

SAPHA REPORT: CARDIOVASCULAR DISEASE

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Cardiovascular disease (CVD) is the primary cause of mortality among Asian Indians in the US. However, most of the available research on CVD among South Asians has been conducted in countries other than the United States.² Those studies that have been done in the US have investigated almost exclusively persons of Asian Indian descent, or have assessed a specific type of risk such as lipid status or fasting insulin status.³ We focus primarily on Asian Indians due to the paucity of data among other South Asian groups. Where data are available on groups from specific geographic origins, the group's country of origin is noted. Available data from the United Kingdom (UK) demonstrate differences in disease rates and risk factors among various South Asian groups living in Great Britain,⁴ so it cannot be assumed that all South Asians have similar risks for cardiovascular diseases.

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National level surveys are currently inadequate for assessing risks or health status in specific Asian subpopulations either due to the aggregation of multiple ethnic groups into the socially constructed category Asian American and Pacific Islander (AAPI) or due to small sample sizes. Similarly, Behavioral Risk Factor Surveillance Systems (BRFSS) often do not obtain information on specific AAPI subpopulations. Population-based surveys of South Asians living in the US have not been conducted with sufficient rigor to form generalizations on data about coronary heart disease risk factors. Little is known about overall health status, health-related

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behaviors such as diet and physical activity, and access to and use of health care services within the South Asian community living in the US. First generation Asian Indian immigrants to the US have a much higher prevalence (percentage of cases in the population) of cardiovascular diseases compared with other Asian populations and non-Hispanic Whites.⁵ In the only published study examining this, 1,688 Asian Indian physicians and their family members (1,131 men and 557 women) were studied. The age-adjusted prevalence of myocardial infarction or angina among Asian Indian male physicians was 7.2% compared with 2.5% in the Framingham Offspring Study, a longitudinal study of Caucasian residents of Framingham, Massachusetts. Rates were similar between Asian Indian women and the women from the Framingham study.⁶ It is unclear whether all South Asians living in the US are at higher risk for coronary heart disease, although studies in the UK which have included other South Asians, such as Bangladeshis and Pakistanis, indicate other South Asians also have higher than average cardiovascular risks.⁷ Heart disease is the leading cause of death for Asian Indians aged 45-64 years, with 38.7% of all deaths among Asian Indians attributable to diseases of the heart.⁸ This source, drawn from National Center for Health Statistics (NCHS) mortality data, does not list mortality data on any other South Asian population. One study of six ethnic groups in California, using death certificate data from 1985 to 1990, found that while all cause mortality was lowest for Asian Indians, age-standardized death rates for coronary heart disease (CHD) were similar to several other ethnic groups (258 deaths per 100,000 in Asian Indian men compared with 280 for all men, and 110 per 100,000 in Asian Indian women compared with 139 per 100,000 in all women). While persons of Bangladeshi, Pakistani, and Sri Lankan origins are identified on the death tapes used for this study and were included, the Census data the author used included only Asian Indians in the denominator (which could make standardized mortality rates higher than the true rate). Age-specific proportional mortality rates of coronary heart disease among Asian Indians were higher, however, than for any other group studied.⁹

While little appears on vascular diseases outside of the heart disease among South Asians, many authors have suggested that atherosclerotic processes ("hardening of the arteries") are accelerated,¹⁰ that function of the lining of arteries is more likely to be abnormal even in healthy Asian Indians,¹¹ and that such endothelial dysfunction may contribute to vas-

cular disease processes including CHD. In addition to the lack of data on death rates and disease prevalence, there is little information about how programs can best address health promotion and chronic disease prevention to improve health. Similarly, there is minimal information on how to tailor cardiovascular prevention interventions to the unique languages, cultures, and histories of South Asians. Recommendations on dietary and lifestyle modification for Asian Indians have focused on reductions in use of saturated fats, ensuring regular exercise, and decreasing caloric and carbohydrate consumption.¹² However, design of culturally tailored interventions for the larger South Asian community and testing of such recommendations have not appeared in the literature.

Risk Factor Epidemiology among South Asians

Asian Indian migrants, as a group, appear to be at risk for CHD despite the relatively healthy lifestyles reported in Enas' Asian Indian physician study.¹³ Pakistani and Bangladeshi migrants to the UK also have high rates of CHD, while risk factor profiles differ. One UK study on risk factors found that Indians were the most physically active, Pakistani and Bangladeshi persons were less likely to drink alcohol, Bangladeshi men were more likely to be smokers, and Pakistani and Indian men ate more fruits and vegetables daily.¹⁴ Another UK study indicated higher rates of self-reported ischemic heart disease among Pakistanis and Bangladeshis as compared with Asian Indians, and suggested that some of this increase was related to differences in socioeconomic position.¹⁵ One study from Canada found that South Asians (including Asian Indian, Pakistani, Sri Lankan, and Bangladeshi) have a higher prevalence of cardiovascular disease, but neither the morbidity statistics nor the risk factor profiles were delineated by specific South Asian subpopulation.¹⁶ In contrast, there is very little information on risk factors among South Asians in US studies.

Coronary heart disease is prevalent among Asian Indians despite fewer traditional risk factors, such as tobacco use, hypercholesterolemia (high cholesterol or other abnormal fats in the bloodstream), high blood pressure, high dietary fat intake, low physical activity levels, and family history. The combination of genetic predisposition and broad changes accompanying Westernization could help explain this higher risk. In Enas' study, many persons were vegetarian; in one survey, physical activity was far above the US average,¹⁷ and

smoking was comparatively low.¹⁸ However, there is speculation that diets high in tropical oils are common and it is known that some of these oils are very high in saturated fatty acids.¹⁹ A combination of diets high in tropical oils with diets high in use of butter and ghee (clarified butter) could potentially cause atherosclerosis.

Lipid Abnormalities

Lipid, or fat, abnormalities contribute to the high rate of CHD among South Asians.²⁰ In a study of 1,150 subjects from seven ethnic groups in several countries, mean lipoprotein (a) levels among Asian Indians in Singapore were two times higher than those of all other ethnic groups, with the exception of Black Sudanese persons. Effects of high lipoprotein (a) are magnified in the presence of high LDL (the "bad" cholesterol), or high total cholesterol (TC) to HDL ratio (TC/HDL).²¹ Genetic research on lipid disorders represents another key area for designing methods for risk modification, including potential pharmaceutical intervention. Evaluation of specific interventions with statins or other lipid modifying drugs are needed, and some of these are in progress.²²

Other Biological Factors

While lipids, and lipoprotein (a) in particular, appear to be specific risk factors among Asian Indians, other recent research has focused on abnormalities of the lining of the blood vessels (vascular endothelial function) among even healthy Asian Indian men²³ and elevated serum homocysteine, among other metabolic abnormalities.²⁴ The SHARE study in Canada demonstrated that South Asians' excess cardiovascular disease prevalence could be partially attributable to elevated levels of plasminogen activator inhibitor-1 (PAI-1) in addition to elevated lipoprotein (a).²⁵ These studies may need to be replicated in US dwelling persons of South Asian descent and particularly in women.

Diet, Body Habitus, and Risk for Metabolic Syndrome (Insulin Resistance Syndrome)

Dietary intake cannot be assumed to be similar among all Asian subpopulations or even among South Asians migrating from different countries or regions. Asian Indian men who had immigrated to the US at least 10 years earlier had low mean body mass indexes (BMIs) compared with Americans but still were at risk for elevated triglycerides (another fat in

the body) and total cholesterol, whether vegetarian or non-vegetarian.²⁶ Definitive dietary differences which persist post-migration have been demonstrated in studies of different religious groups from South Asia. Existing diet instruments must be modified to reflect foods commonly eaten in South Asian cultures, to allow for comparisons between men and women, and to specifically compare dietary intake among recent immigrants with more acculturated migrants to the US and with second (and later) generation persons. Specific nutritional components such as folic acid and Vitamin B-12, along with other micronutrients, must be assessed by accurate collection of dietary information across all of those groups.

Asian Indians have been noted in other studies to have higher rates of insulin resistance and central obesity (obesity around the center of the body), although these studies have generally been conducted in other countries.²⁷ Asian Indians also have been shown in at least one study to have a higher percent of body fat at normal BMI and to have higher conicity (central fat distribution) at the same BMI as comparison groups.²⁸ In Bhopal's study of South Asian migrants to the UK, obesity was more common among Indian and Pakistani persons. Obesity was more common among Indian and Pakistani women compared with Bangladeshi women.²⁹ In addition, a recent study in the UK showed that South Asian children of normal weight were more likely to be insulin resistant than a comparison group of Caucasian children.³⁰

High birth weight and low birth weight are risk factors for diabetes and have been associated in some studies with obesity later in life. Low birth weight has also been shown to be associated with high rates of CHD in other populations.³¹ Studies have also shown that low birth weight is more common among Asian Indians in several countries, including the US.³² Extensive research on the fetal origins of metabolic syndrome and non-insulin dependent diabetes is taking place in Great Britain, the United States and in Pune, India. New research on body habitus, or shape, among US dwelling Asian Indians is in progress.³³

Tobacco use

Tobacco use among Asian Indians living in the US appears to be lower than for other Asian Americans (8.7% reported smoking).³⁴ Due to small sample sizes in the National Health Interview Survey (NHIS), producing these statistics requires aggregating three years of NHIS data and the collective sam-

ple size still does not allow for additional analysis to compare rates between males and females. A recent survey of South Asians in Northern California showed 12% of respondents had ever smoked.³⁵ However, according to personal communication with California medical providers, recent immigrants from Asian countries are sometimes adopting smoking as they assimilate, so it remains important to monitor tobacco use in this group. Asian American youth may also be smoking more than their parents, based on observations that overall tobacco use among Asian American and Pacific Islander

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women is often higher in the US than in the native countries from which those persons immigrated.³⁶ In particular, a recent trend has been observed among US youth, including youth descended from India and its Diaspora communities, to smoke small, flavored, hand-rolled cigarettes known as bidis.

Does Acculturation Predict CHD risk?

Higher rates of CHD are seen in Asian Indian migrants in a number of environments (Canada, UK, Fiji, and Mauritius), almost regardless of where those migrants settle.³⁷ One very significant finding in the SHARE study from Canada was that, after taking into account traditional and novel biological risk factors for CVD, "South Asian ethnicity" itself remained a strong and independent predictor of CVD.³⁸ As with any group undergoing a migration process, South Asian migrants may undergo acculturation stress, but acculturation may impact cardiovascular risks among different groups in different ways. There are a number of life stressors that occur among recent immigrants to the US which are not unique to migration to America. The impact of post-migration stress on the cardiovascular system is relatively unstudied. Some diabetes researchers have called the initial post-migration period the upward curve of assimilation, representing adoption of behaviors that may increase risk factors for CHD and diabetes as groups assimilate.³⁹

At a minimum, the risks of rapid assimilation could include adopting smoking/tobacco use, adopting dietary changes that promote the intake of highly processed, high sodium, and high fat food products, and diminishing levels of physical activity. On the other hand, there is a downward slope of post-migration stress as well, during which groups who have prospered post-migration begin to adopt healthier behaviors such as exercise and use of preventive medical services,

which may also have a role in reducing CHD risks. Use of health services by immigrants begins to approximate the native US population after about 10 years of residency in the US.⁴⁰ It is not clear where the present American population of South Asian origin falls on these acculturation curves, as earlier waves of immigrants were often better-educated than more recent waves. Another factor of interest is environmental and occupational stress and whether coping varies among assimilated and less assimilated immigrants. In a Whitehall II study of psychosocial factors in heart disease, South Asians described higher depression, lower job control, and lower social support at work compared with Caucasians or Afro-Caribbeans.⁴¹ Qualitative research conducted in preparation for the survey portion of Cardiovascular Risk Factors among South Asians revealed that not all persons even related to the word "stress" but preferred the terms "pressures" or "tensions."⁴²

It remains unknown whether cardioprotective factors occur among immigrants who assimilate more slowly or among those who live in an agricultural-based economy as compared with persons migrating here to assume professional positions. Concepts of life stressors, discrimination, and coping can be measured across groups to assess differences that may exist in order to determine if such differences help explain the known linkages between CHD and acculturation. Instruments measuring these concepts must be modified for specific ethnic groups. Research into biochemical pathways that might explain how stress impacts CHD risks is ongoing.

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Screening and Treatment Recommendations

While the higher rate of CHD among South Asians is fairly well established, screening and treatment recommendations do not reflect this higher risk. Health providers need information on which to base recommendations for earlier screening (lipid and glucose abnormality testing) and on interventions that promise to address those risk factors that are modifiable. At a minimum, it seems prudent to screen patients with family histories of early onset heart disease, to treat lipid abnormalities when detected by advising therapeutic lifestyle change (TLC), including dietary changes (such as substituting canola oil for more saturated fats), and regular physical activity. Recommendations on the best pharmaceuti-

cal approach for non-responders to lifestyle intervention can be found in recent reviews such as the National Cholesterol Education program's ATP-III recommendations.⁴³ If lifestyle changes are not effective in lipid profile modification after three months, the addition of a therapeutic agent may be considered if the patient has multiple risk factors. Generally, statin drugs have shown to be the most effective in lowering cholesterol and LDL. Some authors have recommended this group of drugs be used as first line therapy in patients with elevated cholesterol levels, particularly for elevated LDL.⁴⁴

Treatment should be tailored for each patient. No randomized controlled trials have compared the different lipid lowering agents for treatment of lipid disorders among Asian Indians but some authors believe that niacin is very effective at lowering lipoprotein(a)⁴⁵ and gemfibrozil (alone or in combination with niacin)⁴⁶ may be useful in modifying low HDL. Physical activity increases may raise HDL and improve insulin metabolism.

Once adequate baseline health information is available on the South Asian people in the US, prevention and treatment intervention trials can be undertaken for outcomes. Rigorous intervention evaluation will allow recommendations to be issued for primary prevention, screening for risks, and early treatment of affected individuals.

As one of the groups most impacted by cardiovascular diseases in the world, and as one of the most rapidly increasing groups of Asian American immigrants to the US, the cardiovascular status of South Asians is ignored at great cost, both in terms of lives lost and in costs to the health system that are potentially avoidable with earlier screening and intervention.

Recommendations of Researchers

- Collect additional baseline data using population-based surveys on the current health status of Asian Indians and other South Asians living in the US, including an assessment of traditional and novel CHD risk factors.
- Tailor instruments so that they are culturally relevant to collect the best information possible in the areas of diet, physical activity, and tobacco usage, among others. In addition, the best information will be yielded if surveys are conducted in the most common South Asian languages in order to prevent the bias introduced when only the most acculturated

and educated segment of the South Asian community is surveyed using an English-only instrument. An English-only bias contributes to the "model minority" stereotypes that continue to plague health policy advocacy efforts for AAPI communities in general and the South Asian community in particular.

- Incorporate information on race, ethnicity, and country of origin as well as years of residency in the United States in larger studies of lipid status and genetic markers for lipid abnormalities. Subjects should be drawn from all parts of the country. One mechanism for this would be to conduct a multicenter study.
- Pair survey information with biomarkers to help separate contributions of genetic factors, tobacco, diet, physical activity, access to health services, and acculturation to risks and prevalences of cardiovascular diseases of all types, but particularly CHD. The information collected will also assure better intervention designs that target South Asians for prevention strategies.



1. The authors appreciate the assistance of Kurt Greenlund, PhD, Latha Palaniappan, MD, and Dr. Michael Miller for reading over earlier drafts of the paper. The authors would also like to thank Mahesh Krishnan, MD and an anonymous reviewer who read the chapter for technical accuracy and Dr. Amita Vyas and Vidya Setty for their editing assistance.
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