A Study of Dietary Patterns in Patients with Angiographically Diagnosed Tripple Vessel Coronary Artery Disease

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ABSTRACT

Aim: To determine the frequency of various dietary patterns in patients with angiographically diagnosed tripple vessel coronary artery disease.

Study design: Cross Sectional Study.

Place of study: Cardiology Department Punjab Institute of Cardiology Lahore.

Duration: September 2015 to March 2016.

Methods: 500 angiographically diagnosed patients of Tripple vessel coronary artery disease (TVD) only from the city of Lahore were included in this study. Patients with single or double vessel disease and cases from cities other than Lahore were excluded from the study. After taking informed consent all patients were interviewed by doctors in outpatient department and indoorof Punjab institute of cardiology about their dietary patterns and food habits.Food items eaten for five days a week were defined as regular consumption while less than five days was taken as insignificant. The information provided was recorded on a pre designed proforma and the data collected was analyzed on SPSS for windows version 17.

Results: Out of 500 cases 359(71.8%) were male patients while 141(28.2%) were females. 420(84.4%) cases were regular eaters of various types of Fast Food followed by regular consumers of raw sweet (Mithais and Halwas) in 417(83.4%) cases. Beef was a regular red meat diet in 414(82.8%) cases. 392(78.4%) were regular eaters of refined or white flour or MAIDA in various forms. Saturated fat and animal fat as a regular dietary pattern in its various forms e.g., Desi ghee, organ meat, butter and cream was seen in 218(43.6%) cases under study.

Conclusion: In present study a significant association was found between Tripple Vessel coronary artery Disease and diet rich in fast food, red meat, raw sweet and white our refined flour. This study has shown that modification of dietary patterns through adaptation of preventive strategies at an early age can decrease the incidence of tripple vessel coronary artery disease in general population.

Keywords: Tripple vessel disease, angiography, diet

INTRODUCTION

During past decade cardiovascular disease (CVD) has emerged as a single most common cause of death worldwide causing 16 million deaths in 2010 and 293 million disability adjusted life years accounting for approximately 30% of all deaths and 11% of all disability adjusted life years[1].

The relationship between dietary patterns and atherosclerotic coronary artery disease is a well known and established fact. Eating an atherogenic diet rich in cholesterol and saturated fat results in accumulation of small lipoprotein particles accumulate in the intima of the arterial wall. Early atherogenesis is characterized by the adherence of circulating monocytes in the blood to the vascular endothelium followed by the migration to the sub endothelial space and further activation in to monocyte derived macrophages. The basic driving

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factor of this process is oxidized lipoprotein particles accumulated in the arterial wall beneath the endothelial cells as mentioned above. These low density lipoproteins (LDL) particles which invade the endothelium become oxidized, a process which involves enzymes like (Lp and Lp A2) and free radicals in the endothelium. This damage to endothelium initiates an inflammatory response resulting in migration of monocytes from blood stream in to the arterial wall with platelets adhering to the area of damage. These monocytes differentiate in to the macrophages and ingest oxidized LDL and slowly transform in to foam cells due to the ingestion of numerous internal cytoplasmic vesicles and result in high lipid content. Under the microscope these lesions now appear as foam cells and the process of fatty streaking starts while foam cells eventually die and further propagate the inflammatory process . There smooth muscle proliferation and migration from tunica media in to the intima in response to cytokines secreted by the damaged endothelial cells a process

which results in the formation of a fibrous capsule covering the fatty streak. This fatty streaking can be prevented by intact endothelium which releases Nitric Oxide. It is quite evident from above discussion that the sole offending agent in the pathogenesis of atherosclerotic process is the high lipid or cholesterol content of the diet and if dietary cholesterol and lipids are maintained in normal ranges this pathological process can be minimized. Saturated fat and Cholesterol consumption in diet along with trans fats can lead to early atherosclerosis and Ischemic Heart Disease (IHD). Atherosclerosis and Fatty streaking begins in childhood. It is therefore essential to avoid foods rich in saturated and transfats in childhood to prevent cardiovascular disease in adult life.

Monosaturated Fatty Acids (MUFA) and Polyunsaturated Fatty Acids (PUFA) are good for healthy Heart. MUFA are found in Olive oil, Canola Oil, Peanut Oil , Nuts and Avocado. Omega 3 PUFA are found in fish , Shell fish, Flax Seeds and Wall nuts while Omega 6 PUFA are found in Corn, Sunflower, Soybean Oils and nuts. These fats are good for heart and they must form an essential component of diet in all age groups.

Saturated Fats and Trans Fats (Trans fatty acids) are "BAD" fats which contribute to heart disease. All fats , good or bad are rich in calories as compared to proteins and carbohydrates. Fruits, Vegetables, Whole grains, low fat and non dairy products, Beans, Fish and lean meat are all good for a healthy heart and prevention of atherosclerosis[2].

There is substantial evidence from previous literature favoring a cardioprotective benefit of diet rich in Vegetables, Fresh fruits, complex carbohydrates (Fiber) found in whole grains , seeds, nuts and Legumes and a damaging role of diet rich in heavy starchy foods like white flour or refined flour and potatoes. Increased consumption of Nuts such as (Almonds, Walnuts, soluble fiber rich diets like dried beans, Oat , Bran, Barley, Apples and Citrus fruits are good for healthy heart while simple carbohydrates (Sugar) found in Sugar cane, corn syrup and Honey when consumed in abundance are associated with low HDL and high Triglyceride levels resulting in increased risk of ischemic heart disease. Fish and Chicken is also cardio protective as compared to Red meat. Although a plethora of literature is available on the role of diet in ischemic heart disease but the nature of disease found on coronary angiograms and its association with diet has not been addressed in the past. The objective of this study is to evaluate the dietary patterns in diagnosed cases of Triple vessel coronary artery disease (TVD) . The results thus obtained will be utilized to modify the dietary patterns of the masses to prevent the occurrence and progression of coronary artery disease by devising strategies like diet plans, preventive measures and educate the masses on large scale.

MATERIAL AND METHODS

This cross sectional study was conducted at Cardiology Department of Punjab Institute of Cardiology Lahore from September 2015 to March 2016 after approval from the hospital Ethical committee. A total of 500 patients from all ages and both genders with angiographically diagnosed tripple vessel coronary artery disease were included in this study. Patients with double vessel ,single vessel and Left main stem disease were excluded from the study. This study was purely urban based. Only patients from the city of Lahore were included in the study while patients from other cities were excluded from the study. Informed consent was taken from all the patients willing to participate in the study and a predesigned proforma was explained to the patients in local language before starting the study. All patients were interviewed in detail about their dietary patterns and food habits andthe information provided was recorded on the proforma by the doctors on duty in outpatient and indoors of the hospital. Food items taken for five days a week were defined as regular consumption while less than five days was taken as insignificant. The data recorded by interviews of the patients on proforma was then analyzed on SPSS version 17 for windows which was used for compilation of results and statistical evaluation.

RESULTS

Out of 500 patients included in the study 359(71.8%) were males and 141(28.2%) were females with ages ranging from 16-99 years . Mean age was 48.97±2.06 years (Table 1). All patients had Tripple vessel coronary artery disease (TVCAD) diagnosed on coronary angiogram. 218(43.6%) cases with TVD were regular consumers of saturated fat in its various forms like Desi ghee, Butter and Creamin their diet. Refined Sugar (Raw Sweet like Mithai and Halwas) was found as a regular dietary pattern in 417(83.4%) besides their routine diet. 210(42%) patients were regular consumers of various cooking oils. Regular Fast food consumption was found in a very high number of patients diagnosed with (TVCAD). 420(84.4%) were consumers of Fast food in its various forms (Table-II). Beef and Mutton consumption (Red Meat) was found in 414(82.8%) and 156(31.2%) respectively. Only 140(28%) patients had been using whole Wheat or Aaata in their diet regularly while Refined or White flour or Maida was a regular dietary pattern in 392(78.4%) cases under

study. Chicken and Fish consumers in (TVCAD) patients were only 192(38.4%) and 110(22%) respectively. Only 80(16%) were regular Vegetable eaters while 125(25%) were Fresh Fruit consumers as a regular dietary pattern. Eggs, Rice and Pulses or Nuts (Almonds etc) were found as a regular dietary pattern in 306(61.2%), 239(47.8%) and 174(34.8%) respectively.

Table 1: Demographic profile of the cases under study (n=500)

Male	Female	Mean age
359	141	48.97±2.06

Table 2: Frequencies of various dietary patterns in cases under study (n=500)

Dietary items	Regular Consumers	Non consumers
Saturated/ Animal fat/desi ghee/ butter/ cream	218(43.6%)	282(56.4%)
Refined / Raw Sweet/ Mithais and Halwas	417(83.4%)	83(16.6%)
Cooking Oils	210(42%)	290(58%)
Fast Food	420(84.4%)	180(15.6%)
Beef	414(82.8%)	86(17.2%)
Mutton	156(31.2%)	344(68.8%)
Whole Wheat	140(28%)	360(72%)
White Flour/ Maida	392(78.4%)	108(21.6%)
Chicken	192(38.4%)	308(61.6%)
Fish	110(22%)	390(78%)
Vegetables	80(16%)	420(84%)
Fruits	125(25%)	375(75%)
Eggs	306(61.2%)	194(38.8%)
Rice	239(47.8%)	261(52.2%)
Pulses and Nuts	174(34.8%)	326(65.2%)

DISCUSSION

The relationship between dietary patterns and atherosclerotic Coronary Artery Disease (CAD). Cardiologists and General Physicians are mostly of the opinion that although diet is important both in Cardiovascular disease progression as well as prevention, the practical knowledge about nutritional aspects remains insufficient and suboptimal[3]. Those patients who have diagnosed CAD on coronary angiograms is the only group among the general population which can provide us with a useful data indicating dietary patterns of this group along with their dietary habits. This study evaluated the dietary patterns of 500 cases of TVCAD diagnosed on Coronary Angiograms for their regular dietary patterns with a view to find out the association of these dietary patterns with nature and severity of disease.Saturated fats and Trans fats from animal sources was a regular dietary pattern in less number of patients with TVCAD. Frank et al have reported

that a high intake of saturated fat and cholesterol leads to atherosclerotic coronary artery disease.[4]In our study less than half number of patients was found to have TVCAD which is not in accordance with the above mentioned trial. A healthy diet rich in Fish, Fruit and Vegetables and low in dairy products and meat is associated with a lower rate of cardiovascular disease. [5] We found that in our study population the percentage of Vegetable and Fresh fruit eaters was much lower in the cases under evaluation thereby confirming this finding but contrary to the above statement in our study consumers of dairy products were less than half the population under trial. A Mexican study proved a linear relationship between dietary patterns and different levels of adiposity and obesity[6]. There is a marked impact of the overall quality of diet on health and cardiovascular morbidity and mortality[7]. Consumption of Almonds and Tree Nuts resulted in reduction of Low density Lipoprotein (LDL) and total cholesterolin a trial which was aimed at studying the primary targets for cardiovascular disease prevention.[8] In our study population Nuts (Almonds etc) consumption emerged as a protective factor for cardiovascular disease confirming the above findings. There is a convincing evidence that Vegetarians have lower rates of coronary artery disease on account of decreased incidence of Diabetes Mellitus and Hypertension in these people[9].

Principal component analysis (PCA) and Treelet Transform (TT) analysis were compared in a study and they found that TT was more useful than PCA in epidemiological derivation of dietary patterns which summarize food and nutrient intake[10]. Eating a plenty of fruits and uncooked vegetables resulted in a lower incidence of hyperhomocysteinemia while diets rich in red meat, chicken and tea with milk carried a high risk of hyperhomocysteinemia[11]. We could not evaluate this association on account of financial limitations in our study population.Healthy eating patterns reduced the risk of Major Adverse Cardiac E vents (MACE) and Diabetes Mellitus and offer a significant benefit of health in general population[12]. Dietary intake of Monosaturated Fatty Acids (MUFAs) and Polyunsaturated Fatty Acids (PUFAs) was associated with a lower risk of cardiovascular disease and death while Saturated and Trans Fatty acid intake was associated with a high risk of cardiac events[13]. The results of this study are in accordance with our study findings. Red meat consumption leads to microbioata dependent risk of cardiovascular disease. [14]Rahrmann et al concluded that the saturated fat and cholesterol content of processed meat and unprocessed meat had a close association with high risk of cardiovascular disease[15]. Processed meat however has a stronger association with coronary artery disease as compared to unprocessed

meat. Our study provided significant and convincing evidence confirming the findings of this study but a higher incidence of Beef consumption in patients with TVCAD as compared to Mutton. Eating Fish is associated with a decreased risk of endothelial dysfunction and low grade inflammation with over all decreased risk of cardiovascular disease[16]. Less than 30% of our study population had Fish as a regular dietary element in their diet. Majority of patients with TVCAD in our study did not have Fish as a regular component of their diet which is in confirmation with the results of above study. A research conducted in Brigham and Women's Hospital and Harvard Medical school revealed that there is a strong association of fried and fast food with increased incidence of cardiovascular disease and heart failure.[17] The dangers of fast food are well documented due to its high caloric value and low nutrient content. Alternative Healthy Eating Index (AHET) or Women's Health Initiative (WHI) Indexof diet was used in a study to determine Dietary Modification Index (DMI) and they found that adherence to the current nutrient guidelines is associated with a lower risks of cardiovascular disease[18]. Fast food consumption is associated with weight gain and insulin resistance with overall increased risk of Diabetes Mellitus and cardiovascular disease as proven in CARDIA study[19]. 84.4% i.e. a very high percentage of patients in our study were regular eaters of fast food. Corn Oil contains copious amounts of saturated fat which is known to cause heart disease. Most French fries served in western world e.g. USA are fried in corn oil. In Pakistan worst quality of oils is being used for frying fast food.A study was conducted at Mc Master University of Hamilton, Canada to review the association between intake of saturated fat and trans unsaturated fat and all cause mortality and cardiovascular disease. They found that saturated fats are not associated with all cause mortality, coronary artery disease and Stroke but trans fats have an association with all these adverse events. This study favours the role of saturated fat in diet and its conclusions ae contrary to the previous available literature in this context[20]. Our study confirms the results of this research endorsing the fact that consumption of saturated fat is a preferred dietary pattern as compared to unsaturated fat. The outside shell of the wheat part is eatable and inside one is not which contains no fiber in it. This part is grinded and bleached with Benzoic Peroxide to form a white powder. This is then mixed with a chemical Alloxan to form refined or white flour or Maida. All the bakery products, Fast food, Pizzas, Nodules and Burger stuff is being prepared from this Maida which is not good for health and heart.392 (78.4%) patients in our study population with TVCAD were regular eaters of white

or refined flour in its various forms including bakery items, Fast food and Nans while whole wheat consumers were only 140(28%) indicating a clear association between atherosclerotic coronary artery disease and Maida eating. Maida is eaten more than whole wheat because it requires less chewing. A study comparing whole wheat flour with Maida or refined flour found that whole wheat flour is better than refined flour. Refined flour or Maida has been labelled as a slow poison by some eminent physicians.[21]Refined Sweet, Raw Sugar is favourite food of our urban and rural population as evident from our study 417(83.4%) patients were regular consumers of Mithais, Halwas and sugar consumed in beverages, tea, coffee, soda and soft drinks. Sugar has no nutrient value other than to provide calories. Available data clearly suggests a detrimental role of sugar in progression of atherosclerotic cardiovascular disease. Dietary recommendations to avoid full fat dairy products in diet are not supported by a study conducted in Brazil. [22]Another meta analysis based on prospective epidemiological studies has revealed no substantial or corroborative evidence for concluding that dietary saturated fat is associated with increased risk of cardiovascular disease. This finding is in confirmation with results of our study. American Heart Association (AHA) recommends no more than six teaspoons of sugar daily for women and no more than nine teaspoons for men per day. A recently conducted research study revealed that a high sugar consumption leads to a fourfold increase in risk of cardiovascular disease.There is a valid association of not all but some dietary patterns with coronary artery disease . [23] Added sugar consumption i.e. which is more than that recommended by American Heart Association (AHA) increases the risk of cardiovascular disease[24]. A research group in Taiwan reported a high risk of components of Metabolic Syndrome in boys with consumption of sugar sweetened beverages thus increasing the risk of cardiovascular morbidity and mortality[25]. Daily Egg consumption was not associated with risk of Stroke and Myorcardial Infarction in both sexes in a study conducted at Sweden in diabetic patients[26]. This result is in accordance with the findings of our study. Dietary patterns in patients with angiographically diagnosed TVCAD is a subject not addressed adequately in the previous literature although other studies have been carried out in Diabetic patients.

CONCLUSION

We conclude here than dietary patterns have a significant impact on the pathogenesis of atherosclerotic coronary artery disease. Use of Red

Meat, Refined or Raw Sugar or Sweet, Fast food, and White or refined flour or Maida have emerged as important dietary patterns in those patients who had angiographically diagnosed TVCAD. Studies conducted previously only address individual dietary components in patients with Diabetes Mellitus , Hyperlipidemias and Metabolic Syndrome. More research work is needed to evaluate the effect of these dietary patterns on coronary artery disease so that dietary modifications and preventive strategies can be devised for prevention of coronary artery disease or CAD in our future generations because "Prevention is better than cure".

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