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CAUSES OF CARDIOVASCULAR DISEASE (CVD) IN OLD AGE PEOPLE HAVING NORMAL RANGE OF BODY MASS INDEX (BMI)

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ABSTRACT

Cardiovascular Disease (CVD) is the one of major cause of deaths globally (WHO, 2011). Cardiovascular Disease is a general term describing disease of the Heart and Blood vessels. Cardiovascular Disease is a class of diseases that involve the Heart and Blood vessels (WHO 2011). Cardiovascular Disease generally refers to conditions that involve narrowed or blocked blood vessels that can lead to a heart attack, chest pain (angina) or stroke. An estimated 17.5 million people died from CVD in 2005, representing 30% of all deaths globally. The present study was carried out to find cause of CVD in old age people having normal range of BMI of Alwar (Rajasthan). The present study was carried out on 40 subjects which was divided into 20 males and 20 females respectively from Alwar (Rajasthan) region. The general information and medical history was collected from the selected subjects by interview cum questionnaire method. The mean nutrient intake viz. calories, proteins, fat, carbohydrates was calculated by seven day recall method. The survey revealed that the main causes of Heart disease were Physical Inactivity, high intake of saturated fats, Hypertension and Diabetes Mellitus despite the fact that the subjects were having normal weight. The nutrition education was imparted to the selected subjects as they were ignorant about their dietary intake.

INTRODUCTION

Cardiovascular Disease is now recognized as the leading cause of death and disability Worldwide (Ahmed et al., 2014) Cardiovascular Diseases are growing contributors to global disease burdens, with epidemics of CVD advancing across many regions of the world. Diet and nutrition have been extensively investigated as they are the one of major risk factors for major Cardiovascular Diseases like Coronary Heart Disease (CHD) and Stroke. Diet and Nutrition is also linked to other Cardio Vascular risk factors such as Diabetes, Hypertension and Obesity. (Reddy et al., 2013). Coronary Heart Disease (CHD) is the most common form of Cardiovascular Disease (CVD) which is caused by Atherosclerosis in the arteries that supply heart muscle with oxygen and nutrients. (Srilakshmi 2014).Heart Attacks and Strokes are usually acute events and are mainly caused by a blockage that prevents blood from flowing to the heart or brain. The most common reason is a build-up of fatty deposits on the inner walls of the blood vessels (WHO, 2015).

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According to the National Centre For Chronic Disease prevention and health promotion (NCCD, 2014) says that Heart Disease and Stroke are principal components of Cardiovascular Diseases as they are the third leading cause of death in the united sates and accounts for more than 40% of all deaths (Williams and Wilkins , 2006). Cardiovascular Disease is now recognized as the leading cause of death and disability worldwide (Ahmed et.al, 2014)

Review of literature

Cardiovascular Disease remains the leading cause of death in many countries. Several fold increase is seen in Coronary Heart Disease since 1960-1990 in urban part of India. In India the onset of CVD is at early age, it more severe and the progression is rapid and aggressive. The incidence of Cardiovascular Disease is 47 % in developing countries, as against 27 % in developed countries among people below 70 years (Srilakshmi 2014). Low BMI is a risk factor for Cardiovascular Disease in Hypertensive patients with Diabetes. The findings provide evidence for an Obesity Paradox in Hypertensive patient with Glucose Intolerance.

Dr Nagahiro said, "Obesity is a risk factor for Cardiovascular Disease but several studies have reported that low Body Mass Index (BMI, kg/m2) was associated with worse Cardiovascular Disease outcome compared to middle or higher BMI. According to World Health Report 2002, Cardiovascular Disease will be the largest cause of Death and Disability by 2020 in India. In 2020, 2.6 million Indians are predicted to die to Coronary Heart Disease which constitutes about 54.1 % of all Cardiovascular Disease (CVD) deaths. Individuals at risk of Cardiovascular Disease may demonstrate raised Blood Pressure, glucose, Lipids as well as Overweight and Obesity. Over 80 percent of deaths and 85 percent of disability from A change in Dietary Habits and physical activity have a major impact in reducing the rates of these chronic diseases, often in a relatively short time Heart attacks and Strokes kill about 12 million people every year; another 3.9 million die from hypertension and other heart conditions.

MATERIALS AND METHODS

The Purpose of the study was to see the association of Dietary, Physical Activity pattern and other factors of Cardiovascular Disease on the normal weight individuals.

The methods and materials used for investigation are discussed under the following headings:-

- Locale of the study
- Selection of subject
- Experimental plan
  - Phase 1
  - Field study
  - Phase 2
  - Dietary survey
  - Phase 3
  - Anthropometric studies
- Dietary counselling

Locale of the study

The study was conducted on male and female adults belonging to the city of Alwar (Rajasthan). The subjects selected were admitted to Solanki Hospital at Alwar (Rajasthan) at the time of study.

Selection of the subjects

- Forty (40) adults including twenty (20) males and twenty (20) females between 40-60 years of age were selected by purposive random sampling from city of Alwar (Rajasthan)
- The Body Mass Index of the subjects was calculated and the subjects having normal body weight were selected.
- All the subjects were Heart patients and admitted to the hospital at the time of study.
- The objective and experimental protocol of the study was explained to the subjects, and their prior consent was taken.

Plan of study

The study was constituted of phases and the classification of subjects is elaborated as under:-

Phase 1 – Experimental plan

First experimental group: - This group comprised of 20 male subjects suffering from Cardiovascular Disease having normal body weight (after calculation of BMI)

Second experimental group: - This group comprised of 20 female subjects suffering from Cardiovascular Disease having normal body weight (after calculation of BMI)

Phase 2: The phase one includes 40 adults for the study. For the purpose field studies medical history as well as assessment was performed as under:

Field Studies: These studies consisted of collection of data regarding General information, Physical Activity Pattern, Health Record, Assessment of Nutritional Status and Medical History. This data was collected by Interview cum Questionnaire method .The general information of subjects related to Age, Sex, Education, Occupation, Economical Status, Marital Status, Family Type and Size, History of Weight Gain or Loss, Medical History were recorded by using the Questionnaire.

Dietary Survey: The information about the food likes and Dislikes and Dietary Pattern of subjects was also obtained. The Nutrition Education was imparted to the subject.

Phase 3

Biochemical Assessment: The two most common types of tests are electrocardiograph (ECG) and echocardiogram. Electrocardiography (ECG or EKG) is the process of recording the electrical activity of the heart over a period of time using electrodes placed on a patient's body. These electrodes detect the tiny electrical changes on the skin that arise from the Heart muscles depolaring during each Heartbeat. Echocardiography is a diagnostic test which uses Ultrasound waves to make images of the heart chambers, valves and surrounding structures. It can measure cardiac output and is a sensitive test for fluid around the heart (pericardial effusion). The Lipid profile and ECG was obtained by the case files of the patient admitted to the hospital.

Phase 4

Anthropometric Studies:

The Height, Weight were also measured for the calculation of BMI so that the relation between the BMI and Cardiovascular Disease can be seen and their effects.

Measurement of Height

A vertical measuring rod attached to a platform was used to measure the Height of the subjects. There are 40 subjects who are divided into 20 male subjects and 20 female subjects respectively

Measurement of Weight

The Weight was recorded in kilograms. There are 40 which were divided into 20 male and 20 female subjects respectively.

Body Mass Index (BMI):- The BMI was calculated with the formula as given below :

BMI was used to classify the subjects into grades/classes of Overweight /Obesity as classified by WHO (1998), is shown in Table. No 3.2:

It is calculated by the formula:-

Body Mass index = *Weight/ Height (Metres)* ²

Table No. 3.1: BMI Classification

BMI	Nutritional grad	Classification
≥ 18.5 - < 20.0	Low Normal	
≥ 20 - < 25.0	Normal	
≥ 25.0 - < 30.0	Over Weight	WHO (1998)
≥ 30 – 34.9	Obesity I	
≥ 35 – 39.9	Obesity II	
≥ 40	Obesity III	

Source: WHO, 1998

Dietary Counselling

After collecting the initial information regarding the subjects of who volunteered to be part of the study for Cardio Vascular Disorders It was found that effective nutrition therapy was necessary for prevention and treatment of CVD. The Nutrition Education was imparted to the subject belonging to Alwar (Rajasthan) region

Statistical Analysis of the data

The collected data were Decoded, Tabulated and Statistically Analyzed using Standard Techniques such as Arithmetic Mean, Standard Deviation and Average.

RESULTS AND DISCUSSION

Cardiovascular Disease is a general term describing disease of heart and blood vessels. Coronary Heart Disease (CHD) is the most common form of CVD and is caused by Atherosclerosis in the large and medium sized arteries that supply heart muscles with oxygen and nutrients. Cardiovascular Diseases are leading cause of morbidity and mortality in India. BMI is one of the most important factors that influence Cardiovascular Disease (CVD) risk. In the present study low BMI is linked with Cardiovascular Disease.

Table No. 4.1 Body mass index of selected male and female subjects suffering from Cardiovascular Disease (N=40)

Assessment of Nutritional Status	Number of the Subjects (N=40)	
	E1 group males(n=20)	E2 group females(n=20)
Average height	166.05±5.29	156.94±6.03
Average weight	70.35±7.77	57.42±12.86
Average BMI	25.42±3.1	23.2±4.32

N - Number of total subjects n- Number of male and female subjects respectively

Table 4.2 Physical Activity pattern followed by selected subjects suffering from Cardiovascular Disease (N=40)

Daily Physical Activity	Response	E1 group Males (N=20)	E2 group Females (N=20)
Walking 2-3 Times per week	Walking (2Km)	36.84%	34.21%
	Walking (2-4Km)	2.63%	0%
	Walking (>4Km)	0%	0%
Climbing Per week	2-4 floors	0%	2.63%
Stairs	>4 floors	0%	0%
Aerobics Per week		0%	0%
Yoga Per week		2.63%	0%
None of above		7.89%	13.15%

N* = total number of the subjects of all age groups
n** = number of subjects of each age group

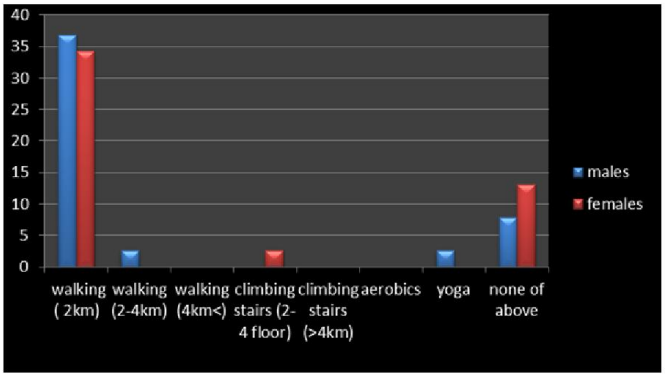

Figure 4.1 Bar graph depicting the Physical Activity pattern among selected male and female subjects suffering from Cardiovascular Disease

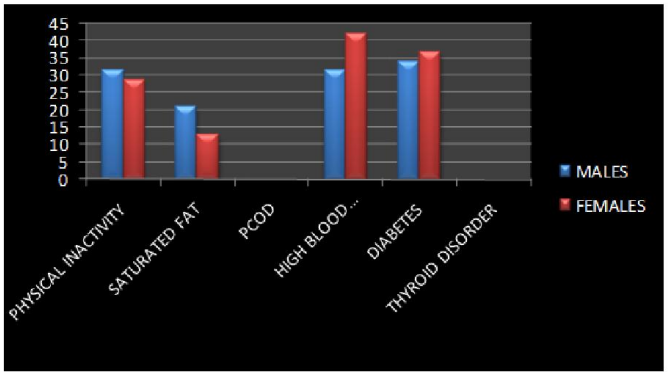

Figure 4.2. Bar graph depicting the cause of Cardiovascular Diseases among selected male and female subjects

Energy: -There were 40 subject which was divided into 20 male and 20 female subjects respectively from Alwar (Rajasthan) region The mean daily intake of Energy of Cardiovascular Disease male subjects of Alwar (Rajasthan) was 1650.7± 74.3 respectively while the mean value of Cardiovascular Disease female subjects of Alwar (Rajasthan) was 1599±521.3 respectively.

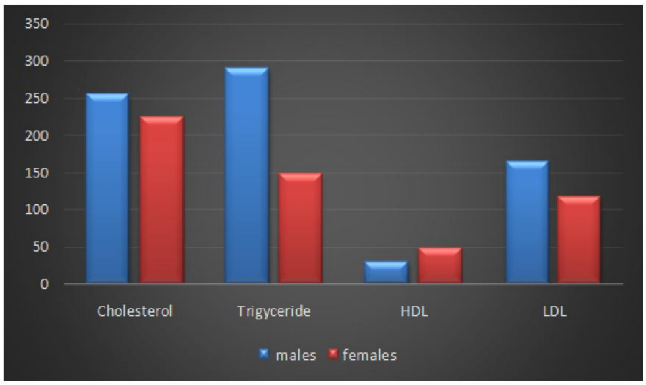

Figure 4.3: Bar graph depicting the lipid profile of selected male and female subjects suffering from Cardiovascular Diseases

Table.No.4.3. Mean of Daily Food Intake of selected male and female subjects suffering from Cardiovascular Diseases

Nutrient	Subjects Alwar (Rajasthan)		RDA (g/day) according to ICMR 1998	
	Male	Female	Male	Female
Energy (kcal)	1650.7± 74.3	1599±521.3	2425 Kcal	1875 Kcal
Carbohydrate (g)	238.1± 26.83	209±54.9	300 gms	275 gms
Protein (g)	49.72± 3.48	46±10.5	60 gms	50 gms
Fat (g)	55.5± 7.97	55±9.4	20 gms	20 gms

Food group	Portion or serving per day	Serving sizes
Grains	6-8 servings	1 slice bread; or ½ cup cereal or cooked porridge; ½ cup cooked rice or pasta
Vegetables	4-5 servings	½ cup cut-up raw or cooked vegetables or 1 cup leafy veg/salad
Fruits	4-5 servings	1 medium fruit or ½ cup fruit salad or ½ cup fruit juice
Fat-free or low-fat milk and milk products	2-3 servings	1 cup milk or yoghurt or 30g cheese
Lean meats, poultry and fish	4-5 servings	30-40g meat, fish or chicken
Nuts, seeds and legumes	4-5 servings	⅓ cup, 2 tablespoons peanut butter, 2 tablespoons seeds, ½ cup dry beans
Fats and oils	2-3 servings1	1 teaspoon soft margarine, 1 tablespoon mayonnaise, 2 tablespoons salad dressing, 1 teaspoon vegetable oil
Sweets and added sugars	5 or fewer servings per week	1 tablespoon sugar, 1 tablespoon jelly or jam, ½ cup sorbet and ices, 1 cup lemonade

Proteins: - There were 40 subjects which were divided into 20 male and 20 female subjects respectively from Alwar region (Rajasthan). The mean value of Proteins of Cardiovascular Disease males belonging to region of Alwar (Rajasthan) was 55.5±3.48 respectively. Similarly the mean value of Cardiovascular Disease females from Alwar (Rajasthan) was 46±10.5 respectively.

Fats: - There were 40 subjects which were divided into 20 male and 20 female subjects respectively from Alwar (Rajasthan) region. The mean value of Fats of Cardiovascular Disease males belonging to region of Alwar (Rajasthan) was 55.52± 7.97 g/day. Similarly the mean value of Cardiovascular Disease females from Alwar (Rajasthan) was 55±9.4 g/day. One gram of Fat in the body contributes 9 kcals so Fats are energy dense foods.

Carbohydrates: - There were 40 subjects which were divided into 20 male and 20 female subjects respectively from Alwar (Rajasthan) region. The mean value of Carbohydrates of Cardiovascular Disease males belonging to region of Alwar (Rajasthan) was 238.1± 26.83 g/day. Similarly the mean value of Cardiovascular Disease females from Alwar (Rajasthan) was 209±54.9 g/day.

Conclusion

Cardiovascular Diseases account for high morbidity and mortality all over the world. The factor which increases the risk of Cardio Vascular Disease are :-

- Increasing Age
- Elevated Blood Pressure
- Increased Heart Rate
- Overweight / Obesity
- Increased Body Mass Index
- Central Obesity
- Increased Abdominal Circumference
- Increased Abdominal Adiposity (waist-to-hip ratio)
- Elevated LDL or Non -HDL Cholesterol
- Low HDL Cholesterol
- Smoking
- Family history of Premature CVD (<age 50 yes in men,<age 60 yes in women
- Sedentary lifestyle

In this study 40 subjects were taken on the basis of purposive random sampling and then divided into 20 males and 20 females. After conducting this survey it was found that there was high intake of fats and oil, sugar and less intake of fruits , vegetables which increased the risk of Cardiovascular Disease. The nutrition education regarding proper and balanced meal was imparted to the subjects. There are many clinical studies that hypothesizes if flaxseed added to diet could improve the lipid and metabolic profiles and decrease risk factors related to Cardiovascular Disease. Proper recommendation of diet is necessary for the Cardio Vascular patient. the diet should include at least five portions, or ideally 7-9 portions, of a variety of fruit and vegetables per day , 3 – 4 portion should be carbohydrate-based foods (such as cereals, wholegrain bread, pasta), plus fruit and vegetables , mono-unsaturated or polyunsaturated are recommended.

Regular physical activity is extremely important for CVD prevention. The recommended physical activity is 30-to-45 minutes of moderate-intensity activity such as brisk-walking every day. Patients accustomed to the typical western diet should consider the following primary dietary changes the increase intake of plant protein which include the combination of increased consumption of whole grains, nuts, legumes, fruits, and vegetables with a diet low in saturated fat and trans-fatty acids. This may significantly decrease cardiac events and mortality. Legumes (e.g., chickpeas, lentils, soybeans, peanuts, kidney beans, black beans, peas, legumes), tree nuts (e.g., almonds, hazelnuts, pistachios, walnuts), and seeds (e.g., sesame seeds, pumpkin seeds, ground flaxseed) are excellent examples of plant proteins that also contain beneficial fats and soluble and insoluble fiber. The increase intake of omega-3 fatty acid is necessary. The increased fish intake (i.e., one or two servings per week) reduced the risk of sudden cardiac death compared with consumption of less than one serving per month. Green leafy vegetables, flaxseed, canola oil, soybeans, walnuts, and omega-3 fatty acid supplements also are high in polyunsaturated omega-3 fatty acids. The change the oil used in food preparation is necessary. Non hydrogenated plant oils have been associated with reduced levels of triglycerides, increased levels of high-density lipoprotein (HDL) cholesterol .Oils that are primarily monounsaturated (e.g., olive oil, canola oil, peanut oil) may be used for cooking and salad dressings, and oils rich in omega-3 fatty acids (e.g., flax-seed oil, walnut oil) work well in cold foods. All of these oils, even the predominantly omega-6 oils (e.g., soybean oil, corn oil, safflower oil), are preferred over saturated fats (e.g., butter, animal fats, lard) and trans-fatty acids (e.g., partially hydrogenated oils). There should be decrease intake of saturated fats and trans-fatty acid

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