

*AAPI: DIA Project*

*Risk Factors For Diabetes Mellitus And Other Chronic Diseases Among Asian-Indian Population  
In The United States*

**PROTOCOL**

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## **1.0 Introduction**

### **1.1 Specific Aims**

The investigators will recruit and study 1000 Asian Indians aged 18 years or older during an 18- month period, with screenings done at large community gatherings, temples, or community health fairs. The Specific Aims are as follows:

1. To identify and determine the risk factors (behavioral, anthropometrics, dietary, and genetic) for diabetes and CAD in Asian Indian men and women in the United States.
2. To identify other chronic diseases such as cardiovascular disease (hypertension and hyperlipidimia) and co-morbid conditions (osteoarthritis, falls, etc) among the respondents.
3. To calculate the prevalence rate of diabetes and cardiovascular diseases in this population.
4. To compare risk factors for chronic diseases by gender.

### **1.2 Hypothesis**

We hypothesize that the Asian Indians sampled in this study will be at risk for cardiovascular disease and diabetes. We expect to find a higher prevalence rate for cardiovascular disease and diabetes among our sample compared to the majority of the United States. We also expect to identify different risk factors by gender among our sample.

### **1.3 Objectives**

#### **To determine:**

1. which risk factors for CVD and diabetes are most significant among Asian Indians
2. the prevalence rate of diabetes and CVD among Asian Indians
3. if significant gender differences exist for risk factors

## **2.0 Background and Significance**

### **2.1 Asian Indian Population in the United States**

Asian Indians are represented under the broader classification of Asian Americans and Pacific Islanders (AAPI). They represent the third largest Asian group in the United States (U.S. Census 2000) and one the fastest growing immigrant group. Between 1980 and 1990, the Asian Indian population grew by 126 percent as compared to the 108 percent growth of all Asian

Americans combined (Kar, Campbell, Jimenez & Gupta, 1995). The Asian Indian population is currently 1.6 million with a growth of 106% over the last 10 years (Bureau of Census, 2000). Despite the increasing numbers, the current body of research on Asian American health issues does not adequately address the health needs of Asian Indians (Kar, Campbell, Jimenez, & Gupta, 1995; Hacker, 1997).

## **2.2 Cardiovascular Disease and Diabetes Among Asian Indians**

The burden of cardiovascular disease and diabetes among Asian Indians is among the highest in the world for both men and women (Anatharaman, 1997; Enas 1996). As shown in Table 1, the prevalence of coronary artery disease (CAD) in Asian Indians in the United States is estimated to be 10%, compared to the 2.5% in the general US population (Enas, 1996). According to a recent report in the *AAPI Journal*, the newsletter of the American Association of Physicians from India, “Asian Indians have the highest rate of heart attacks of any ethnic group in the world” (Sait, 1995). Similarly, the prevalence of diabetes is strikingly higher in Asian Indian immigrants to the United States, and is estimated to be two- to three-fold higher than in the general US population (Enas, 1996). Therefore, this population has been designated as an “at-risk” special population category as identified in Healthy People 2010, the national health promotion and disease prevention objectives (Kuo, 1998). The Healthy People 2010 focuses on eliminating disparities among AAPI sub-populations (Japanese, Chinese, Filipinos, Asian Indians, Koreans, etc.). These factors warrant our selection of chronic diseases especially diabetes and cardiovascular disease as the priority areas of interest for study.

**Table 1. Disease Prevalence: Asian Indians versus General U.S. Population**

<b>Disease</b>	<b>American Asian Indians</b>	<b>U.S. Population</b>
Coronary artery disease	10%	2.5%
Diabetes	7%-10%	3%

*Source: Enas, 1996; Diabetes in America, 1995.*

The relative risk of CAD mortality is about 1.4 for immigrant Asian Indians compared to Americans (Enas, 1996). CAD occurs at an earlier age and presents in a more advanced phase in this population (Wilkinson, 1996). It has also been found that mortality within six months of myocardial infarction is higher in Asian Indians in England as compared to the general British

population (Wilkinson, 1996). Hence assessment of risk factors as proposed in this study will help in early detection and reduce morbidity and mortality from CAD.

The prevalence of diabetes in Asian Indian immigrants in the United States is at least 7-10%, compared with 3% in the general population. Diabetes may be a contributing factor in up to 20% of cardiovascular deaths of Asian Indians in the United States (Enas, 1996; Diabetes in America, 1995). Data also suggests that Type 2 diabetes is the single most important risk factor for CAD in immigrant Asian Indians (Enas, 1996). Prevalence of insulin resistance is even higher, with some estimates as high as 66% of an adult population (Enas, 1996). Inactivity, commonly found in Asian Indians in the United States, exacerbates the likelihood of insulin resistance expression and progression to diabetes (McKeigue, 1992). However the prevalence of insulin resistance and undiagnosed diabetes in this population is not known.

### **2.3 Strategies to Reduce Risk**

Several authors have pointed out the existence of proven strategies to help diminish this excess risk. For example, increasing the monounsaturated fat content in the diet and decreasing the total number of calories from carbohydrates in addition to decreasing total calories are likely to have favorable effects (Enas, 1992). Redistributing intake of calories away from the evening hours has also been suggested (Yagalla, 1996; Modawal et al., 1999). Increasing physical activity is certain to decrease the risk (Enas, 1996). Of course, early detection of diabetes and dyslipidemias with good management can also favorably alter the risk. Results from the descriptive component of this study (identify and assess risk factors for chronic diseases), and epidemiological component (incidence/prevalence of chronic diseases) will help us target successful intervention programs for prevention, diagnosis, and treatment.

### **2.4 Health Behaviors of Asian Indians in the United States**

There are several characteristics of Asians in the United States that necessitate research in the area of health behaviors (Lin-Fu, 1988). First, large proportions of Asians are recent immigrants and refugees. Second, there is an extreme heterogeneity among and within the Asian population in their anatomical and physiological characteristics in the US. Third, there exist significant differences in the socio-economic status and health behaviors within Asian subgroups. Fourth, they are predisposed to certain genetic disorders. Lastly, there exist ethno-

cultural barriers to health care services as mentioned earlier. Asian Indians differ from other immigrant Asian groups in several ways. They constitute a highly diverse population in terms of language, provincialism, region, and ethnic composition. (Kar, et al, 1995; Hacker, 1997). There are 14 official languages in India and first generation Indians from different states retain their own cultural and religious practices. This diversity prevents Asian Indians from building ethnic solidarity based on region of origin as in the case of the Chinese, Japanese, and Filipinos. As a result South Asians lack visibility socially, politically, and geographically in this country. South Asians tend to be bimodal in terms of the socio-economic status, with the earlier Indian immigrants to the United States consisting of educated professionals, and the recent cohort of Asian Indians consisting of professionals and individuals who that lack education and job skills (mostly family members of earlier immigrants).

The literature on health behaviors and chronic disease suggest that immigration to developed countries increases behavioral (e.g., consumption of high fat diet and more animal products, and a sedentary lifestyle) and biological risks (e.g., obesity, hypertension) for chronic diseases among immigrants from developing countries. This is true for the Japanese and Hispanic immigrants to the USA (Reed, & Yano, 1997; Markides, Levin, & Ray, 1985). We expect this to be true for Asian Indians as well. For example, Asian Indians in this country is expected to be not as physically active as their American counterparts due to (a) lack of health education and health promotion behaviors in India prior to their immigration to the US, and (b) more hours spent at work to succeed in the United States, leaving less leisure time for physical activities.

Most scientific studies on Asian Indians have been conducted in populations living in India or the United Kingdom, with very few studies population-based studies on Asian Indian immigrants in the United States. These factors necessitate further research into the health behavior and risk factors for chronic diseases in this population. The proposed research will survey 1000 Asian Indians randomly selected in Texas, New Jersey, and Washington DC. This community-based study is important, as it will provide an accurate assessment of risk factors for chronic diseases. It will also help to identify programs for prevention, diagnosis, and treatment for this population.

### **3.0 Preliminary Studies**

#### **3.1 Research with Minority Populations**

The Principal Investigator has gained experience in developing and using survey questionnaires among minorities (African Americans, diabetics, and Asian Indian population) as part of grants received in the past 5 years from previous place of employments (Truman State University and Ohio University). Manuscripts of these works are currently under review/in press for publication. Anthropometrics and blood pressure measurements have been obtained in her study on type 2 diabetics.

#### **3.2 Research with Asian Indian Populations**

Results from the studies on specific Asian Indians populations (Gujuratis and physicians) indicated a lack of health promotion behaviors and high prevalence of diabetes and hypertension in both groups. The proposed project represents a new area of research for the applicant, i.e., to determine risk factors for chronic disease among Asian Indians.

#### **3.3 First Community-Based Study**

Although Enas and his colleagues (1996) have published a few studies on CAD among Asian Indian immigrants, their sample has been limited to Asian Indian physicians residing in the United States. This study will be the first community-based study to identify and assess risk factors for chronic diseases among Asian Indians and within subgroups.

### **4.0 Research Design and Methods**

#### **4.1 Study Design**

The choice of sampling design and sampling is governed by the need for (1) a community based sample, (2) a sample representative of gender and age, (3) an economical recruitment plan, (4) high rates of cooperation and (5) obtaining sufficient statistical power. The sampling design will consist of telephone interview of 1000 randomly selected respondents using the telephone directory.

**4.2 Sampling Frame and Recruitment**

Data collection for this research will be focused in Houston (Texas), Edison (New Jersey), Phoenix (Arizona), and Washington DC. Coverage of these four areas is possible due the partnership between Texas A&M University and American Association of Physicians of Indian Origin. New Jersey has the third largest Asian Indian population and one of the fastest growing immigrant groups in the United States (Census, 2000; Table 2). In 2000, New Jersey has more than 169,000 Asian Indians, almost doubling from the 1990 census of 79,000. They constitute 35% of the Asian Indian population in New Jersey. Most Asian Indians in New Jersey reside in Middlesex, Hudson, Atlantic, and Passaic Counties. The catchments areas selected for this study are Edison Township.

Texas has the fifth largest population of Asian Indians in the U.S. (U.S. Census, 2000; see Table 2). In 2000, Texas has more than 129,000 Asian Indians, more than doubling from the 1990 census of 55,795. They constitute 23% of the Asian American population in Texas. Washington DC has 88,211 Asian Indian population (Census 2000) and is the fourth largest metropolitan city with the Indian American population. The size of the Asian Indian population by states/metropolitan area of DC is shown in Table 2.

Some data suggest that diabetes, hyperinsulinemia, and coronary artery disease prevalence increase as Indians migrate from rural to urban locations in India, and even more when urban Indians move to urban U.S. areas (Dhawan, 1996). Hence this study provides a unique opportunity to examine recent immigrants and focus on a partially acculturated population.

**Table 2. States With The Largest Asian-Indian Populations, 1980-1990**

State	Rank	1980 Population	1990 Population	2000 Population	% Change from 1990
California	1	59,774	159,973	314,819	96.80
New York	2	67,636	140,985	251,724	78.55
<b>New Jersey</b>	<b>3</b>	<b>30,684</b>	<b>79,440</b>	<b>169,180</b>	<b>112.97</b>
<b>Texas</b>	<b>4</b>	<b>23,396</b>	<b>55,795</b>	<b>129,365</b>	<b>131.98</b>
Illinois	5	37,438	64,200	124,723	94.27
<b>Washington /Baltimore</b>	<b>6</b>			<b>88,211</b>	



Florida	6	11,039	31,457	70,740	124.88
Pennsylvania	7	17,039	28,396	57,241	101.58
Michigan	8	15,363	23,845	54,631	129.11
Maryland	9	13,788	28,330	49,909	76.17
Ohio	10	13,602	20,848	38,752	85.88
Total United States		387,223	815,447	1,678,765	106.00

Since there are no sampling frames, telephone directories will be used to create a list of South Asians as identified by their last names. Respondents will be randomly selected from this list. We recognize the limitation of using telephone directory to create a list i.e., non-inclusion of individuals with unlisted numbers and married individuals listed by different family names.

Selected individuals will be sent a postcard with information on the purpose of the study and inviting their participation. Preliminary telephone contacts will be made to those individuals who returned the postcard indicating their willingness to participate for a telephone interview at a time convenient to the respondent.

#### **4.3 Data Collection**

Data collection for this study is divided into 2 parts:

- 1) Telephone surveys
- 2) Anthropometrics, blood pressure measurements, and blood assays of the sample

Telephone Survey. Descriptive information will be obtained from the surveys. The survey instrument, developed by the primary investigator, seeks information on the respondents' health status and behaviors, dietary habits, medical and family history of diseases (especially diabetes, cancer, and CAD), and use of preventive health services. Questions from Behavioral Risk Factor Survey (BRFSS), a national survey by the Centers for Disease Control, are used for this study so that our results can be compared with other ethnic minorities (Appendix 2). The American Diabetes Association's (ADA) screening questionnaire for detection of diabetes will also be used. Candidate domains for the survey will include several listed in Table 3.

**Table 3: Candidate Domains for the Survey**

Survey Group	Candidate Domains
All persons	Cardiovascular risk factors: <ul style="list-style-type: none"> <li>• Smoking status</li> <li>• Level of physical activity</li> <li>• Dietary patterns</li> <li>• Hypertensives taking medication</li> <li>• Dyslipidemics taking medication</li> <li>• Knowledge of heart attack and stroke signs and symptoms</li> <li>• Heart attack and stroke survivors taking aspirin</li> </ul>
Persons with known diabetes	Diabetes services received in past year: <ul style="list-style-type: none"> <li>• Hemoglobin A<sub>1c</sub> measured</li> <li>• Feet examination</li> <li>• Dilated eye examination</li> </ul>
Persons without known diabetes	ADA Screening questionnaire for detection of diabetes

Surveys will be administered by telephone interview. Ethnically similar interviewers (Asian Indian) will conduct the telephone interviews. Because of a large number of recent immigrants and cultural factors, interview by ethnically similar interviewers is perceived to bring greater success. Graduate Indian students and Asian Indian investigators will be used for survey administration. Contacts have already been made with representatives to the Indian Students' Association and community leaders in the selected communities. Other potential sources for increasing contacts and recruitment are listed in Appendix 1. Many of these contacts live in these communities, and speak two or more Indian languages. Survey administrators undergo training before data collection begins.

Anthropometrics, blood pressure measurements, and blood assay. Because of the need to quantify the prevalence of abdominal obesity in this population, we propose to measure waist and hip circumference of each survey participant. Formal training of staff will be provided for those who will obtain these measures, and a data integrity and quality-monitoring program will

be developed and instituted. These measures will be obtained at the time of the interview. Survey information will be supplemented by fasting capillary blood sampling (testing fasting glucose, hemoglobin A1c, triglycerides, lipoprotein a, total cholesterol and HDL) to identify undiagnosed diabetes prevalence and the prevalence of high-risk dyslipidemias. These tests will be provided to the respondents free of cost. These screenings will be conducted at the temples, community centers, and health fairs in the target communities. Trained health professionals will draw blood from the respondents and the samples will be analyzed at the Atherotech Laboratory in Birmingham, Alabama. Results from this project will be used to apply for a R-03/R-01 grant from NIH.

#### **4.4 Data Management and Analysis**

Data will be analyzed using the Statistical Package for Social Science (SPSS) software. Data will first be entered into SPSS and cleaned before any statistical analyses are performed. Standard statistical techniques (e.g. frequency, means, standard deviations) will be used for data description, display, and simple comparisons. Student's t-tests will be used to examine differences between males and females in health status, behaviors and risk factors. These figures will also be compared to other ethnic minorities and among native populations in India. Incidence and prevalence rates for chronic diseases, especially diabetes and CAD will be calculated. Multivariate analyses will be used to predict risk factors for diabetes and CAD. Predictors of chronic diseases will be determined using a regression model.

#### **4.5 Power/Precision Consideration**

Level of significance to be used?

Statistical power

#### **4.6 Potential Limitations of the Study**

Certain limitations of the study should be noted. Using telephone directories to create a list i.e., non-inclusion of individuals with unlisted numbers and married individuals listed by different family names, limits the coverage of our study. Another weakness with our sampling frames is that they include membership directories of various Indian organizations. The members of these organizations may possess certain differences from the rest of the Indian population and therefore not be an accurate representation of the population. Also, the Houston sample was

not completely randomized because some of the participants were recruited at an Indian festival rather than strictly through random sampling. However, subsequent samples for this study (Phoenix, Washington, D.C., and Edison) will be completely randomized.

### **5.0 Progress for the Current Project**

The Timeline for the AAPI: DIA Project is shown in Table?? The project is currently in phase ??

Data collection has been completed for the Houston sample and preliminary analyses are underway. Sampling frames for Phoenix and Washington, D.C. are currently being compiled. Letters of invitation for the Phoenix sample will be mailed by the end of February 2003, so telephone surveys of this sample will begin in March 2003.

Phase	Tasks

### **6.0 Publications and Presentations**

Several publications and presentations will be generated from the results of this research project. Preliminary results from the Houston data will be compiled for a report by March 2003, and a workshop will be conducted in Oklahoma City in Spring 2003. In addition, abstracts have been submitted for the American Public Health Association's annual conference in October 2003. Further publications and presentations are expected as the study progresses.

### **7.0 Summary**

The *AAPI: DIA Project* is the first community-based study of Asian Indians in the United States. The purpose of this pilot project is to (1) get baseline information on the health status, behavior, and risk for chronic disease (especially diabetes and CAD) among Asian Indian males and females (2) explore other co-morbid conditions in this population (e.g. osteoarthritis, falls and injuries including hip fractures), and (3) to generate enough data to form a basis for submission of an R-03/R-01 proposal to National Institutes of Health. Knowledge of the health status and chronic disease prevalence will help identify programs that may support prevention, diagnosis, and treatment.

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**Appendix 1: Organization and Representative Asian Indian Community Members**

<b>Organization</b>	<b>Coalition Representative</b>	<b>Description</b>
American Association of Physicians of Indian origin (AAPI)	S Jayasankar, MD President, AAPI & TG Patel, MD, National Chair, Public Health Committee, AAPI	Professional association
AAPI—New Jersey Chapter	Ashok Kumar, MD	Professional association
Indian Students' Association at UMDNJ	Navin Budhwani, MD	Graduate health students' association
Bochasanvasi Swaminarayana Sanstha, Edison, NJ	Praful Raja Dr. Yashwant Patel	Religious and cultural temple: Membership is mainly Gujaratis
Jain Center of NJ West Caldwell, NJ	Sanat Jhaveri	Religious temple for Jain people from India, Many of them are Gujaratis
India Cultural Center of Central Jersey, Edison, NJ	Pradumna Shah	Cultural group: membership from central Jersey Asian Indian communities (mainly Gujaratis)
Federation of Indian Associations (FIA)	Yashpal Soi	Cultural leadership group of representatives from Asian Indian community
Chha Gam Patidar Samaj of NJ	Pravin Patel Suresh Patel	Cultural and ethnic group of Gujarati Patels
Dwarkadhish temple Parlin, NJ	Govindlal Parekh	Religious and ethnic/cultural temple (mainly Gujaratis)
Indian Business Association Edison, NJ	Pradeep Kothari	Cultural and professional association
Santram mandir, NJ	Dinesh Patel	Religious group: Conducts health screenings
Indian association, Washington DC chapter	Lipishree Nayak	Cultural and ethnic group of Indian Americans in DC
AAPI, Texas chapter	Arati Agarwal	Professional association
Thakkar Samaj of NJ	Ramesh Thakkar	Ethnic group of Lohana Gujaratis
India Association of North Texas	Rashmi Gupta	Cultural leadership group of representatives from Asian Indian community
Gurudwara, Dallas, TX		Religious place for Hindus: Conducts health screenings
Hindu temple, Dallas, TX		Religious temple.