

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

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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.*

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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 morbid 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.

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

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%).

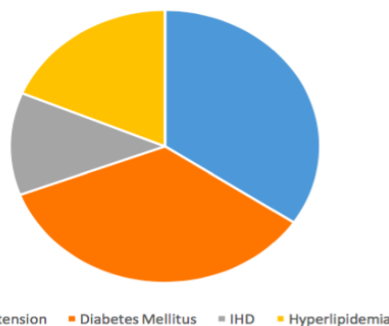


Fig.1 Number of Patients who were K/C/O HTN,DM, Hyperlipidemia and IHD.

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

IHD		
	Yes	No
Diabetes Mellitus	86	2200
Not having Diabetes Mellitus	123	19788

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

IHD		
	Yes	No
Hypertension	85	1500
Not having Hypertension	124	20488

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

IHD		
	Yes	No
Smoking	89	1563
Not Smoking	120	22108

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

IHD		
	Yes	No
Alcohol	64	1145
Not alcoholics	145	22133

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

IHD		
	Yes	No
Hyperlipidemic	46	2379
Not Hyperlipidemic	163	22151

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.

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

$$= \frac{209}{22197} \times 100$$

=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.

Mortality	Factor –I DM	Factor –II HTN	Total
IHD	86	85	171
Non-IHD	2200	1500	3700
Total	2286	1585	3871

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

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

$$\chi^2 = \frac{(O-E)^2}{E}$$

O- Observed E-Expected

$$\chi^2 = 80.09$$

x value from chi-square table value is 3.84

Degree of freedom = Row-1 x Column 1

$$= 2-1 \times 2-1$$

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.

Mortality	Factor III- Smoking	Factor IV- Alcoholics	Factor V- Hyperlipidemics	Total
IHD	89	64	46	199
Non-IHD	1563	1145	2379	5087
Total	1652	1209	2425	5286

$$= \frac{\text{Total Disease} \times \text{Total Number of factors.}}{\text{Grand Total}}$$

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

$$\chi^2 = \frac{(O - E)^2}{E}$$

O- Observed E-Expected

$$\chi^2 = 41.47$$

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, Comorbid Conditions, Blood Pressure, Heart rate, INR value, APTT value and medications data were collected. The effect of risk factors in IHD was assessed by using Chi Square Test and there was a significant effect of risk factors on IHD patients.

From the Retrospective study carried out at BGS Gleneagles Global Hospital showed that the risk factors present in IHD patient increases the chances of stroke and other life threatening conditions. The risk factors must be controlled and prevented accordingly.

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References

- [1] Ischemic Heart Disease <http://www.webhealthcentre.com/DiseaseConditions/heart.aspx>
- [2] Coronary Artery Disease https://en.wikipedia.org/wiki/Coronary_artery_disease
- [3] Coronary Artery Disease (Ischemic Heart Disease) Introduction - <http://diseasesdata.blogspot.in/2015/04/coronary-artery-disease-ischemic-heart.html> Faxon, D. P. (1 June 2004). "Atherosclerotic Vascular Disease Conference: Executive Summary: Atherosclerotic Vascular Disease Conference Proceeding for Healthcare Professionals From a Special Writing Group of the American Heart Association".
- [4] Rupert A Payne, Gary A Abel, Colin R Simpson *A retrospective cohort study assessing patient characteristics and the incidence of cardiovascular disease using linked routine primary and secondary care data* *BMJ Open* 2012;2:e000723. doi: 10.1136/bmjopen-2011-000723 Available from: URL: <http://bmjopen.bmj.com/content/2/2/e000723>
- [5] Sukanta Mandal, Joyti Bikash Saha, Sankar Chandra Mandal, Rudra Nath Bhattacharya, Manashi Chakraborty, and Partha Pratim Pal *Prevalence of Ischemic Heart Disease Among Urban Population of Siliguri, West Bengal Indian J Community Med.* 2009 Jan; 34(1): 19–23. doi: 10.4103/0970-0218.44518 Available from: URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2763663/>
- [6] Najlaa Aljefree and Faruk Ahmed *Prevalence of Cardiovascular Disease and Associated Risk Factors among Adult Population in the Gulf Region: A Systematic Review* Volume 2015 (2015), Article ID 235101, 23 pages
- [7] Masoud Aliyali, Hossein Mehravaran, Siavash Abedi, Ali Sharifpour, and Jamshid Yazdani Cherati *Impact of Comorbid Ischemic Heart Disease on Short-Term Outcomes of Patients Hospitalized for Acute Exacerbations of COPD Tanaffos.* 2015; 14(3): 165–171. Available from: URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4745184/>
- [8] Maguy Chiha, Mario Njeim, and Edgar G. Chedrawy *Diabetes and Coronary Heart Disease: A Risk Factor for the Global Epidemic* *International Journal of Hypertension* Volume 2012 (2012), Article ID 697240, 7 pages Available from: URL: <https://www.hindawi.com/journals/ijhy/2012/697240/>
- [9] Pekka Jousilahti, Erkki Vartiainen, Jaakko Tuomilehto, Pekka Puska *Sex, Age, Cardiovascular Risk Factors, and Coronary Heart Disease* *Circulation.* 1999;99:1165-1172 Originally published March 9, 1999 Available from: URL: <http://circ.ahajournals.org/content/99/9/1165>
- [10] Richard W Nesto, MD *Prevalence of and risk factors for coronary heart disease in diabetes mellitus* Nov 21, 2016.
- [11] Majaz Moonis, Marc Fisher *Considering the Role of Heparin and Low-Molecular-Weight Heparins in Acute Ischemic Stroke* Originally published July 1, 2002 2002;33:1927-1933 Available from: URL: <http://stroke.ahajournals.org/content/33/7/1927>
- [12] PW Wilson *Diabetes mellitus and coronary heart disease* *American Journal of Kidney Diseases* Volume 32, Issue 5, Supplement 3 react-text: 63 ,react-text react-text: 64 November 1998 react-text react-text: 65 , Pages S89-S100 Available from: URL: <http://www.sciencedirect.com/science/article/pii/S0272638698003370>
- [13] Jan Skov Jensen, Bo Feldt-Rasmussen, Svend Strandgaard, Marianne Schroll, Knut Borch-Johnsen *Arterial Hypertension, Microalbuminuria, and Risk of Ischemic Heart Disease.* Originally published April 1, 2000 2000;35:898-903 Available from: URL: <http://hyper.ahajournals.org/content/35/4/898>
- [14] Deepak L. Bhatt, MD, Eric J. Topol, MD *ANTIPLATELET AND ANTICOAGULANT THERAPY IN THE SECONDARY PREVENTION OF ISCHEMIC HEART DISEASE* Volume 19, Issue 2, 1 May 2001, Pages 253–265
- [15] Shaper AG, Cook DG, Walker M, et al *Prevalence of ischemic heart disease in middle aged British men.* *Heart* 1984;51:595-605

- [16] Mark A Hlatky Comorbidity and outcome in patients with coronary artery disease Volume 43, Issue 4, February 2004> DOI: 10.1016/j.jacc.2003.11.021 Available from: URL: <http://www.onlinejacc.org/content/accj/43/4/583.full.pdf>
- [17] Nathan D. Wong Epidemiological studies of CHD and the evolution of preventive cardiology Wong, N. D. *Nat. Rev. Cardiol.* 11, 276–289 (2014); published online 25 March 2014
- [18] Dawn Shepard, Gregory Roth, Amy Vander Zanden Ischemic heart disease worldwide, 1990 to 2013 Published in *Circulation: Cardiovascular Quality and Outcomes*, July 2015
- [19] Khaled Hbejan Smoking Effect on Ischemic Heart Disease in Young Patients *Heart Views*. 2011 Jan-Mar; 12(1): 1–6. doi: 10.4103/1995-705X.81547 Available from: URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3123509/>
- [20] Jean-Bernard Ruidavets et al. Patterns of alcohol consumption and ischaemic heart disease in culturally divergent countries: the *Prospective Epidemiological Study of Myocardial Infarction (PRIME) BMJ* 2010; 341 doi: <https://doi.org/10.1136/bmj.c6077> *BMJ* 2010;341:c6077 (Published 24 November 2010) Available from: URL: <http://www.bmj.com/content/341/bmj.c6077>
- [21] Lucie Lacoste, Jules Y.T. Lam, Joseph Hung, Glaci Letchacovski, Charles B. Solymoss, David Waters *Hyperlipidemia and Coronary Disease Correction of the Increased Thrombogenic Potential With Cholesterol Reduction* <https://doi.org/10.1161/01.CIR.92.11.3172> *Circulation*. 1995;92:3172-3177 Originally published December 1, 1995 Available from: URL: <http://circ.ahajournals.org/content/92/11/3172>
- [22] Joseph T Dipiro et al. *Pharmacotherapy principles and practice*, (McGraw Hill Publishers, United States of America. 2008.)

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