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Risk Stratification for Detection of Coronary Artery Disease and Effectiveness of Sensitization Programme on Reduction of Risk for Coronary Artery Disease among Adults in Selected Urban Areas of Vijayapur

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Abstract

Background: Cardiovascular diseases, especially coronary heart disease (CHD), are epidemic in India. The Registrar General of India reported that CHD led to 17% of total deaths and 26% of adult deaths in 2001-2003, which increased to 23% of total and 32% of adult deaths in 2010-2013. In India, studies have reported increasing CHD prevalence over the last 60 years, from 1% to 9%-10% in urban populations and <1% to 4%-6% in rural populations. Important risk factors for CHD in India are dyslipidemias, smoking, diabetes, hypertension, abdominal obesity, psychosocial stress, unhealthy diet, and physical inactivity. Suitable preventive strategies are required to combat this epidemic.

Aim: The aim of the study is to assess and stratify the risk of coronary artery disease among adults.

Materials and Methods: The research design used for this study is true experimental pre test post test control group design with follow up. Non probability Quota sampling technique will be used for this study. Sensitization programme is an intervention in which repeated administration of interventions to the participants to understand and involve in risk reduction strategies of coronary artery disease.

Result: Frequency and Percentage distribution of study participants according to their risk of CAD. Majority 144(72.0%) of the study participants had low risk of CAD followed by 52(26.0%) of the study participants who had intermediate risk and remaining 4(2.0%) of the study participants had high risk. A total of 200 adults were completed the questionnaire. The sociodemographic data represented that frequency and percentage distribution of adults according to socio- demographic profile such as age, gender, religion, marital status, educational status, occupation, dietary habits, family history of heart disease, smoking habits and alcohol consumption. The BMI level of the adults depicts that majority 131(91.0%) had normal BMI, 6(4.2%) were overweight and 7(4.9%) under weight. Off high risk study subjects, majority 28(50.0%) had over weight and 14(25.0%) each of the study subjects had normal weight and obese respectively. In relation to adult stress majority 52(92.9%) were at moderate risk of illness and only 4(7.1%) were at risk illness. It was clear that coronary artery risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with

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posttest-I, posttest-II and posttest-III. Hence the sensitization programme was effective on reduction of coronary artery disease among the adults and hence second hypothesis was proved. It was seen that there was no association between knowledge risk scores of coronary artery disease with their selected socio-demographic variables such as Age, Gender, Religion, Education, laborer, dietary habit, family History, smoking habits, alcohol consumption but it was highly associated with Marital Status.

Conclusion: The study concludes that risk factor of coronary artery disease was highly associated with selected risk factors such as dietary habits, junk food consumption, family history, smoking habits, consumptions of alcohol, adult stress, BMI and physical activity**.**

Key words: Risk Stratification, Coronary Artery Disease, Sensitization Programme, Adults

Introduction

Cardiovascular diseases, especially coronary heart disease (CHD), are epidemic in India. The Registrar General of India reported that CHD led to 17% of total deaths and 26% of adult deaths in 2001-2003, which increased to 23% of total and 32% of adult deaths in 2010-2013. The World Health Organization (WHO) and Global Burden of Disease Study also have highlighted increasing trends in years of life lost and disability adjusted life years from CHD in India. In India, studies have reported increasing CHD prevalence over the last 60 years, from 1% to 9%-10% in urban populations and <1% to 4%-6% in rural populations. Case-control studies have reported that important risk factors for CHD in India are dyslipidemias, smoking, diabetes, hypertension, abdominal obesity, psychosocial stress, unhealthy diet, and physical inactivity. Suitable preventive strategies are required to combat this epidemic.[1]

Coronary heart disease (CHD) is a major cause of mortality and morbidity all over the world. According to a report of World Health Organization (WHO) in 2005, cardiovascular disease (CVD) caused 17.5 million (30%) of the 58 million deaths that occurred worldwide. While the prevalence and mortality due to CHD is declining in the developed nations the same cannot be held true for developing countries. There has been an alarming increase over the past two decades in the prevalence of CHD and cardiovascular mortality in India and other south Asian countries. India is going through an epidemiologic transition whereby the burden of communicable diseases has declined slowly, but that of non-communicable diseases has risen rapidly, thus leading to a dual burden. The burgeoning burden of CHD in India can be explained by the alarming rise in the prevalence of coronary risk factors like diabetes, hypertension, atherogenic dyslipidemias, smoking, central obesity and physical inactivity. Rapid urbanization and change in lifestyle that occurred during the past two decades have led to the growing burden of coronary risk factors in India.[2]

Concurrent with rapid urbanization and development there has been a remarkable change in the lifestyle of most Indians. People tend to smoke or chew tobacco as a mark of social status, tend to ignore physical activity, eat more junk or fatty food, consume more salt, and prone to more psychosocial stress. The resultant effect of this change is epidemic like increase in life style related disorders According to a very modest calculation India is a home to 155 million obese, 140 million hypertensive, 31.8 million CAD, 64 million diabetes including pre-diabetes and 1-2 million stroke patients.[3]

Symptoms of coronary artery disease presentations can vary from asymptomatic, stable chest pain and acute coronary syndrome to sudden cardiac death. Chest pain seen with stable angina is often mid-sternal, squeezing in quality, associated with a feeling of constriction or anxiety, radiating to the arms, neck, jaw, back or upper abdomen. These symptoms worsen with exertion because of the increased oxygen demand and improve with rest because of the decreased oxygen demand.

History taking is the most valuable technique to differentiate among different causes of chest discomfort. A thorough history and physical exam is the hallmark for the diagnosis of coronary artery disease. Characteristic features of stable angina are chest pain that worsens with emotional and physical exertion, cold weather, and meals. The patient experiences pain relief from rest and nitrates. Features of unstable angina include pain at rest that lasts over

30 minutes and does not relieve with sublingual nitroglycerine. Pain associated with sweating, nausea, and vomiting may suggest myocardial infarction. Patients may present with complications of MI such as heart failure, ventricular septal defect (VSD), harsh systolic murmur, or papillary muscle rupture.

ECG is a tool for assessing patients who are either stable or in emergent situations. The presence of specific ECG findings should prompt referral, when necessary, for thrombolysis. However, ECG is not absolute as ST-segment elevations are present in only 50% of MIs confirmed by cardiac enzymes. Echocardiogram, stress testing, cardiac CT, and angiography are also other available options.

Early recognition of risk factors and primary prevention have significantly decreased the morbidity and mortality associated with CAD. Diet is a significant contributing factor to reduce the risk of coronary artery disease. According American Heart Association - 2019, the plant-based Mediterranean diet (high in vegetables, fruits, nuts, whole grains, and fish) is highly recommended. Replacing saturated fats with dietary monosaturated and polyunsaturated fats are found to be beneficial to reduce cardiovascular risks. Besides, dietary sodium reduction is found to have reduced BP and decreased risk for cardiovascular events, according to the DASH trial.

Physical activity is also equally beneficial for CAD risk reduction. At least 150 minutes per week of moderate-intensity activities and greater than 75 minutes a week of vigorous-intensity physical activities are helpful. Moderate activities include brisk walking (2.4 to 4 mph), biking (5 to 9 mph), active yoga, and recreational swimming, whereas vigorous activities include jogging/running, biking (greater than 10 mph), playing tennis, swimming, etc.[4]

Materials and Methods

Quantitative research approach with longitudinal measurement of outcome used for the present study. The research design used for this study is true experimental pre test post test control group design with follow up. The study was conducted at selected urban areas of Vijayapur. Total 200 adults were selected by using Non probability Quota sampling technique. The study includes adults between the age group of (20 years to 60 years) who fulfilled the inclusion criteria and available at the time of data collection. The data were collected on selected urban areas of Vijayapur to assess and stratify the risk of coronary artery disease among adults. Short lecture and Video assisted teaching, weekly once for 2 weeks will be given to experimental group and control group will be on routine activities. Post test will be done at 3 Months, 6 Months and 9 Months after intervention. Frequency and Percentage distribution of Socio demographic profile. Frequency and Percentage Distribution, mean and standard deviation of study variables. Chi-square test will be used to find out the association between the risk scores of coronary artery disease of adults with their selected demographic variables. ANOVA for repeated measurement.

Results

Frequency and Percentage distribution of study participants according to their risk of CAD. Majority 144(72.0%) of the study participants had low risk of CAD followed by 52(26.0%) of the study participants who had intermediate risk and remaining 4(2.0%) of the study participants had high risk. A total of 200 adults were completed the questionnaire. The sociodemographic data represented that frequency and percentage distribution of adults according to socio- demographic profile such as age, gender, religion, marital status, educational status, occupation, dietary habits, family history of heart disease, smoking habits and alcohol consumption. The BMI level of the adults depicts that majority 131(91.0%) had normal BMI, 6(4.2%) were overweight and 7(4.9%) under weight. Off high risk study subjects, majority 28(50.0%) had over weight and 14(25.0%) each of the study subjects had normal weight and obese respectively. In relation to adult stress majority 52(92.9%) were at moderate risk of illness and only 4(7.1%) were at risk illness. It was clear that coronary artery risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with posttest-I, posttest-II and posttest-III. Hence the sensitization programme was effective on reduction of coronary artery disease among the adults and hence second hypothesis was proved. It was seen that

there was no association between knowledge risk scores of coronary artery disease with their selected socio-demographic variables such as Age, Gender, Religion, Education, laborer, dietary habit, family History, smoking habits, alcohol consumption but it was highly associated with Marital Status.

Table 1: Frequency and percentage distribution of adults according to Socio- demographic Profile

SI No	Age	Low Risk		High Risk	
		Frequency	Percentage	Frequency	Percentage
1	20-30	57	39.6%	00	0.0.0
2	30-40	51	35.4%	10	17.9%
3	40-50	25	17.4%	31	55.4%
4	50-60	11	7.6%	15	26.8%
	Total	144	100.0%	56	100.0%
	Gender				
1	Male	73	50.7%	40	71.4%
2	Female	71	49.3%	16	28.6%
	Total	144	100.0%	56	100.0%
	Religion				
1	Hindu	88	61.1%	26	46.4%
2	Muslim	31	21.5%	19	33.9%
3	Christian	18	12.5%	10	17.9%
4	Others	07	4.9%	01	1.8%
	Total	144	100.0%	56	100.0%
	Marital Status				
1	Married	101	70.1%	39	69.6%
2	Unmarried	34	23.6%	13	23.2%
3	Widow/Widow	03	2.1%	00	0.0%
4	Divorce	06	4.2%	04	7.1%
	Total	144	100.0%	56	100.0%
	Educational Status				
1	Illiterate	31	21.5%	08	14.3%
2	Primary	34	23.6%	07	12.5%
3	Higher Primary	40	27.8%	19	33.9%
4	PUC	11	7.6%	09	16.1%
5	Graduates	20	13.9%	11	19.6%
6	PG & Above	08	5.6%	02	3.6%
	Total	144	100.0%	56	100.0%
	Occupation				
1	Labour	56	38.9%	19	33.9%
2	Private Employee	49	34.0%	27	48.2%
3	Unemployed	02	1.4%	03	5.4%
4	House wife	36	25.0%	07	12.5%
5	Business	01	0.7%	00	0.0%
	Total	144	100.0%	56	100.0%
	Dietary Habits				

1	Vegetarian	74	51.4%	13	23.2%
2	Non-Vegetarian	70	48.6%	43	76.8%
	Total	144	100.0%	56	100.0%
	Family History of CAD				
1	Yes	01	0.7%	55	98.2%
2	No	143	99.3%	01	1.8%
	Total	144	100.0%	56	100.0%
	Smoking Habit				
1	Yes	20	13.9%	41	73.2%
2	No	124	86.1%	15	26.8%
	Total	144	100.0%	56	100.0%
	Consumption of Alcohol				
1	Yes	27	18.8%	38	67.9%
2	No	117	81.3%	18	32.1%
	Total	144	100.0%	56	100.0%

Table 01 shows that majority 57(39.6%) were belongs to 20-30 years of age, 51(35.4%) were belongs to 30-40 years of age, 25(17.4%) belongs to 40-50 years of age and 11(7.6%) were belongs to the 50-60 years of age. 56 study participants had risk of CHD. Off these 31(55.4%) were belongs to the age group 40-50 years, 15(26.8%) belongs to the 50-60 years of age and 10(17.9%) were in the age group 30-40. It was noted that, of the low risk study participants 73(50.7%) were males and remaining 73(49.3%) were females. Of the high risk study participants, 40(71.4%) of the study participants were males and remaining 16(28.6%) of the study participants were males. It was clear that, of the low risk study participants, majority 88(61.1%) were Hindu, 31(21.5%) were Muslims, 18(12.5%) were Christians and remaining 7(4.9%) were belongs to other caste. Off the high risk study participants, majority 26(46.4%) were Hindu, 19(33.9%) were Muslims, 10(17.9%) were Christians and only 1(1.8%) belongs to other caste. IN relation to marital status study participants with low risk CAD, 101(70.1%) were married, 34(23.6%) were unmarried, 3(2.1%) were widow/widower and 6(4.2%) were divorced. Off the high risk study participants, majority 39(69.6%) were married, 13(23.2%) were unmarried and 4(7.1%) were divorced. Majority 40(27.8%) were studied up to higher primary followed by 34(23.6%) had primary education, 31(21.5%) were illiterate, 20(13.9%) were graduates, 11(7.6%) were studied PUC and 8(5.6%) were post graduates. Off the study participants with high risk, majority 19(33.9%) had higher primary education, 11(19.6%) were graduates, 9(16.1%) were studied PUC, 8(14.3%) were illiterate, 7(12.5%) had primary education and only 2(3.6%) were post graduates. It was observed off the low risk study participant's majority 56(38.9%) were labors, 49(34.0%) private employee, 36(25.0%) housewife, 2(1.4%) unemployed and 1(0.7%) were doing business. Off the high risk study participants, 27(48.2%) were private employee, 19(33.9%) were labour, 7(12.5%) were housewife and only 3(5.4%) were unemployed. It was noted that, off the low risk study participants 74(51.4%) were vegetarians and remaining 70(48.6%) were Non-Vegetarians. Off the high risk study participants, 13(23.2%) of the study participants were vegetarians and remaining 43(76.8%) of the study participants were non-vegetarians. Study participants with low risk CHD consume junk food and all of the study participants with risk of CAD had habit of consuming junk food. In relation to family history of CAD revealed that 143(99.3%) of the study participants with low risk had no family history of CAD and 55(98.2%) of the study participants with high risk had family history of CAD. it was seen that among the study participants with low risk of CHD, 20(13.9%) had smoking habits and among the high risk study participants 41(73.2%) had smoking habits. Only 27(18.8%) low risk study participants had habit of consuming alcohol whereas 38(67.9%) of high risk adolescents had habit of consuming alcohol.

Determination of Effect of Sensitization Programme on Reduction of Risk for Coronary Artery Disease among Adults

Table 2: The Pre-existing Level of Knowledge of the Study Participants regarding Coronary Artery Disease

Duration of Study	EG		CG		Independent t-value	P-value
	Mean	SD	Mean	SD		
Pretest	8.17	6.49	8.21	6.61	-0.02	0.984(NS)
Posttest-I	12.71	5.38	8.64	6.41	2.57	<0.0001(S)
Posttest-II	20.03	3.69	9.71	6.24	7.52	<0.0001(S)
Posttest-III	27.10	2.88	9.96	6.36	12.9	<0.0001(S)

From Table No 02, it was clear that coronary artery disease risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with posttest-I, posttest-II and posttest-III.

Hence the sensitization programme was effective on reduction of coronary artery disease among the adults.

Table 3: Association between Pre-test Knowledge Risk Scores of Coronary Artery Disease with their selected Demographical Variables

S.I No.	Pre-test knowledge		Chi-Square	df	P-Value	Result
	≤M	>M				
Age						
30-40	05	05	0.515	2	0.773	NS
40-50	19	12				
50-60	08	07				
Gender						
Male	22	18	0.26	1	0.61	NS
Female	10	6				
Religion						
Hindu	13	13	1.61	3	0.658	NS
Muslim	12	07				
Christian	06	04				
Others	01	0				
Marital Status						
Married	19	20	7.44	2	0.02	S*
Unmarried	11	1				
Divorce	2	2				
Educational Status						
Illiterate	3	5	4.587	5	0.47	NS
Primary	6	1				
Higher Primary	11	8				
PUC	6	3				
Graduates	5	6				
PG & Above	1	1				
Occupation						

Labourer/Coolie	12	7	1.0	3	0.80	NS
Private Employee	15	12				
Unemployed	2	1				
House Wife	3	4				
Dietary Habit						
Vegetarian	6	7	0.83	1	0.36	NS
Non-Vegetarian	26	17				
Family History						
Yes	32	23	1.35	1	0.24	NS
No	0	1				
Smoking Habits						
Yes	23	18	0.068	1	0.79	NS
No	9	6				
Alcohol Consumption						
Yes	20	18	0.98	1	0.32	NS
No	12	6				

Table No 03, it was seen that there was no association between knowledge risk scores of coronary artery disease with their selected socio-demographic variables such as Age, Gender, Religion, Education, labour, dietary habit, family History, smoking habits, alcohol consumption but it was highly associated with Marital Status.

Discussion

Coronary heart disease is now the leading cause of death and disability globally. Despite recent declines in age-adjusted death rates from CHD, the number of CHD deaths has been increasing due to a combination of growth in population numbers and their longevity. In addition, manifestation and outcome of CHD varies substantially between and within countries. There are strong, unconfounded relationship between several risk factors and CHD mortality and non-fatal myocardial infarction. The most important risk factors for CHD are smoking, high blood pressure, dyslipidemia, diabetes, physical inactivity, unhealthy diet, and obesity. Controlling these risk factors even in middle- aged individuals, through lifestyle changes, medical treatment, or public health interventions, may reduce CHD incidence by almost one-half. The study result shows that frequency and percentage distribution of study participants according to their risk of CAD. Majority 144(72.0%) of the study participants had low risk of CAD followed by 52(26.0%) of the study participants who had intermediate risk and remaining 4(2.0%) of the study participants had high risk. A total of 200 adults were completed the questionnaire. The sociodemographic data represented that frequency and percentage distribution of adults according to socio- demographic profile such as age, gender, religion, marital status, educational status, occupation, dietary habits, family history of heart disease, smoking habits and alcohol consumption. The BMI level of the adults depicts that majority 131(91.0%) had normal BMI, 6(4.2%) were overweight and 7(4.9%) under weight. Off high risk study subjects, majority 28(50.0%) had over weight and 14(25.0%) each of the study subjects had normal weight and obese respectively. In relation to adult stress majority 52(92.9%) were at moderate risk of illness and only 4(7.1%) were at risk illness. It was clear that coronary artery risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with posttest-I, posttest-II and posttest-III. Hence the sensitization programme was effective on reduction of coronary artery disease among the adults and hence second hypothesis was proved. It was seen that there was no association between knowledge risk scores of coronary artery disease with their selected socio-demographic variables such as Age, Gender, Religion, Education, laborer, dietary habit, family History, smoking habits, alcohol consumption but it was highly associated with Marital Status.

Recommendations

- Several experts and organizations have published guidelines or recommendations on the identification, management and prevention of Coronary Artery Disease
- A similar study can be conducted on a large sample may help to draw more definite conclusions and make generalization.
- Our study highlighted the coronary artery risk score were same between experimental and control group during pretest but the difference in risk scores was highly significant when compared with posttest-I, posttest-II and posttest-III. Hence the sensitization programme was effective on reduction of coronary artery disease among the adults.

Conclusion

Preventing coronary artery disease is largely about controlling the risk factors. "Ideally, prevention habits start early, but they remain important all through life. Preventive healthcare is comprised of three main platforms. First, there is primary prevention, which suggests that patients should live in a way that he/she would not be a victim of the disease in the first place. In relation to CVD, this means maintaining ideal bodyweight, balanced diets, and cessation from unhealthy practices such as smoking and excessive alcohol consumption. However, CVD is a result of many factors which are modifiable as well as unmodifiable risk factors. Tertiary prevention aims to treat patients when the symptoms have been set and critical damage has already occurred. This in general aims to increase the life expectancy and quality of life of the patient via intensive procedures such as pacemaker placement and bypass surgery.

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