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IMMIGRANT INDIAN MALES-SITTING DUCKS FOR HEART ATTACKS A CAUSE FOR ALARM-AND CALL FOR ACTION

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Coronary heart disease (CHD) has reached epidemic proportions throughout the western industrialized societies. More than half a million Americans die of CHD each year, at an economic cost of 60 billion dollars per year. Even with all the scientific advances and medical marvels, sudden death is frequently an unexpected and tragic presentation of this malady.

Thanks to the increasing awareness of the major risk factors due to the incessant educational compaigns especially by the American Heart Association in the last quarter of century, large segments of society in the United States have modified many of their adverse patterns of living. As a result, there has been a striking decline in both the incidence and mortality from CHD.

In the late 1960's the United States had the second highest death rate from CHD second only to Finland (1). By the early 1980's the United States ranked eighth among 27 economically developed countries with a 50% drop in age adjusted death rate from 1965 to 1985, and a 28% decline from 1976 to 1986 - an almost 3% decline per year. The decline in mortality hasn't been universal with Poland for example experiencing a 98% increase in CHD mortality from 1969 to 1985 (2;3). Interestingly 75% of Polish physicians are cigarette smokers compared with just 10% of US physicians.

Indian community in the USA is not benefitting at all from the 3% per year decline in CHD mortality but is following the lead of Poland with a 6% increase per year.

The crux of this article is to highlight the alarming fact that the migrant Indian community in the USA is not benefitting at all from the 3% per year decline in CHD mortality but is following the lead of Poland with a 6% increase per year (17). Several reports have appeared in recent literature indicating higher incidence of CHD among Indian immigrants in England, S. Africa, West Indies, and Fiji Islands compared with other ethnic groups. It is also felt that the incidence of heart attacks is increasing in India (4-15,54). Our president Dr. Navin Nanda, who is also the president of Indo-American Society of Cardiology and the founder-president of American Association of Cardiologists of Indian origin in USA has done extensive work in this area. The readers are

TABLE 1

Percent Change in CAD Death Rate From 1969 - 1985 - Men aged 45 - 64

DECREASE		INCREASE	
Nation	**Rate**	**Nation**	**Rate**
Australia	-49	France	+0
U.S.A.	-47	Denmark	+0
Japan	-42	N. Ireland	+0
Israel	-42	Italy	+3
Canada	-38	Ireland	+5
New Zealand	-33	Yugoslavia	+17
Belgium	-29	Hungary	+64
Finland	-24	Poland	+98
Portugal	-13	India	???
Scotland	-11		
Germany	-7		
England & Wales	-7		

Source: Thomas Pearson; Population, Health & Nutrition Div., Population & Human Resources Dept., The World Bank, Washington, D.C. 20433

encouraged to read the authoritative study "Serum Lipids of Indian physicians living in the U.S. compared with U.S. born physicians" by Dr. Isaac Thomas (16). (Atherosclerosis, 61 (1986) 99-106).

Many cardiologists across the nation have begun to consider the Asian Indian male living in America to be a major risk factor for CHD. This in turn may be due to high-fat food from both Indian and American cooking, high incidence of genetically determined lipid abnormalities like high triglyceride, high LDL, high apo B, low HDL, low apo A-1, dense LDL trait or hyperapobetalipoproteinemia. Indians, especially South Indians, have a high incidence of

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Type IV hyperlipidemia characterized by high VLDL and low HDL. Selective immigration of Type A personalities and the severe stress the immigrants must endure to be successful in the most competitive society on earth, and an almost six-fold increase in incidence of diabetes mellitus are also major contributors to be considered in pathogenesis (19).

There is an interesting but contrasting parallel involving Mexican-Americans in Texas. Genetically they are less susceptible to CHD but they are in double jeopardy; not only are they 4 times more likely to develop diabetes (NIDDM) they are also 6 times more likely to suffer from endstage renal failure than Anglos (18). We believe the East Indian male in America is in triple jeopardy; not only are they 3 times more likely to develop CHD, they also develop a rather diffuse and virulent disease on an average 5 to 10 years earlier. To add insult to injury they have small coronary arteries where a smaller plaque can produce larger obstruction. Technically aorto-coronary bypass surgery is more difficult and results less than optimum in Indians (17).

So-called migrant studies indicate that as large group of individuals migrate from less affluent to a more affluent country their dietary fat intake rises

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with a parallel increase in their cholesterol levels and CHD rates. Such studies have included native Japanese compared with Japanese-Americans in California and Hawaii and Yemenite Jews migrating to Israel and Irish immigrants to Boston (20). The mortality rate from CHD in Japan is among the lowest in the world - no wonder they consume the lowest amounts of fats, accounting for only 9% of the total calories and only 3% from animal fat. When the Japanese immigrants and their children adopt the American lifestyle especially the high saturated fat American diet, the CHD mortality increases but remains substantially less than American Caucasions (21). Tragically, Americanization of life style by immigrant Indians is associated with a steep increase in CHD.

The Risk Factors:

The risk factor concept enables us to indentify candidates for intervention who are asymptomatic before a catastrophic cardiovascular accident. Until this concept was developed the first reliable indications frequently were symptoms of a stroke, myocardial infarction, or sudden death.

The declining CHD mortality has been analysed by Lee Goldman (22) with only 40% decline directly attributable to medical interventions such as CCU care, CPR, Coronary Artery Bypass surgery and medical treatment of hypertension and CHD. The

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most fascinating fact was an astounding 62.5% reduction in mortality was attributable to modification of life style and reduction of the three major risk factors:

Reduction of Cholesterol - 30%

Reduction of Smoking - 24%

Treatment of Hypertension - 8.5%

The prevalence of smoking among adults decreased from 40% in 1965 to 29% in 1987. By that year, nearly half of all living adults who had ever smoked had stopped smoking (23). Between 1970 and 1980 there was a 100% increase in percentage of population with hypertension diagnosed, treated and controlled (from 17% to 34%) (24). From 1960 to 1980 the national mean cholesterol level for men decreased from 217 to 211 and for women 223 to 215 (25).

Because atherosclerotic cardiovascular disease has multiple causes, no single risk factor gives an adequate picture of an individual's risk status. Even a combination of several risk factors cannot predict the risk with complete accuracy. Despite these limitations one can make reasonable estimate of risk and provide guidance for prevention (26).

The risk factors are:

Male Sex
Hypercholesterolemia >.200 mg/dl
Cigarette smoking
Diabetes mellitus
Family history of premature CHD
Type A personality - stress
Severe obesity 30%
Sedentary living
Indian male living in America?

Atherogenic lipid profile consisting of various combinations of the following may be of special significance among Indians and needs further study (16-37).

High Triglycerides
Low HDL Cholesterol
Low Apolipoprotein A-1
High LDL Cholesterol
High apo B
High Lipoprotein A LP (a)
High Total Cholesterol/HDL ratio
High LDL/HDL ratio
HIgh Apo B/Apo A-1 Ratio
Dense LDL trait
Hyperapobetalipoproteinemia

Heart attack is not fate - it is preventable if you begin early.

Since immigrant Indians are at a very high risk for CHD we can no longer wait for the results of the proposed longitudinal, Framingham-like epidemiologic study. Our efforts to prevent the ravages of CHD should begin in early childhood and become a lifelong practice. The message of the medical profession should be "Do as I do, rather than do as I say".

There is an urgent need to passionately implement and practice the prudent diet recommended by AHA and NCEP and other life style modifications that have already proven to have saved millions of American lives from premature death. We cannot overemphasize the importance of cessation of cigarette smoking which can instantaneously reduce the chance of sudden death by as much as 50%. Regular aerobic exercise at least every other day for 30 to 45 minutes at a time not only help one attain and maintain ideal body weight but also significantly increases the protective HDL. Control of hypertension and diabetes when present are equally important.

We hope to have specific dietary recommendations for Indian cooking in a future issue of this newsletter.

Cholesterol the worst culprit of the silent killer.

Laboratory, epidemiologic and clinical studies have established the role of hypercholesterolemia in the pathogenesis of atherosclerosis and CHD. The placebo-controlled double blind LRCCPPT study involving 3,806 men followed for a minimum of 7 years conclusively showed a 2.1% decline in CHD risks for every 1% reduction in plasma cholesterol (38).

A prospective study of nearly 13,000 men in 16 groups and in 6 western countries and Japan was initiated between 1958 and 1964. In addition to confirming the risk factor associations it provided extensive data that dietary fat intake both by quantity and type, was a determinant of blood cholesterol in free living populations. It was also shown that blood cholesterol level was a determinant of heart attack in these same populations(1).

The WHO study of 19 industrialized countries showed that in men 45% of interpopulation variation in CHD mortality was explained by the variations in serum cholesterol, 32% by variations in HDL and 55%by variations in total cholesterol/ HDL ratio (39).

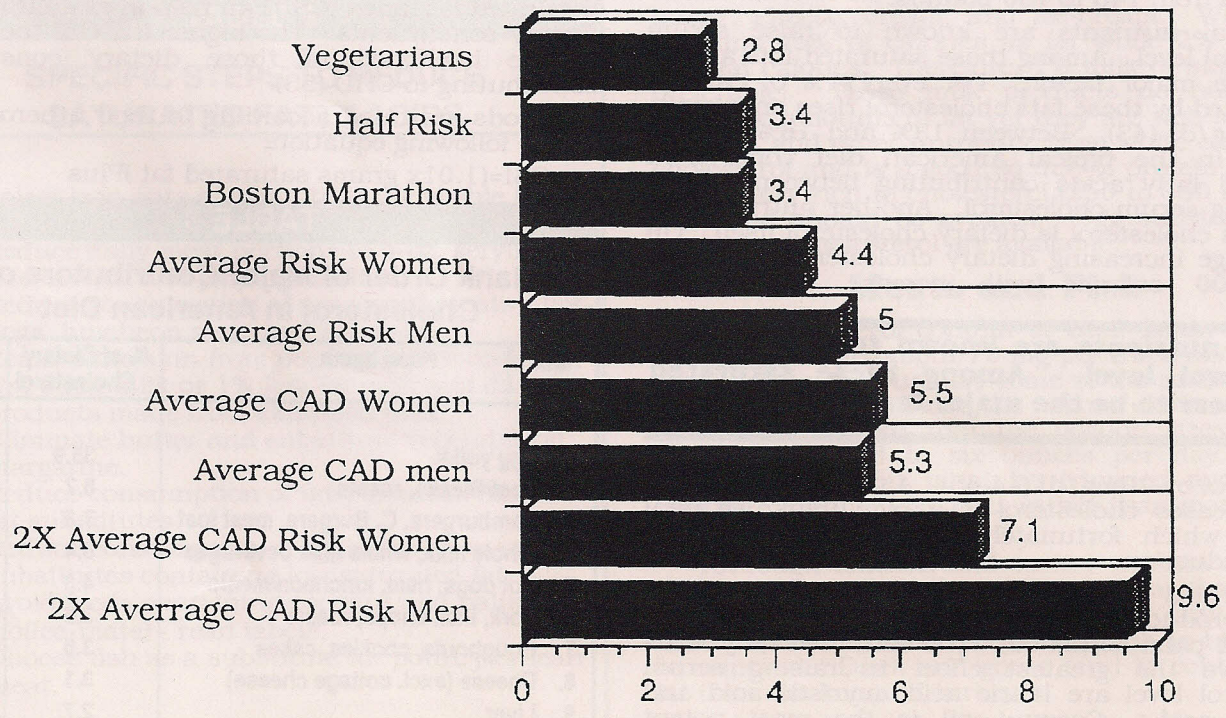
The NHLBI Type II Coronary Intervention study has demonstrated that lowering the LDL-cholesterol results in the reduction of angiographically demonstrable progression of CHD. Because of these findings the NHLBI established the National Cholesterol Education Program (NCEP) in 1985. The Adult Treatment Panel (ATP) has already issued a report which has become the bible for the treatment of high cholesterol (40). The ATP guidelines provides a classification scheme based on the total cholesterol as follows:

High	240 mg/dl or more	25% of population
Borderline High	200 to 239 mg/dl	35% of population
Ideal	Less than 200	40% of population

However, we believe that a serum cholesterol of 200 is too high for Indian immigrants and their children. In view of the reported low HDL levels, the ideal total cholesterol level among Indian immigrants

FIGURE 1

CORONARY (CAD) RISK BY TC/HDL RATIO



Adapted from: Can J Cardiol 1988; (suppl A): 5A-10A

In view of the reported low HDL levels, the ideal total cholesterol level among Indian immigrants should be about 150 mg/dl to achieve the total cholesterol/HDL ratio of 4.5 or less, which is considered the national goal for the US population.

should be about 150 mg/dl to achieve the total cholesterol/HDL ratio of 4.4 or less, which is considered the national goal for the US population.

The Japanese men on the average have 10mg/dl. higher HDL clolesterol (55mg/dl) than the caucasion American male (45 mg/dl). This might partially explain why myocardial infarction is very rare before the age of 50 in Japanese male while this seems to be the rule among Indian immigrants.

About three quarters of plasma cholesterol is synthesized in the liver and intestine involving at least 30 steps, while about one quarter is exogenous from diet. When individuals are studied in metabolic ward with low cholesterol low saturated fat diet the cholesterol typically decreases 20% to 25%. However, type IV hyperlipedimia common among Indians responds dramatically to exercise and diet restricted in simple sugars and fat to attain ideal body weight. One of the volunteers in Dr. Isaac Thomas' study was, with diet and exercise alone,

The cornerstone of treatment of lowering elevated cholesterol is diet modification, with reduction in the amount of saturated fat and cholesterol itself.

able to lower the cholesterol from 239 mg/dl to 128 mg/dl, and triglyceride from 1,150mg/dl to 148 mg/dl in less than a year. This was accompanied by an extremely favorable lipid profile characterized by an increase in HDL ratio decrease from 8.5 to 2.7 with an all important four fold decrease in CHD risk. Interestingly this volunteer needed only 15 lbs weight reduction from 145 to 130 pounds.

Several nutrients are known to raise serum cholesterol level. Among these saturated fats appear to be the major factor. For every 1% of calories contributed by these fats cholesterol rises an average of 2.7 mg/dl (43). Between 13% and 16% of total calories in the typical American diet come from saturated fatty acids contributing between 30 mg and 40mg serum cholesterol. Another nutrient that increases cholesterol is dietary cholesterol itself. On an average increasing dietary cholesterol by 100mg per 1,000 calories will increase total serum

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cholesterol by 10mg/dl (44;45). A third way in which diet increases cholesterol is a high intake of total calories which fortunately is easily reversible by weight reduction.

Saturated fatty acids are found primarily in animal products and in the "Tropical oils" (coconut, palm and palm kernel oil). The saturated fatty acids that have the greatest effect in raising serum cholesterol level are lauric acid, myristic acid and palmitic acid. Coconut oil is the most potent cholesterol raising fat. This is followed by butter fat and palm oil. The major contributors to cholesterol and fatty acids in American diet are given in tables 2 and 3 and specific steps to reduce them are given in tables 4 and 5. (Adapted from Cholesterol and

TABLE 2

The Rank Order of Major Contributors of Saturated Fat in American Diet

Rank	Food Items	% of dietary Cholesterol	mg/ day
1.	Hamburgers, Cheeseburgers, meat loaf	9.3	26
2.	Whole milk, whole-milk beverages	9.1	25
3.	Cheeses (excluding cottage cheese)	7.3	20
4.	Beef Steaks, roasts	7.3	20
5.	Hot dogs, ham, luncheon meats	7.0	20
6.	Doughnuts, cookies, cake	4.8	13
7.	Eggs	4.5	13
8.	Pork, including chops, roasts	4.0	11
9.	Butter	3.7	10
10.	White bread, rolls, crakers	3.2	9
	Total	60.02	167

Coronary Heart Disease....Reducing the Risk National Cholesterol Education Program ref. 52).

Many nutritionists believe that both cholesterol

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and saturated fat should be evaluated to determine a food's atherogenicity. Using the cholesterol Saturated fat Index (CSI) can help in evaluating these dietary constituents. The higher the CSI the greater is the likelihood of those dietary constituents contributing to CHD (53).

Foods are rated according to their atherogenicity by the following equation:

CSI=(1.01x grams saturated fat)Plus

TABLE 3

Rank Order of Major Contributors of Cholesterol in American Diet

Rank	Food Items	% of Dietary Cholesterol	mg/ day
1.	Egg yolks	35.9	162
2.	Beef Steaks, roasts	8.7	39
3.	Hamburgers, C. Burgers, meat loaf	7.3	3
4.	Whole milk, whole milk beverages	5.4	24
5.	Hot dogs, ham, luncheon meats	4.3	20
6.	Pork, incl. chops, roasts	3.6	16
7.	Doughnuts, cookies, cakes	3.6	16
8.	Cheese (excl. cottage cheese)	3.1	14
9.	Liver	2.7	12
10.	Chicken and Turkey (excl. fried)	2.6	12
	Total	77.2	348

(0.05xmilligrams cholesterol).

GUIDELINES FOR DIETARY MODIFICATIONS

A reasonable recommendation is to limit the total fat intake to less than 30% of total calories with 10% of the calories coming each from saturated, polyunsaturated and monounsaturated fatty acids. It is not necessary to severely curtail the total fat intake to lower the cholesterol provided the fat is of the right quality. The cholesterol intake must be reduced to 300 mg per day. But Indians with lipid abnormalities should consume the least amount of cholesterol, perhaps less than 100mg/day.

TABLE 4

AHA & NCEP RECOMMENDATIONS

	Fats (% of tatal calories)				General Population
	Total	Sat.	Mono.	Poly.	Cholesterol mg/day
Current intake:	40	17	16	7	500
Recommended intake no more than	30	10	10	10	200 - 300

When polyunsaturated fatty acids, specifically linoleic acid are substituted for saturated fatty acids in the diet the serum LDL cholesterol falls. The same is true of monounsaturated fatty acids specifically oleic acids (46;47). From a cholesterol-lowering point of view olive and puritan oils are preferable while coconut oil., butter and other animal fats should be avoided.

TABLE 5

SPECIFIC STEPS TO REDUCE SATURATED FATTY ACIDS

1. Select lean cuts of meat, trim the visible fat and broil or grill.
2. Reduce daily meat portions to 4-oz. serving-the size of a deck of playing cards.
3. Reduce consumption of processed meats - hot-dogs, luncheon meat and sausage.
4. Remove the skin from poultry before cooking.
5. Use skim milk or 1% low-fat milk and dairy products made from skimmed milk.
6. Eliminate butter and substitute vegetable oil margarine.
7. Reduce consumption of fatty cheeses-find low-fat substitutes.
8. Reduce consumption of egg yolks - use egg substitutes containing low saturated fat.
9. Avoid foods containing coconut and palm oils (coffee-mate) - read labels.
10. Choose fish as a substitute for poultry or lean meat.

Monosaturated fatty acids are a sizable constituent of all animal fats making up about 40% of beef fats and up to 45% of chicken fats. They are also major components of several vegetable oils such as olive oil (74%), peanut oil (46%), corn oil (24%), safflower oil (12%). When saturated fats are reduced in the diet by lowering animal fats, there is an associated reduction in monounsaturated fatty acids by approximately the same degree. Carbohydrates should constitute 55% to 60% and protein 15% of the total calories.

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TABLE 6

SPECIFIC STEPS TO REDUCE DIETARY CHOLESTEROL

1. Limit or eliminate the intake of egg yolks.
2. Limit the intake of liver and other organ meats.
3. Limit meat, poultry, and shellfish to 3-oz. cooked portions.

Diary products and egg

The major hypercholesterolemic fat in the diet is milk fat which contains both cholesterol and saturated fat. Apart from milk, milk fat is found in butter, cheese, cream, and ice-cream. Whole milk contains 45% of calories as fat while 2% milk has 30% fat calories. Therefore, 1% milk or skim milk is preferable. These milk products do not contain excessive amounts of fat yet they are rich in protein, calcium, and other nutrients. Egg white contains no cholesterol and is a good source of protein while egg yolk is very rich in cholesterol (250 to 350 m per egg yolk) and should be avoided. Egg substitutes that contain no cholesterol are available.

Meats and Fish

The cholesterol content of beef, lamb, pork and veal is moderate (about 70 mg per three and one half ounce of meat). Further, some of the saturated fatty acids in meat will raise the serum cholesterol level. It is recommended that the portion sizes of these meats be limited to six ounces per day. On all meats, outside fat must be trimmed away before cooking. Finally, lean cuts rather than marbled cuts of meat must be purchased.

Although chicken and turkey contain about the same amount of cholesterol as meats, they usually are leaner and contain less saturated fatty acids. It is recommended that the skin, which is high in fat, be removed. Duck and goose tend to contain, more fat than chicken and turkey.

Processed meats such as bacon, bologna, salami, sausage, hamburger and hot dogs usually contain large amounts of fat. They should be avoided

because of their high content of saturated fatty acids and high calorie content. Organ meats include liver, sweet breads, kidneys and brains. All of these meats are loaded with cholesterol and should be eaten only sparingly.

Fruits, Vegetables and Grain

More fruits, and grains may be eaten as desired. They usually are low in fat, contain no cholesterol, and are high in fiber and vitamins. There are, however, a few exceptions. Coconut is very high in saturated fatty acids. Olives and avocado are high in total fat, although the fat is that of an unsaturated type; they should be restricted only because of their high caloric content. Breads and pasta made with egg yolks should be limited. Intake of most processed and preserved vegetables needs to be restricted because of their high sodium content.

Nuts and seeds are high in total fat, but most of the fat is unsaturated and does not raise serum cholesterol level. They do not contain cholesterol. They need to be limited in diet because of their high calorie content, but they can be substituted in limited quantities for other protein sources.

Baked Goods, Fats and Oils and Beverages

More fruits, and grains may be eaten as desired. They usually are low in fat, contain no cholesterol, and are high in fiber and vitamins.

Cakes, pies, doughnuts, cookies and candy are high in total calories but low in beneficial nutrients. Baked goods made with egg yolks and saturated fats should be strictly limited. Preferable are homemade baked goods made with egg white and unsaturated oils.

All fats and oils are high in total calories and must be limited to avoid weight gain. Hard fats tend to contain more saturated fatty acids and should be restricted. They come from either animals (butter, lard, tallow) or plants (coconut oil, palm oil, palm kernel oil). Vegetable oils, in contrast, usuallly are high in unsaturated fatty acids and preferred to hard fats. Hydrogenated vegetable oils, although made hard artificially, do not raise cholesterol as much as naturally hard fats.

Most beverages (coffee, tea, soft drinks, alcoholic beverages) have little nutritional value. Some are high in calories and caffeine. Total alcohol intake should not exceed one ounce per day on the average.

If the serum cholesterol levels remain stubbornly high, despite decisive dietary intervention and diligent exercise program, several effective medications are available now. A discussion of these drugs is beyond the scope of this article.

Obesity

Obesity is a major health problem affecting 24.2% females (48). The lowest CHD mortality is associated with a Body Mass Index of 23 to 32. One should atttempt weight reduction by both exercise and caloric restriction. It is better to lose weight through exercise than through severe restriction of calories, which can make the intake of vital nutrients marginal. Now that only 10% of US physicians smoke, according to CDC researchers more of us are at risk for CHD from lack of exercise than smoking.

Atherosclerosis begins in the young - Second Generation, Beware!

In 1953 Enos reported the autopsy findings of 300 American soldiers killed in Korean war. The average age of the men in the group was 22.1 years. Yet, in 77..3% of these cases some gross evidence of coronary disease was demonstrated that varied from "fibrous"thickening to complete occlusion of one or more of the main branches. Only 23% were free of grossly visible lesions (49). In 1971 McNamaraet al studied the hearts of American soldiers killed in the Vietnam war and reported that 45%had significant and another 5% had severe coronary atherosclerosis (51). The preliminary report of PADAY studies involving 3,000 sets of coronary arteries and aortas from 15 to 34 year old autopsied accidental death victims with post mortem risk factor analysis also concluded the close association with risk factors and the childhood onset of CHD.

We have tried to underscore the importance of prevention through dietary management and behavior modifications that have proven amazingly successful in our adopted land. CHD is a cumulative climax of various dietary and enviornmental insults

The answer to CHD is prevention and prevention must begin in early life. Yes, CHD is not an affliction of fate or old age.

to genetically susceptible individuals. Luckily, we can live longer if we alter the food habits and adverse lifestyle patterns early in life. Let me conclude this article by quoting the monumental words of wisdom of Dr. Paul Dudly White, the father of modern cardiology.

"Heart Disease before eighty is our fault not God's or Nature's Will".

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TABLE 7

MAJOR OILS AND THEIR COMPOSITION

Food Item	Cholesterol mg/Tbsp.	Sat. Fat%	Mono-Unsat. fat%	Poly-unsat fat %
Canola Oil	0	6%	62%	32%
Safflower Oil	0	9%	13%	78%
Sunflower Oil	0	11%	20%	69%
Corn Oil	0	13%	28%	59%
Peanut Oil	0	14%	50%	32%
Olive Oil	0	14%	77%	9%
Soybean Oil	0	15%	24%	61%
Margarine (fat)	0	18%	48%	29%
Vegetable Shortening (Crisco)	0	26%	43%	25%
Cottonseed Oil	0	26%	20%	55%
Chicken Fat	11	30%	47%	22%
Lard	12	42%	48%	10%
Animal Fat Shortening (precreamed)	9	44%	48%	5%
Beef Fat	14	51%	44%	4%
Palm Oil	0	50%	40%	10%
Cocoa Butter	0	61%	34%	3%
Butter (fat)	33	63%	31%	3%
Palm Kernel Oil	0	82%	15%	2%
Coconut Oil	0	92%	6%	2%

COCONUT OIL IS THE MOST POTENT CHOLESTEROL RAISING FAT

BEWARE OF FANCY NAMES OF PREPARATIONS THAT ARE LOADED WITH HIGH CHOLESTEROL AND SATURATED FAT. HERE ARE A FEW SAMPLES.

Au Gratin	Crispy	Basted
Fried	Braised	Hash
Buttery	Hollandaise	Buttered
Marinated in Oil	In butter sauce	Pan fried
In cheese sauce	Pot pie	In Cream sauce
Prime	Casserole	Sauteed
Creamed	Scalloped	Stewed

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