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REVIEW ARTICLE

NUTRITION IN CARDIOVASCULAR DISEASE

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ABSTRACT: Nutrition in cardiovascular disease stands as query in million CVD patients. Nutritional advice plays a critical role in management horizon of sick cardiacs. No fasting, no feasting; no worry, no curry- should be the basic platform. Fruit, fiber and fish are friendly to them while red meat is a red signal. No stress, no race for them in daily life will add to their food pattern. Be a vegan- may be the best practice one can do when he is prone to get CVD. Avoid concentrated sugar in form of sweets which will cause hyperglycemic wave front mediated endothelial dysfunction. Moderation in nutritional practice help them not the excessive one if alcohol is taken into account. Avoid fry otherwise you will cry: Se advise them. No fry, no fast food, no fake beverages-they should follow. Low salt, low calorie and low fat diet should be their dietary principle. A healthy diet will make a man, society, race healthy together.

INTRODUCTION: Dietary habit constitutes the foundation of prevention and treatment of cardiometabolic disease. Ugly dietary habit translates into global socioenvironmental surge in obesity, DM, HTN and CVD while healthy nutritional behavior can eventually reverse and one day mitigate the global cardiovascular burden. In view of global panorama of cardiovascular burden, dietary recommendations for improving cardiovascular death have emerged as an essential tool in modern cardiovascular practice. Dietary queries do not get solved from a physician's pen leading them to wonder through myths and beliefs ultimately landing the victim in a fatal jeopardy. Modern cardiovascular practice endorses the clinician to spend minimum an hour a day in dietary counseling and life style modification (LSM) to bring out a healthy outcome. Dietary advice must be complete, comprehensive, complaint with day to day schedule and compatible with the common men forum as outlined below.

NUTRITION PLAN:

Carbohydrates: Whole grain is more beneficial than refined ones due to beneficial effect of dietary fiber. It has also been well observed that fibers from cereals, grains and fruit reduce the incidence of CHD. Dietary fiber reduces LDL-C, blood glucose and blood pressure. Foods with higher glycemic index (GI) and glycemic load (GL) like white bread, white rice , potato and cornflake increase the risk of CHD in prospective studies[1] ; in contrast low GI and GL foods like milk, apple, lentils and nuts improve blood glucose and LDL-C, attenuate inflammation, improve endothelial function and fibrinolysis.

Fats: Majority of the saturated fatty acids (SFA) come from meat, dairy products, palm and coconut oil. Each 1% increase in SFA increases LDL-C level by 1.2mg/dl. Replacing SFA in place of polyunsaturated fatty acids (PUFA) enhances CV risk exponentially. Animal fat and vegetable oils like olive oil and canola oil are major sources of monounsaturated fatty acids (MUFA).

Although MUFA reduce LDL-C but it does not translate into CV benefit because it increases the cholesteryl oleate content of LDL forming an atherosclerotic milieu. Both SFA and MUFA are proatherogenic but olive oil lowers CHD events as seen with Mediterranean type diet probably due to

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protective effect of polyphenols.[2] Vegetable oils, fish and shellfish are major source of PUFA. PUFA decrease LDL-C, TG, increases HDL-C, improves TC/HDL ratio, and favorably affects platelet function, inflammation, endothelial function, fibrinogen level, arterial compliance. Consuming PUFA in place of SFA translates into cardiovascular benefit but it does not happen so when consumed in place of carbohydrate or MUFA.

Fish oil is a major source of Eicosapentanoic acid (EPA) and Docosahexanoic acid (DHA). EPA and DHA have additionally demonstrated their beneficial effect on heart rate, cardiac relaxation and autonomic tone. In a Japanese randomized trial addition of EPA in statin treated hypercholesterolemic patients reduced nonfatal coronary events by 19%.

Baked and fried foods, packaged snacks and meat constitute major source of transfatty acids (TFA) which are clearly atherogenic, raising LDL-C, TG and Lipoprotein a [Lp (a)], lowering HDL-C, increasing TC/HDL-C ratio and Apo B/Apo A1 ratio, promoting inflammation, endothelial dysfunction, adiposity, insulin resistance and arrhythmia.[3] Owing to their cardiovascular hazard TFA should be strongly discouraged always in high risk cohort. Dietary cholesterol is also proatherogenic, increases both LDL and HDL, increase CV risk in diabetics.

Proteins: Plant proteins decrease CHD risk, protein intake in place of carbohydrates improve glycemic control, blood pressure, LDL-C and TG level. Increasing total protein intake has null effect on overall cardiovascular outcome.

Fruits and Vegetables: High fruit and vegetable intake consistently associated with lower CHD incidence. Fruit intake lowers stroke risk.[4] Multiple cardiometabolic risk factors are modified with fruit and vegetable intake include adiposity, BP, insulin resistance, inflammation and endothelial function predominantly due to fiber, micronutrients and phytochemicals and minor beneficial effect from K^+ and Mg++.

Whole v/s Refined Grains: Whole grain contains fiber, B vitamins, minerals, flavonoids, tocopherols and antioxidants. It promotes weight loss, glucose homeostasis, attenuate inflammation and improve endothelial function. Whole grain oat reduces LDL-C.[5] Paradoxically refined rice and white bread not consistently associated with CHD. Based on the neutral effect it seems prudent to replace the refined grain with whole grain to get cardiovascular benefit.

Nuts: Those are an attractive summation of unsaturated fat, vegetable protein, fiber, folate, mineral, tocopherols and polyphenolic compounds. They reduce weight, decrease LDL-C and improve inflammatory and oxidative biomarkers. Modest nut consumption reduce CHD incidence.

Legumes: CVD effects of legumes not well established. Isoflavones in legumes reduce LDL-C and DBP.

Fish: Nonfried fish are good source of EPA and DHA which decrease nonfatal MI, ischaemic stroke and AF. Once weekly fish consumption decrease CV risk by 15%, twice weekly by 23% and five times weekly by 38%.[6] EPA along with DHA supplementation more than 250mg/day decrease CV risk by 36%. They improve TG, blood pressure but raise glucose production due to genetically mediated hepatic stimulation without causing insulin resistance, rather decreases hyperinsulinemia.

Meat: Contains high cholesterol and SFA. Processed and fried meat are highly atherogenic; hence they should be avoided completely in persons at risk. Stroke has been reported with consumption of meat,[7]

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Diary Products: Long term diary consumption reduces CHD. Although low fat diary is recommended at present, whole fat diary (Milk and yogurt) has similar benefit except causing obesity. Cheese and butter should be avoided as they increase LDL-C. DASH diet with low fat dairy products improved BP, lipid profile, insulin resistance and endothelial function due to presence of calcium and linoleic acid.

Alcohol: Alcohol has beneficial effect on HDL and insulin resistance. Moderate consumption i. e. up to 2 drinks per day for men and one drink per day in female exert cardiovascular benefit. Benefit is seen in regular drinking persons rather than in irregular or binge drinking persons. In spite alcohol consumption must be strongly discouraged due to deleterious effect of alcohol on other major organs.

Coffee and Tea: Caffeine increases BP but more than 4 cups daily decrease the incidence of DM. There is no significant relationship between coffee intake and CHD. Tea decreases weight but increases the risk of stroke and DM when taken more than 3 cups daily. Although no definite recommendation exists, they should not be taken much.

Sugar Sweetened Beverages (SSB): Soda, cola and sweetened fruit drinks increase incidence of obesity, DM, metabolic syndrome and CHD; they should be avoided.

Micronutrients: Na^+ comes from salt or sauce. Sodium restriction benefits black more as compared to whites. Reducing Na^+ intake to 1.8gm/day in hypertensives decrease SBP/DBP by 5/2.7mmHg which translates into a good CV outcome and increasing it by 2.7gm /day increase CVD (stroke) risk by 42%. Vegetable, fruits, grain, legume, meat and dairy are major source of K^+, Ca^{++}, Mg^{++}, K^+ supplementation decreases BP in hypertensives and cases with hypernatremia but the effect of Ca^{++} and Mg^{++} is not so robust.

Antioxidants and Vitamins: Recently it has been shown that plasma Vitamin D level is inversely related to CHD but WHI trial showed no effect of Vit. D on incident CHD. Brief sun exposure is optimum for patient, even more than dietary supplementation. Antioxidants and vitamin supplementation does not prevent CVD except thiamine for Beriberi.

Flavinoids: They exhibit antioxidant, antiplatelet and antiinflammatory effect. They are present in onion, broccoli, apple, grape, citrus fruits, berries, soy, red wine and tea. Consumption of dark chocolate decrease SBP and DBP, improve endothelial function by releasing NO and decrease CHD death. Benefits of dark chocolate are quite interesting!

DIETARY PATTERN: Calorie consumption must be balanced against calorie expenditure. More intake of fast food, fried food, processed snacks, sugar and sweetened beverages with less intake of fruits, vegetables and whole grains, more time watching television and lower average sleep duration culminate in adiposity. For each 2% of calories from transfat is associated with a 23% higher risk of coronary heart disease. Each daily serving of fruits or vegetables is associated with a 4% lower risk of CHD and a 5% lower risk of stroke.

Greater whole grain intake (2.5 compared with 0.2 servings per day) was associated with a 21% lower risk of CVD events. Macronutrient composition i.e., percentage of carbohydrate, fat and protein has little effect on weight gain, it the amount of total calorie consumption that matters, even more than 50 kilocalories a day can result in weight gain. Prudent, DASH and Mediterranean type of diet significantly reduce CVD risk.

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Factor	Recommendation	Approximate SBP reduction	Approximate LDL-C reduction
Sodium Intake	Reduce to no more than 2,300 mg or 6g of sodium chloride daily	2-8 mm Hg	-
Saturated fat intake	Reduce to no more than 7% of calories	-	8-10%
Dietary Cholesterol	Reduce to no more than 200mg per day	-	3-5%
Adopt DASH eating plan	Consume a diet rich in fruits, vegetables and low-fat dairy products with a reduced content of total and saturated fat	8-14mm Hg	-
Viscous fiber	Increase intake to 5-10g per day	-	3-5%
Plant Sterols/stanols	Increase Intake to 2g per day	-	6-15%
Soy Protein	Increase intake to 20-50g per day	-	3-5% (7-10%)
Weight reduction	Achieve and maintain a normal body weight (BMI: 18.5-24.9ka/m$^{2)}$	5-20mmHg/10kg weight loss	5-8%/4.5kg weight loss
Physical activity	Achieve regular aerobic physical activity for at least 30 min each day, for 5 days each week	4-9 mm Hg	-
Alcohol consumption	Limit consumption to no more than 2 drinks per day for men and no more than 1 drink per day for Women	2-4 mm Hg	-
Cumulative Estimate		Suggestive evidence for a Cumulative response	24-37%

Table 1

Healthy dietary pattern improve BP, blood lipid, glucose homeostasis, inflammation, endothelial function, coagulation, thrombosis and attenuate some arrhythmia even. We should adopt a cardio metabolically healthy diet rich in fruits, nuts, vegetables, whole grains, fish, modest dairy intake and vegetable oil with low intake of fried food and beverages. Diet should be rich in fiber, antioxidants, minerals, phytochemicals, unsaturated fat and low in salt as outlined below according to USDA and ADA guideline recommending a 2000 Kcal diet:

- Fruits four to five servings a day, one medium sized fruit in each, should not be juice alone.
- Vegetables four to five servings a day both raw and cooked with less amount of potatoes.
- Whole grain three services a day either in form of bread or cooked rice.
- Nuts: four to five serving per week 50gm each.
- Minimum 2 servings of fish per week 100gm each.
- 1 cup of milk or yogurt two to three times a day.
- 2 to 6 teaspoon of vegetable oil a day.
- Avoid trans fats like ghee, butter, vanaspati.
- Avoid processed meat and sugar sweetened beverages, sweets and bakery.
- Above all dietary planning must be individualized and population based.

CHANGING BEHAVIOR:

- Quit smoking.
- Quit heavy alcohol use.
- Low intake of unfiltered coffee.
- Less TV watching.
- Increase physical activity and ensure adequate sleep.
- 30 minutes early morning brisk walking 5 days a week.

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CONCLUSION: Dietary advice is the cornerstone of management of cardiometabolics; it should never inoculate queries among the family, friends and physicians so far as day to day practice is taken into account. We should adopt a healthy dietary choice far from fried, processed, baked and beverages with adequate green leafy vegetables and fruits, endorse in brief morning walk, physical activity and sound sleep. Adopting a 2000Kcal meal plan with aforesaid strategy will help us to achieve 2020 healthy heart. Nutritional revolution can only bring out extinguish to the raged volcano of diabetes, obesity, HTN, CVD and their morbid spectrum. Our porridge can only mitigate the present day CVD spells, not the pills in pocket.

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