

Cardiovascular Health Screening Of A Group Of Adults Residing In Ahmedabad City A Study Of Correlation Between Exercise, Body Mass Index And Heart Rate

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Abstract: Background & Objectives: Cardiovascular diseases are the most common cause of death in India, causing 1.7 to 2 million deaths annually. Objective of the present study is to screen cardiovascular health of participating adult subjects. **Method:** A cross sectional study on total 49 subjects, selected randomly from the general population of Ahmedabad city was performed. A thorough history analysis, random blood sugar level, electrocardiography along with 2D echocardiographical evaluation of each individual was done. The study sample was divided into three groups, group A of subjects having 23-40 years of age, group B of subjects having 41-50 years of age and group C of subjects having 51-66 years of age. Prevalence of ischemic heart disorders, diabetes mellitus, hypertension and obese or overweight subjects in each group were obtained. **Results:** 87% subjects of group C had ischemic heart disorders, whereas 67% subjects of group B and 46% subjects of group A had ischemic heart disorders. Subjects belonging to older age group (group C) had significantly higher prevalence of ischemic heart disorders than younger age group (group A) subjects ($p < 0.05$). 15% subjects of group A, 9% subjects of group B and 20% subjects of group C had diabetes mellitus. 30% subjects of group A, 33% subjects of group B and 33% subjects of group C were overweight or obese. 15% subjects of group A, 9% subjects of group B and 27% subjects of group C were hypertensive. **Interpretation & Conclusion:** Ischemic heart disorders are highly prevalent in older age groups among the study sample. Also, almost half subjects of younger age group and more than half subjects of middle age group have history or signs of ischemic heart disorders, indicating the need of development of nationwide guidelines for screening and preventing cardiovascular diseases in apparently healthy population.

Key Words: Ischemic heart disease, 2-D echocardiography, electrocardiography, older age, cardiovascular screening.

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Introduction: Cardiovascular diseases are the leading cause of mortality in all age groups and have been increasing at alarming rates worldwide. Cardiovascular diseases are the most common cause of death in India, causing 1.7 to 2 million deaths annually. Over 80% of CVD deaths take place in low- and middle-income countries. According to WHO global atlas on cardiovascular disease and prevention, by 2030, almost 23.6 million people will die from CVDs.¹ CVDs due to atherosclerosis include ischemic heart disease or coronary artery disease (e.g. heart attack), cerebrovascular disease (e.g. stroke), diseases of the aorta and arteries, including hypertension and peripheral vascular disease. Other CVDs include congenital heart disease, rheumatic heart disease, cardiomyopathies and cardiac arrhythmias. Though CVD places a significant economic burden on low- and middle-income countries², the resources available for its management in these countries are limited because of competing health priorities. Therefore, it is essential to recognize CVD in early stages of development, when they are still preventable. The incidence and prevalence of

CHD both rise steeply with increasing age³. Age is a powerful cardiovascular risk factor. According to United Nations (UN) projections, in 2025 there will be 1.2 billion elderly people worldwide, 71% of them likely to be in developing countries³. The rapidly growing burden of CVD in low middle income countries is accelerated by population ageing. Preventing ischemic heart disease at early stages can be helpful to decrease the burden of disease, therefore screening of middle and older aged population can be helpful for early recognition of disease. Many studies have been done for establishing the age as a risk factor^{4,5} for ischemic heart diseases. The present study is done to screen the asymptomatic adults for presence of ischemic heart diseases and some of risk factors of ischemic heart diseases like diabetes mellitus, obesity and hypertension.

Material and Method: Screening of ischemic heart diseases in whole population of Ahmedabad city is not possible due to financial reasons. Still, screening of ischemic heart diseases in a small group of adults is possible. Our study group was selected randomly by

simple random sampling from population of Ahmedabad city. The study group comprised of persons having age between 23-66 years, so that young, middle and old aged individuals can be included in the study group. A cross sectional study on total 49 subjects, was performed. Study was performed in Narayana Hrudayalaya speciality heart hospital located in Ahmedabad. The study was conducted during September and October, 2012.

Each subject was explained about the details of study and written consent from each subject was taken prior commencing the study. Each person was given a self assessment form for initial information about name, age, past, personal and family history. Direct questions were asked in the form to help the subject to give proper history. Weight, height and pulse and blood pressure measurement of each subject was done. Blood pressure was measured with the help of sphygmomanometer.

Random blood sugar level using glucometer, electrocardiography using 12 lead ECG machine and 2D echocardiographical screening, of each individual was done. RBS \geq 200 plus symptoms of diabetes mellitus was considered as having diabetes mellitus⁶. A person with the past history of being diagnosed as hypertensive, were classified as hypertensive. Body mass index of each subject was calculated by using formula $\text{weight (in kilograms) / (height)}^2$ (in meter²). Body Mass Index (BMI) is the ratio of weight in kilograms to the square of height in meters is used as an indicator of overweight / obesity. BMI \geq 25 is considered as overweight and BMI \geq 30 is considered as obese.

The subjects taking part in the study were of 23-66 years of age. The study sample was divided into three groups, group A of subjects having 23-40 years of age, group B of subjects having 41-50 years of age and group C of subjects having 51-66 years of age. Presence of ischemic heart disease was determined by previous history of heart attack and ECG along with echocardiographic findings positive for ischemic heart disease. Number of subjects having IHD, DM, HTN, and number of subjects having BMI \geq 25 (overweight subjects) from each group were calculated. Prevalence of cardiovascular

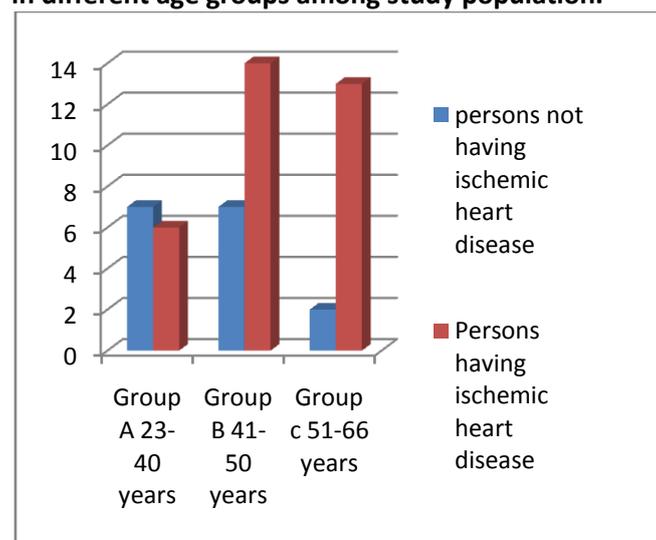
disorders, diabetes mellitus, hypertension and obese or overweight subjects in each group were obtained and statistically compared between groups A, B, C using fisher's exact test. All the subjects were screened by skilled doctors and their ECG, 2 D echocardiography and other findings were assessed by a cardiologist. Appropriate treatment and follow up was advised to whomever needed.

Observations and Results: 87% subjects of group C had ischemic heart disorders, whereas 67% subjects of group B and 46% subjects of group A had ischemic heart disorders. Number of subjects having IHD in older age group (group C) were significantly higher than number of subjects

Table-1: Prevalence of Ischemic heart diseases in different age groups among study population

Group	Persons having ischemic heart disease	Persons not having ischemic heart disease	Total
Group A 23-40 Years	6	7	13
Group B 41-50 years	14	7	21
Group C 51-66 years	13	2	15

Figure-1: Prevalence of Ischemic heart diseases in different age groups among study population.



having IHD in younger age group (group A) (p value 0.0418, $p < 0.05$). 15% subjects of group A, 9% subjects of group B and 20% subjects of

group C had diabetes mellitus. 30% subjects of group A, 33% subjects of group B and 33% subjects of group C were overweight or obese. 15% subjects of group A, 9% subjects of group B and 27% subjects of group C were hypertensive.

Table-2: Prevalence of Diabetes Mellitus in different age groups among study population

Group	Persons having diabetes mellitus	Persons not having diabetes mellitus	Total
Group A 23-40 years	2	11	13
Group B 41-50 years	2	19	21
Group C 51-66 years	3	12	15

Figure-2: Prevalence of Diabetes Mellitus in different age groups among study population.

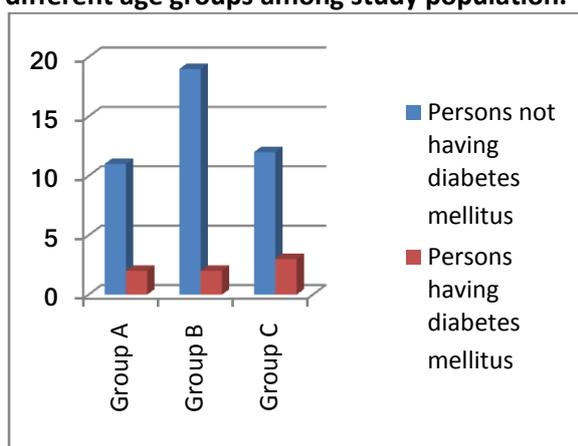


Table-3: Prevalence of Hypertension in different age groups among study population.

Group	Persons having hypertension	persons not having hypertension	total
Group A 23-40 years	2	11	13
Group B 41-50 years	2	19	21
Group c 51-66 years	4	11	15

Figure-3: Prevalence of Hypertension in different age groups among study population.

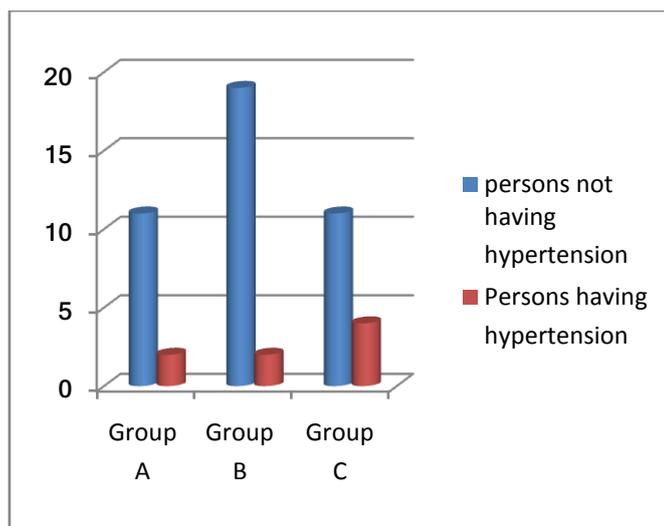


Table-4: Obese and overweight persons in different age groups among study population.

	Persons overweight or obese	persons not overweight or obese	total
Group A 23-40 years	4	9	13
Group B 41-50 years	7	14	21
Group C 51-66 years	5	10	15

Discussion: Ageing is a risk factor for cardiovascular diseases. From our study it is clear that presence of ischemic heart disease is significantly higher in old age group(51-66 years) than younger age group (23-40 years) (p value 0.0418, p<0.5). It is also evident that ischemic heart diseases are present in large proportion not only in older age group (51-66 years), but also middle age group (41-50 years) and younger age group (23-40 years).

In present study, 6 persons out of 49 gave the history of previous heart attack, while 27 persons did not give past history of any heart attack or any disorder of heart but their electrocardiographic and echocardiographic findings were showing signs of ischemic heart disease like ST segment and T wave

abnormalities, suspected myocardial infarction in different walls of heart in ECG and reduced LV function, regional wall motion abnormalities, left ventricular and atrial enlargement, LV hypertrophy, LV ejection fraction (LVEF) < 55%, in echocardiography. Thus, total 33 persons out of 49 (67% of total screened population) were either detected to have ECG or Echo findings of ischemic heart disease or gave previous history of ischemic heart attack. As stated above, 87% subjects of group C, 67% subjects of group B and 46% subjects of group A had ischemic heart disorders, indicating the high prevalence of IHD not only in older but also in middle and younger age people.

Out of 49 subjects, 6 persons were suffering from diabetes mellitus, 1 person was spot diagnosed by having random blood sugar level more than 200mg/dl, she also had symptoms of the disease. Thus, total 7 subjects out of 49 had diabetes mellitus, indicating 14% of the screened subjects having diabetes mellitus. Out of 49, 7 persons were diagnosed cases of hypertension. Thus, 14% subjects of the study population were hypertensive. Out of 49, 2 persons had body mass index greater than or equal to 30 and 14 persons were overweight, thus around 33% subjects were either overweight or obese among the study population.

As a result of the study, 67% persons participating in the study have been found as having history or signs of ischemic heart disease.

Conclusion: Disease burden of our country is increasing as a result of higher incidence of chronic non-communicable diseases such as cardiovascular diseases, cancer and diabetes. There is a need of integrating population based measures for CHD risk factor modification, along with cost-effective case management for individuals at high risk for developing CHD. The present study is a screening strategy which can be used for cardiovascular risk assessment of healthy population groups. Epidemiologic transition⁷ describes the paradigm shift in communicable diseases, as a predominant concern in developing countries, towards chronic non-communicable diseases. With respect to the evolution of cardiovascular

diseases in such countries, the increased numbers could be because of changing lifestyle measures including dietary practices, towards which the native population is genetically unaccustomed to. Disease prevention is the most cost-effective strategy for improving the health of our population, as this disease affects our population a decade earlier than the west.⁸

The study was designed with an intent to identify the presence of ischemic heart disease among apparently asymptomatic persons. Our study was done in a tertiary care cardiology institute with highly skilled specialist and super specialist doctors doing the screening of subjects. As a result of which, subjects who otherwise would have visited a tertiary health care centre following onset of symptoms (indication of progressive pathology and subsequent end organ damage) were identified beforehand, and damage control measures (referral and subsequent interventional health care) were duly implemented.

Although most chronic disease (CVD in the present scenario) pathological processes cannot be reversed, through our study we gained lead time by detecting, referring and thus postponing/preventing end organ damage. Through the study, we were able to achieve our goal of finding the prevalence of ischemic heart disease among the screened group and also, we could compare the occurrence of the same disease in young, middle and older aged individuals of our study population. We are able to conclude from the study that ischemic heart disorders are highly prevalent in older age groups among the study sample. Also, almost half subjects of younger age group and more than half subjects of middle age group have signs or history of IHD, indicating the need of guidelines for cardiovascular screening in apparently healthy adults of both younger and older ages. Further studies with a large study population are needed to find prevalence of undiagnosed ischemic heart diseases in the country to develop nationwide strategies to prevent cardiovascular diseases.

Acknowledgement: A sincere gratitude towards financial support given by Maharaja Karnadev Memorial Trust through which, we were able to

carry out the study, also thanks to Narayana Hrudayalaya Heart Hospital, who provided the screening services and cardiologist consultation at a very affordable rate.

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Disclosure: No conflicts of interest, financial or otherwise are declared by the authors.