td>23</td>
<td>11.00%</td>
</tr>
<tr>
<td>81-90</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>2.87%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>166</td>
<td>43</td>
<td>209</td>
<td>100%</td>
</tr>
</tbody>
</table>

Past medical history:
The Number of patients who were known case of IHD, Hyperlipidemia, Hypertension and Diabetes mellitus. The number of Patients who had Hypertension are 85 (43%), Diabetes Mellitus 86 (42%), Hyperlipidemia 46 (22.6%) and IHD 30 (15%).

DOI: 10.9790/3008-1302031016 www.iosrjournals.org
Relative risk
Relative Risk or risk ratio (RR) is the ratio of the probability of an event occurring (for example, developing a disease, being injured) in an exposed group to the probability of the event occurring in a comparison, non-exposed group.

The Relative risk of Diabetes Mellitus in IHD

Table No.2 Relative Risk of Diabetes Mellitus in IHD

<table>
<thead>
<tr>
<th>IHD</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Mellitus</td>
<td>86</td>
<td>2200</td>
</tr>
<tr>
<td>Not having DM</td>
<td>123</td>
<td>19788</td>
</tr>
</tbody>
</table>

Relative Risk Formula = $a/(a+b) / c/(c+d)$.
Result: The Relative risk for 2114 diabetic patients were found to be 6.16 times likely to get IHD if they continue with uncontrolled diabetes lifestyle.

The Relative risk of Hypertension in IHD

Table No.3 Relative Risk of Hypertension in IHD

<table>
<thead>
<tr>
<th>IHD</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>85</td>
<td>1500</td>
</tr>
<tr>
<td>Not having Hyperten</td>
<td>124</td>
<td>20488</td>
</tr>
</tbody>
</table>

Result: The Relative risk for 1415 Hypertensive patients were found to be 10.8 times at risk of having IHD if they continue with uncontrolled blood pressure.

The Relative risk of smoking in IHD

Table No. 4 Relative Risk of Smoking in IHD

<table>
<thead>
<tr>
<th>IHD</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>89</td>
<td>1563</td>
</tr>
<tr>
<td>Not Smoking</td>
<td>120</td>
<td>22108</td>
</tr>
</tbody>
</table>

Result: The Relative risk for 1474 Non-smokers were found to be 9.97 times at risk to have IHD if they continue smoking.

The Relative risk of Alcohol in IHD

Table No. 5 Relative Risk of Alcohol in IHD
Result: The relative risk for 1081 non-alcoholics were found to be 8.1 times at risk of having a IHD if they continue to drink.

**The Relative risk of Hyperlipidemia in IHD**

Table No. 6 Relative Risk of Hyperlipidemia in IHD

<table>
<thead>
<tr>
<th>IHD</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperlipidemic</td>
<td>46</td>
<td>2379</td>
</tr>
<tr>
<td>Not Hyperlipidemic</td>
<td>163</td>
<td>22151</td>
</tr>
</tbody>
</table>

Result: The relative risk for 2333 non-hyperlipidemic patients were found to be 2.53 times at risk of getting IHD if they continue to be hyperlipidemic.

**Prevalence**

Prevalence is the proportion of disease found to have been affecting a particular population (typically a disease or a risk factor such as smoking or seat-belt use). It is arrived at by comparing the number of people found to have the condition with the total number of people studied, and is usually expressed as a fraction, as a percentage or as the number of cases per 10,000 or 100,000 people.

Formula to calculate Prevalence = \( \frac{\text{Total No. of factor with disease}}{\text{Total number of data observed}} \times 100 \)

\[ = \frac{209}{22197} \times 100 = 0.94\% \]

Conclusion: The number of people who were suffering from IHD was 0.94% in the quaternary care hospital.

**Chi-square test**

A chi square statistic is a measurement of how expectations compare to results. The data used in calculating a chi square statistic must be random, raw, mutually exclusive, drawn from independent variables and drawn from a large enough sample.

Using Chi-Square Statistic in Research. The Chi Square statistic is commonly used for testing relationships on categorical variables. The null hypothesis is that no relationship exists on these categorical variables in the population; they are independent.

**Chi-Square test analysis for Hypertension and Diabetes Mellitus**

Chi Square test was used to find out the impact of Risk factors in IHD patients.

**Null Hypothesis:** The Risk factors do not have any significant impact on the IHD.

**Alternate Hypothesis:** The Risk factors have a significant impact on the IHD.

**Table No.7** Number of patients having Risk Factor I and II.

<table>
<thead>
<tr>
<th></th>
<th>Factor – I DM</th>
<th>Factor – II HTN</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHD</td>
<td>86</td>
<td>85</td>
<td>171</td>
</tr>
<tr>
<td>Non-IHD</td>
<td>2200</td>
<td>1500</td>
<td>3700</td>
</tr>
<tr>
<td>Total</td>
<td>2286</td>
<td>1585</td>
<td>3871</td>
</tr>
</tbody>
</table>

\[ \frac{\text{Total disease} \times \text{Total number of factors}}{\text{Grand Total}} \]

Expected number of disease occurred in DM Result: 100.983

Expected number of disease occurred in HTN Result: 70.016
Expected number of people without IHD but have DM = 2286-100.983 =2185.017  
=Result: 2185.017

Expected number of people without IHD but have HTN = 1585-70.016= 1514.984  
=Result: 1514.98

\[ x^2 = \frac{(O-E)^2}{E} \]

O- Observed E-Expected
\[ x^2 = 80.09 \]

x value from chi-square table value is 3.84
Degree of freedom = Row-1 x Column 1  
= 2-1 x 2-1
Degree of freedom = 1
The p-value is <0.00001.
The result is significant at p<0.05

Decision: If the calculated value is equal/ greater than the table value then reject null hypothesis.

Conclusion: There is a strong relationship between the presence of risk factors DM and HTN and IHD. Chi-Square Test analysis for Smoking, Alcoholics and Hyperlipidemic.

Null Hypothesis: The Risk factors do not have any significant impact on the IHD.

Alternate Hypothesis: The Risk factors have a significant impact on the IHD.

Table No.8 Number of patients having Risk Factor III,IV and V.

<table>
<thead>
<tr>
<th>Mortality</th>
<th>Factor III-Smoking</th>
<th>Factor IV-Alcoholics</th>
<th>Factor V-Hyperlipidemics</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHD</td>
<td>89</td>
<td>64</td>
<td>46</td>
<td>199</td>
</tr>
<tr>
<td>Non-IHD</td>
<td>1563</td>
<td>1145</td>
<td>2379</td>
<td>5087</td>
</tr>
<tr>
<td>Total</td>
<td>1652</td>
<td>1209</td>
<td>2425</td>
<td>5286</td>
</tr>
</tbody>
</table>

\[ = \frac{\text{Total Disease } \times \text{Total Number of factors}}{\text{Grand Total}} \]

Expected number of disease occurred in Smoking = 62.192
Expected number of disease occurred in Alcoholics = 45.51
Expected number of disease occurred in Hyperlipidemia = 91.29
Expected number of people without IHD but are smokers = 1652-62.192  
=Result: 1589.8

Expected number of people without IHD but are alcoholics= 1209- 45.51  
=Result: 1163.4
Expected number of people without IHD but are hyperlipidemics =2425- 91.29  
=Result: 2333.7

\[ x^2 = \frac{(O - E)^2}{E} \]

\[ x^2 = 41.47 \]

x value from chi-square table is 5.99
Degree of freedom = Row-1 x Column 1  
= 3-1
Degree of freedom= 2
The p-value is <0.00001. The result is significant at p<0.05

Report: There is a strong relationship between the presence of risk factors DM and HTN and IHD. The person with IHD has higher chances of getting stroke and other life-threatening conditions.

IV. Discussion

The relative risk was highest in Hypertensive patients indicating that they were more prone for serious cardiovascular complication. Followed by Smoking, Alcohol, Diabetes and Hyperlipidemics. The chi square test done reveals that there is a strong association of the risk factors in the patients and must be avoided accordingly.
by proper management by following healthy lifestyle and diet.

V. Conclusion

Coronary artery disease is thought to begin with damage or injury to the inner layer of a coronary artery, sometimes as early as childhood. The damage may be caused by various factors, including:

- Smoking
- High blood pressure
- High cholesterol
- Diabetes or insulin resistance
- Sedentary lifestyle

Once the inner wall of an artery is damaged, fatty deposits (plaque) made of cholesterol and other cellular waste products tend to accumulate at the site of injury in a process called atherosclerosis. If the surface of the plaque breaks or ruptures, blood cells called platelets will clump at the site to try to repair the artery. This clump can block the artery, leading to a heart attack.

Out of 209 Patients who were enrolled for the study, their Demographics, Past Medical History, Comorbidity, Conditions, Blood pressure, Heart rate, INR value, APTT value and medications data were collected. The risk factors on IHD patients.

Acknowledgement

We sincerely thank our project guide Mr. Sanjay Sharma, Assistant Professor, Dept of Pharmacy Practice, PES college of Pharmacy, Bengaluru whose help stimulating suggestions and encouragement helped us during the study period and for writing the thesis and publication. We also like to thank Dr. Biswaranjan Patra without His cooperation and help this study could not be completed.

References


DOI: 10.9790/3008-1302031016 www.iosrjournals.org 15 | Page
Tejal Hiremath. “‘Retrospective Study on The Effect of Comorbid Conditions And Prevalence of Ischemic Heart Disease In Quaternary Care Hospital.”’ IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) 13.2 (2018): 10-16.