

Asian Americans and Heart Disease:

Heart Disease has always been a public health problem. People are living longer. An ever-increasing number suffer from one form of heart disease or another. The World Health Organization estimated that 12 million deaths were related to cardiovascular diseases in 1992. One half of all deaths in developed countries like the USA were from heart disease. In developing nations too, the increase in coronary heart disease is reaching epidemic proportions. India and China, which together account for over 50% of the earth's population, account for 4.5 to 5 million deaths from heart disease every year. And that doesn't count the sufferers who do not die, but live with complications and restrictions imposed by their disease. Determining the unique risk factors for CVD among these groups is critical in order to develop tailored strategies for the prevention of CVD. Coronary artery disease (CAD) is a major public health problem facing Asian Americans, particularly South Asians and to complicate further, it can't be explained by conventional risk factors.

A case in point that strengthens my view is the following recent studies:

1. British Heart Foundation statistics show that the death rate from coronary heart disease is 46% higher in South Asian men than the UK population as a whole, for women it is 51% higher.
2. Anand and her colleagues at McMaster University in Hamilton studied 985 South Asians, Europeans and Chinese in three Canadian cities to determine whether ethnic background had any impact on the risk of heart disease. The study found a higher risk of cardiovascular disease was linked to a condition called carotid atherosclerosis (*Atherosclerosis is the progressive narrowing and hardening of the arteries. It can occur as a result of ageing but also as a result of high cholesterol, high blood pressure, smoking, and diabetes*). It is regarded as a major cause of heart disease. When it affects the carotid artery, which carries blood from the heart to the brain, it can lead to stroke. This condition was much more common among South Asians than among Europeans and Chinese. The researchers suggested that the variations between ethnic groups might be caused by differences in the way the disease develops. They added, however, that it could also be due to other undiscovered factors - diet is thought to play a significant role.
3. Dr. Gupta and colleagues in Canada examined medical records of about 3,413 South Asian and European patients with coronary artery disease who underwent angiography at the Trillium Health Centre in Mississauga and the Rouge Valley Health System in Scarborough between April, 1999, and March, 2000. Coronary angiography is a diagnostic/treatment procedure that uses an inserted catheter to visualize the interior of blood vessels. (Ethnicity was determined by self-reporting and name analysis). This study showed that every segment of the three major arteries of the heart in South Asian patients were more seriously diseased than in Canadians of European descent. When the data were re-examined to focus on

women the results were even more disturbing. This type of life-threatening coronary anatomy was found to be twice as often in South Asian group of women compared to the European women," says Dr. Gupta. There was no significant difference between South Asian Canadians and European Canadians in the known risk factors for heart disease - obesity, high blood pressure, elevated cholesterol levels or family history. Smoking, a powerful risk factor was much less common in South Asians.

Potential risk factors:

The risk factors are two kinds. The first kind, one can't do much about includes factors like gender, age, ethnicity, genetics and geographic location.

- Coronary artery disease is 2.5 times more likely in men than women.
- Heart attacks occur in 9.7% of women between 65 and 69 years of age, but in 17.9% of those older than 85.
- African - Americans have a higher heart disease risk than whites, and the incidence also varies among Hispanics, Asians and other races.

The second kind is, one can modify through diet and exercise.

Risk factors more common to Asian Americans – South Asians:

- Coronary artery disease (CAD) 40% higher in Indian Asians compared to European whites (Balarajan, 1991). The burden of CAD is twofold higher in Indian Asian men compared to Europeans.
- Diabetes is 3.8 times higher than that in Europeans (McKeigue et al., 1991).
- 60% risk of CAD due to insulin resistance (McKeigue et al., 1993).
- Six-month mortality (death rate) after acute myocardial infarction (heart attacks) is two-fold higher in Indian Asians compared to Europeans, despite similar therapy (Wilkinson et al., 1996).

An estimated 7 million people in the UK have metabolic syndrome and are therefore at greater risk of stroke, heart attack and diabetes. Deadly Quartet of Syndrome X (Kooner et al., 1998; Reaven 1988) is identified by Diabetes Mellitus/Insulin Resistance (Baliga et al., 1995), Hypertension, Central Abdominal Obesity and Hyperlipidemia.

Other general risk factors are smoking, hypertension, above normal Body-Mass Index (BMI) total cholesterol and apolipoprotein-B. However, in UK based Indians, total cholesterol and Apolipoprotein-B were found to be higher than non-migrant Asians.

Diabetes mellitus:

There is increased prevalence of non-insulin diabetes mellitus in Indian Asians. It could be attributed to genetic factors and acquired from westernization.

Insulin Resistance:

Insulin resistance is characterized by raised plasma **insulin**, glucose **intolerance**, **increased** triglycerides, decreased HDL (good cholesterol) and central obesity. These factors are found to be more prevalent **in Indian Asians** than Europeans (McKeigue et al., 1993). It could be attributed to genetic factors and acquired from westernization.

Raised serum Lp (a) lipoprotein:

Lp(a) concentrations seem to be genetic in nature as it is found to be uniquely higher **in Asians in India** than European whites (Bhatnagar et al., 1995). Asian Indians tested above threshold levels (30 mg/dl) for Lp(a) for the development of CAD constitute about 30% compared to 19% Caucasians and 8% Mexican Americans. It is genetically determined, so it runs in families. It is a powerful independent risk factor for premature fatty deposition (atherosclerosis) and thrombosis (clotting in the blood vessels). It is also responsible for the high failure rate of balloon angioplasty and bypass surgery. Raised serum Lp (a) and low-density cholesterol (LDL) is associated with a 9-fold **increase in** risk of CAD (Seed et al., 1990). Raised plasma **Insulin**, **decreased** physical activity and increase in central obesity is thought to be due to adopting western lifestyles.

Obesity:

Waist circumference (Men >102 cm or 40 **in**, and Women >88 cm or 35 **in**), decreased HDL-cholesterol (Men <40 mg/dL and, Women <50 mg/dL) and increased triglycerides (>150 mg/dl) are thought to attributed to Westernized lifestyle rather than genetic.

Smoking:

Has been found to be major risk factor in non-migrant Indians (Pais et al., 1996) while smoking, hypertension and hypercholesterolemia are generally lower **in migrant Indian Asians** than Europeans. This suggests that other factors also contribute to excess mortality **in** coronary artery **disease**.

C-Reactive Protein:

C-Reactive Protein is a non-specific marker of inflammation. C-Reactive Protein concentrations are higher in healthy Indian **Asians** than in European whites **and** are accounted for by greater central obesity **and** insulin resistance in Indian **Asians** (Chambers et al., 2001). These results suggest that inflammation may contribute to increased risk of CAD in Indian **Asians**

Homocysteine:

Elevated levels cause twice as much CAD levels in Indian **Asians** compared to Europeans (Chambers et al., 2000).

Genetics:

Cd36 gene deficiency (also known as Fatty Acid Translocase) (Aitman 2001). Dominant negative mutations in human (Peroxisome proliferators activated receptor gamma or PPAR gamma) associated with severe insulin resistance, diabetes mellitus **and** hypertension (Barraso et al., 1999)

Diet:

Excessive use of clarified butter (Ghee) is found to be risk factor in South Asian diet (Lancet 1987).

Women:

In pre-menopausal women, polycystic ovarian disease is associated with insulin resistance and coronary artery disease. South Asian women with polycystic ovarian disease are therefore more susceptible to insulin resistance and coronary artery disease (Dunaif et al., 1987). The risk in post-menopausal women was found to be similar to men. South Asian women have higher waist circumference (~87 cm) compared to white women (~79 cm) (Lean et al., 2001).

Stress:

British Heart Foundation is currently funding research to examine why South Asians in the UK have a high incidence of heart disease. Researchers have long suspected that stress plays a role in the development of heart conditions. Now a team at University College London says their study of 183 men provides the first conclusive biological evidence of a link between stress and metabolic syndrome - a condition thought to be a precursor to coronary heart disease.

The study examined the biological, rather than the physical, effects of stress in civil servants aged between 45 and 63. The team monitored changes to the men's nervous system and their production of certain stress hormones. They also measured the men's risk factors for coronary heart disease, and variations in heart rates and cardiac activity. Researchers also questioned the men about their jobs, such as position, levels of control and responsibility, and lifestyles including eating habits and exercise levels. Results showed that men with metabolic syndrome produced more stress hormones, had abnormal heart rates, and were more obese than the control group. Job strain was one of the factors seen to partly explain the increased production of the stress hormones associated with metabolic syndrome and which combined with obesity to affect heart activity. Although this is not concrete proof that stress causes the metabolic syndrome or indeed heart disease, we are certainly closer to proving it. But researchers were also reassured to find that the biological effects of stress were at least partly reversible in men who reduced their risk factors, such as losing weight or who had their blood pressure lowered. The link between stress and heart disease is still unclear, but this study is significant as it helps us to understand more about the relationship between the conditions.

Myocardial Infarction (Heart Attacks):

Six-month mortality (death rate) after acute MI is 2-fold higher in Indian Asians compared to Europeans. This increased mortality has been attributed to a higher prevalence of diabetes.

South Asians show a higher predisposition to adult onset diabetes, a major risk factor. However, when a statistical analysis was performed to correct for the difference in diabetic disease, the rates of coronary disease were still much higher among the South Asians.

Postulated mechanisms include Thrifty Gene Hypothesis (Neel 1962). The gene pool is relatively constant over the past 100 to 200 years although the environment and lifestyle has changed. Asians like other ethnic groups may have the "thrifty gene(s)". This gene (or group of genes) enabled them during centuries of living as hunters or farmers to survive on relatively small amounts of food, thereby being able to survive periods of drought and famine. But the new generation lives in a society where food is not only readily available but is 'high-calorie, high-fat food'. In addition the current desk jobs do not require as many calories as hunting or farming or other activities that were required to eek out an existence in the past. And therefore, they gain weight much more easily, and then develop diabetes and hypertension.

Some of the reasons for decline in heart disease in other parts of the world:

Though not measurable directly, the cost of treating heart disease in American women alone was estimated to be around \$300 billion dollars in 1998. Over the past two decades, there has been a significant decline in the incidence of heart disease. In Japan and Australia, 50-60% decline in heart attacks has been recorded since 1980.

The causes for this decline are related to:

- Decreasing modifiable risk factors - smoking, cholesterol, exercise
- Better treatment facilities for heart attacks and strokes
- Emphasis on primary prevention rather than treatment

How to modify heart disease risk profile? (See also NIH guidelines)

There isn't anything one can do about being born male, growing older or the color of one's skin! But there are other things that can be done to reduce heart disease risk. Eating a healthy diet, exercising regularly, maintaining a healthy body weight, stress reduction and not smoking, are important for everyone but especially for this group.

Risk factor assessment

- Should begin at age 20 years
- Pulse (to exclude atrial fibrillation), blood pressure, fasting cholesterol, blood glucose, and other risk factors should be assessed every year
- Calculate your risk every month: [Risk calculator](#)

Exercise:

Benefits of regular exercise (see also NIH Guidelines)

- Improves heart and lungs
- Decreases resting blood pressure
- Decreases body fat
- Decreases total and LDL cholesterol ("bad cholesterol")

- Raises HDL cholesterol ("good cholesterol")
- Increases energy level
- Increases tolerance to stress and depression
- Controls or prevents the development of diabetes
- Decreases risk of orthopedic injury
- Guidelines for Safe Exercise
- Frequency - 3-5 times a week
- Duration - 20-60 minutes
- Intensity (how hard) - within your target heart rate

Calculating Your Target Heart Rate

- 1) $220 - \text{age} = \text{MHR}$ (maximum heart rate)
- 2) $\text{MHR} \times 0.6 = \text{_____}$ (this is the low end of your target HR)
- 3) $\text{MHR} \times 0.8 = \text{_____}$ (this is the upper end of your target HR)

Example:

If you are 40 years old, your MHR is $220 - 40 = 180$.

$180 \times 0.6 = 108$

$180 \times 0.8 = 144$

Therefore, your Target Heart Rate is between 108 and 144 beats per minute.

Physical activity:

The goal of physical activity to improve both 'metabolic fitness' and 'circulatory fitness'.

Exercise improves insulin sensitivity

Moderate-intensity physical activity such as walking, cycling and swimming so that at least 100 kcal/h is expended daily--e.g. brisk walk 30 min every day

Weight loss (see also NIH guidelines)

The goal of treatment is to reduce central obesity

Aim for ideal body weight (body mass index 18.5-23 kg/sq m). Are you overweight?

Calculate your BMI

Aim for a waist: hip ratio <1.0 in men and <0.85 in women

Weight loss improves insulin sensitivity

UK Indians Asians consume as much fat as Europeans but *twice as much* as non-migrants

Weigh yourself everyday and measure waist:hip ratio daily

Reduce daily calorie intake by 500 Kcal

Reduce fat intake to 21% of total energy intake

Diabetes (see also NIH Guidelines)

The goal of therapy is to achieve optimal blood sugar levels: Plasma glucose (<110 mg/dL) and Hb A1c ($<7\%$)

Cholesterol Profile (see also NIH guidelines)

The goal is to aim for a lipid profile similar to non-migrant rural Indian Asians who have a low risk for CAD. Total cholesterol levels should not exceed 200 mg/dL.

LDL cholesterol ('bad' cholesterol) should not exceed 100 mg/dL.

Triglycerides should not exceed 150 mg/dL

HDL cholesterol ('good' cholesterol) should exceed 60 mg/dL.

Medications: See NIH Website

Statins should be used to treat hypercholesterolemia and mild triglyceridemia

Statins + Fibrates should be used for though with severely increased plasma triglyceridemia or very low HDL cholesterol

Hypertension (see NIH guidelines)

The goal is not to exceed blood pressures seen in non-migrant Indian Asians, i.e, 130/80 mm Hg. Medications: see NIH Website

Thiazide diuretics interfere with blood glucose control, increase total cholesterol and decrease HDL cholesterol ('good' cholesterol)--therefore, avoiding thiazides to diuretics may be relevant to Indian Asians

Smoking (see also NIH guidelines)

The goal of therapy is smoking cessation

Smoking cessation has been shown to reduce coronary artery disease by 25%

Homocysteine:

The goal of therapy is to reduce plasma homocysteine to less than 10 µmol/L.

Patients with homocysteine levels above 11 µmol/L should benefit from folic acid 5 mg every day

Family & Relatives:

The goal is to identify first degree relatives (e.g., brothers, sisters, children and parents) of patients for risk factors particularly lipid profile, blood pressure, smoking, central obesity, insulin resistance, diabetes, homocysteine etc.

Diet:

A Mediterranean-style diet may help reduce the risk of coronary artery disease in Asian people, especially those living in western nations, according to new research.

A study by Indian and Israeli researchers (recent issue of *The Lancet*), included 1,000 people with a history of health problems associated with CAD, including angina, heart attack and diabetes. Half the people were given a Mediterranean-style diet that included whole grains, fruits, vegetables, walnuts and almonds. That diet is rich in alpha-linolenic acid, believed to benefit the heart. The other half of the people in the study, the control group, ate a conventional Asian diet. At the end of two years, the group given the special diet had doubled their daily intake of alpha-linolenic acid. The study group had half the number of sudden cardiac death cases and non-fatal heart attacks compared to the control group

Stress reduction in whatever way or form. For example, Yoga, Ta-ichi etc., appropriate and suitable to the individual in question.

In conclusion, among Asian Americans, South Asians have a certain mix of genes that increase their risk of developing diabetes and premature coronary disease, but those genes only exert a negative effect when exposed to a certain mix of environmental

factors. Economic transition, urbanization, industrialization and globalization bring about lifestyle changes that promote heart disease. The wrong environment appears to be conventional ones such as tobacco use, physical inactivity and unhealthy diet.

Life expectancy in developing countries is rising sharply, and people are exposed to these risk factors for longer periods'

Newly emerging CVD risk factors like low birth weight, folate deficiency and infestations are also more frequent among the poorest in low and middle-income countries.

Diet cannot be the singular factor as there is no such thing as a singular South Asian diet. South Asia is four different countries, more than 20 different cultures and radically different diets. However, one aspect that is common to this group is a predominantly carbohydrate rich and relatively low protein diet coupled with a sedentary lifestyle with little or no physical activity exercise.

It is extremely important that people of South Asian heritage be aware they face a greater risk of adult onset diabetes and heart disease, that they must be investigated for these conditions earlier, and that they be treated appropriately.

Prevention, early detection and treatment of heart disease among this high-risk population could save many lives. Similar studies are needed among other ethnic populations of APIA.

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Other resources:

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Table 2. Growth rate of U.S. Population based on Racial/ethnic classification

Racial/Ethnic Group	Growth Rate, 1980-1990	Growth Rate, 1990-2000
Whites	4.09%	5.08%
Blacks	11.98%	15.26%
American Indians	35.44%	14.42%
Latinos/Hispanics	53.02%	39.42%
Asian Americans	96.13%	63.24%

Table 3. Growth Rates of within major Asian American ethnic groups

Asian Ethnic Group	Growth Rate 1980-1990	Growth Rate 1990-2000	% of Asian American Popul.
Chinese	104.1%	47.5%	23.7
Filipino	81.6%	30.3%	18.1
Asian Indian	125.6%	113.4%	16.4
Vietnamese	125.3%	89.2%	11.0
Korean	134.8%	35.1%	10.5
Japanese	20.9%	-9.4%	7.8

Table 4. Asian Americans, distribution by geographic location in USA

Metropolitan Area	Asian American Popul.	% of Total Population
Los Angeles	1,799,000	11.4%
New York	1,343,000	6.7%
San Francisco	1,279,000	18.8%
Honolulu	566,000	64.9%
Washington DC-Baltimore	373,000	5.1%
Chicago	367,000	4.2%

Table 1. Distribution of Asian Americans in USA.

Ethnic Group	Asian alone		Asian & at least One Other Race (i.e., Filipino-White)	Total Population, Alone or in Any Combination
	Single Ethnicity	Two or More Asian Ethnicities (i.e., Chinese-Vietnamese)		
Chinese	2,314,537	130,826	289,478	2,734,841
Filipino	1,850,314	57,811	456,690	2,364,815
Asian Indian	1,678,765	40,013	180,821	1,899,599
Korean	1,076,872	22,550	129,005	1,228,427
Vietnamese	1,122,528	47,144	54,064	1,223,736
Japanese	796,700	55,537	296,695	1,148,932
Cambodian	171,937	11,832	22,283	206,052
Pakistani	153,533	11,095	39,681	204,309
Laotian	168,707	10,396	19,100	198,203
Hmong	169,428	5,284	11,598	186,310
Thai	112,989	7,929	29,365	150,293
Taiwanese	118,048	14,096	12,651	144,795
Indonesian	39,757	4,429	18,887	63,073
Bangladeshi	41,280	5,625	10,507	57,412