

A Brown Paper: The Health of South Asians in the United States



The *Brown Paper* is a groundbreaking compendium and review of health research and literature on South Asians in the United States. Published in 2002, the *Brown Paper* evaluates and summarizes existing knowledge about key health indicators for South Asian Americans.

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Nutrition

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Objectives: The author reviewed available literature regarding the dietary practices and nutrient intake of South Asian immigrants in the Western world and its impact on their risk of chronic disease.

Key Findings: The dietary practices of the South Asian community are diverse and are influenced by a multitude of factors (e.g., culture, religion, region of origin, etc). Adaptation of the Western dietary practices by these immigrants is observed. Additionally, dietary practices such as low fruit intake, and high fat intake are common among this group, and have been observed to be associated with their risk of chronic disease.

Recommendations: South Asians should be educated about appropriate dietary practices in order to lower their risk of chronic disease. A need exists for in-depth examination of dietary and nutrient intakes of this immigrant population to gain a better understanding of the impact their diet habits and practices have on their chronic disease risk and to allow health care providers to better meet the health care needs of this community.

Introduction: South Asian Dietary Practices

South Asians who live in the United States have significant within-group diversity in dietary intake and practice based on their country of origin.¹ Furthermore, regional differences in dietary intake and practices exist within each South Asian country.² Thus, when examining diet and nutrition of South Asians to assess their health risks, it is important to determine country and region of origin.

Geographic and climactic variations and a heterogeneous population within each country make South Asian dietary practices unique and diverse. For example, dietary patterns differ among individuals of northern, southern, eastern, and western parts of India.¹ Additionally, a vast majority of the South Asian population is vegetarian for reasons, such as cost, culture, and religion.² While individuals from all regions may share similarities with respect to certain foods, such as fruits and vegetables, certain marked distinctions exist in patterns of consumption (see Table 1).

Regional differences in diet are also found among older Asian Indian immigrants in the US. For example, immigrants from the northern states of India more frequently consume dark breads,

¹ Kittler PG, Sucher KP. Food and Culture in America: A Nutrition Handbok. 2nd Edition, Belmont, CA: West/Wadsworth Publishing; 1998.

² American Public Health Association. South Asia Case Study: India. Available at: www.apha.org/ppp/red/indiageadis.htm. Accessed March 5, 2001.

eggs, and fats; and immigrants from the southern states of India more frequently consume starchy foods and fried chicken.³ Specific dietary practices may increase health risks for individuals from a particular region of South Asia. Patterns of food consumption contribute to differences not only in nutrient intake but also in body mass index (BMI), chronic disease risk factors, such as blood cholesterol and blood sugar, and overall health status/

South Asian Immigrants and Dietary Intake: Summary of Current Research Findings

Much of the research related to dietary intake among South Asians has been conducted in the 1980s and 1990s in the United Kingdom (UK) and the US, focusing on subgroups of the South Asian population. Generally, existing studies provide an initial overview of the dietary patterns in the Western world. However, it is important to note that majority of the studies have mainly examined first generation Asian Indian adult immigrants. Specific findings of nutrition-related research are highlighted (see Table 2).

McKeigue et al.⁴ observed that South Asian immigrants consume diets low in fat, (<30% energy), with a high ration of polyunsaturated to saturated fat. However, given the high prevalence of cardiovascular disease (CVD) in this population, it is likely that the 30% dietary fat recommendation may be in excess of actual needs for this group. Yagalla et al.⁵ examined a group of immigrant Asian Indian physicians, with a mean age of 47 years and mean length of residence in the US of 19 years. The average dietary energy intake was 56% carbohydrates, 32% fat, and 8% saturated fat. These individuals tended to consume

Table 1. Examples of Dietary Intake Practices by Selected Regions of South Asia	
Country & Region	Dietary Intake Practices
India (North)	Main staple is wheat
	Higher consumption of dried or pickled fruits, vegetables, eggs
	Common beverage tea
(South)	Main staple is rice
	Higher consumption of fresh fruits and vegetables
	Common beverage coffee
(East)	Seafood commonly consumed even by vegetarians
	Main staple is rice
	Milk based dishes is common
(West)	Predominantly vegetarian based diet
	Seafood popular among coastal regions
	Main staple is wheat
Pakistan	Indian and Arabic cooking practices
	Halal meats
	Flat breads and pilafs common
	Main staples are wheat, rice and corn
	Common beverage team
Bangladesh	Alcohol forbidden
	Seafood commonly consumed
	Halal meat
Nepal	Alcohol forbidden
	Main staples are rice, legumes, pulses

³ Barker RM, Barker MR. Incidence of cancer in Bradford Asians. *J Comm Epid and Comm Health*. 1990;44:125-129.

⁴ Chambers JC, Obeid OA, Refsum H, et al. Plasma homocysteine concentrations and risk of coronary heart disease in UK Indian Asian and European men. *Lancet*. 2000; 355:523-527.

⁵ Sevak L, McKeigue PM, Marmot MG. Relationship of hyperinsulinemia to dietary intake in South Asian and European men. *Am J Clin Nutri*. 1994; 59:1069-1074.



large evening meals consisted of traditional South Asian foods.

BMI, a ration of weight (kg) to height (m) squared, is a widely recognized risk factor for poor health and is influenced by an individuals dietary and lifestyle practices. Yagalla et al.⁵ also found that among vegetarians BMI was higher than that of non-vegetarian participants (26 vs. 24.4). The vegetarian diets were rich in high fat dairy products, resulting in total fat and saturated fat intake similar to that of non-vegetarians. In addition, only 30% of these individuals exercised 60 minutes per week, potentially contributing to the high BMIs.

Raj et al.⁶ reviewed the dietary practice of Asian Indian adults living in the New York and Washington, DC areas, based on length of stay in the US. Of the respondents, 63% preferred mostly Indian foods, 31% preferred traditional and non-traditional food equally, and 6% preferred one or the other exclusively. Interestingly, long-time residents (living in the US for grater than 10 years) reported consumption of mostly traditional foods for dinner and weekend meals. Since immigrating to the US, these participants reported consuming fewer traditional mixed dishes (based on cereals, legumes, and/or vegetables) and consuming more fruit juice, chips, fruits, margarine, cola, and alcoholic beverages. Additionally, self-reported data suggests that these individuals had elevated cholesterol levels, hypertension, arthritis, and diabetes, were over-weight.

Another study conducted by Kamath et al.⁷ examined the CVD risk factors in a group of pre-menopausal South Asian females living in the US. About 38% of the women reported having a vegetarian diet, and 81% reported consuming a variety of ethnic foods in addition total cholesterol (TC), triglycerides (TG), low density lipoprotein cholesterol (LDL-C), and lipoprotein(a), (Lp(a)) were higher, and high density lipoprotein cholesterol (HDL-C) was lower. These are well-established risk factors of CVD in the general population and are influenced by an individual's dietary and lifestyle practices.

Kamath et al.⁷ also observed a group of middle-aged Asian Indian men, living in the US for approximately 17 years, and found that 24% were overweight. Of the total male respondents, 82% were non-vegetarians and dietary fat contributed 36% of calories, carbohydrates contributed 49% of calories and protein contributed 14% of calories. Although dietary cholesterol intake was within the recommended range (162 mg/day), 19% had elevated TC (>6.2 mmol/L) and 46% had borderline TC (5.2-6.2 mmol/L). Of these men, 4% reported having heart disease or angina, 1.6% had suffered a heart attack, 15% had hypertension, and 8.8% had diabetes. Data here show that is necessary to give attention to dietary intake in order to properly assess health risks.

It is necessary to avoid assumptions base don the dietary practices in the country of origin when addressing nutrition and health. Once individuals have immigrated to the US, they need to become aware about food choices and nutritional contents of the various ethnic and non-ethnic foods that are available. Evidence suggests that dietary recommendations to prevent chronic

⁶ Kamath SK, Ravishanker C, Briones E, Chen EH. Macronutrient intake and blood cholesterol level of Asian Indians living in the United States. *J Am Diet Assoc.* 1997;97:299-301.

⁷ Kamath SK, Hussain EA, Amin D, et al. Cardiovascular disease risk factors in 2 distinct ethnic groups: Indian and Pakistani compared with American premenopausal women. *Am J Clin Nutri.* 1999;69:621-631.



disease in the general population may need to be adapted and modified to the dietary practices of the South Asian immigrants. On the other hand, there may be benefits in South Asian dietary practices as well. Death rates associated with cancer have been observed to be low and may be attributed to the high fiber, high beta-carotene intake and/or variations in colonic metabolites of South Asians,⁴ requiring a closer look at diet and nutritional content of various foods and gaining a better understanding of predisposition to chronic disease.

Earlier US-based studies indicate that altering vegetarian status and meal patterns, changing frequency in consumption of traditional Asian Indian foods, and increasing use of Western foods commonly occur among Asian Indians upon migration to the US.^{8,9} Similarly, South Asians in the United Kingdom (UK) were less likely to consume confectionery, biscuits, cakes, and desserts than the general British population.^{4,10} They were also more likely to consume fresh fruit and vegetables, salads, whole wheat flour, soft drinks, and fruit juices. Only 16% of South Asians reported never eating meat. However, compared with the general British population, South Asians were more likely to eat meat three times a week, especially poultry and fish. As in previous studies, individual body fat was more centrally located, and they were shorter.^{4,10,11} These changes in dietary practices may further aggravate the potential genetic predisposition of certain groups to chronic disease conditions.

In addition to the well-established chronic disease conditions, South Asians may also be susceptible to other diet-related conditions, namely lactose intolerance, osteoporosis, and iron-deficiency anemia, which can influence their overall health and functional well-being. Lactose intolerance refers to symptoms associated with the digestive system, such as diarrhea, gas, bloating, and abdominal pain, arising from the consumption of lactose, the principal sugar in dairy products.¹² The intolerance develops due to a decline in the activity or absence of lactase, the enzyme needed for the digestion of milk sugar. Typically, this decline in enzyme activity is believed to be a normal physiologic response of aging. However, certain ethnic groups are known to be more susceptible to lactose intolerance than others, and prevalence of the disorder varies widely among different ethnic and racial groups.

In the US, it is estimated that 90% of Asian Americans exhibit lactose mal-digestion.¹³ However, it is unclear what percent of this population is comprised of South Asians, and the prevalence of the condition in South Asians is not well established. Individuals who believe they are lactose intolerant typically decrease their intake of dairy products, negatively affecting the amount of micronutrients, such as calcium and vitamin D, which are provided by these products. It is,

⁸ McKeigue PM, Shah G, Marmot MG. Relation of central obesity and insulin resistance with high diabetes prevalence and cardiovascular risk in South Asians. *Lancet*. 1991; 337:382-386.

⁹ McKeigue PM, Miller GJ, Marmot MG. Coronary Heart disease in South Asians overseas: A review. *J Clin Epidemiol*. 1989;42:597-609.

¹⁰ Ahmed S. Coronary heart disease: the Indian Asian diet. *Nursing Standard*. 1999;13:45-47.

¹¹ Williams R, Bhopal R, Hunt K. Coronary risk in a British Punjabi population: comparative profile of nonbiochemical factors. *Intl J Epidemiol*. 1994;23:28-37.

¹² Simmons D, Williams R. Dietary practices among Europeans and different South Asian groups in Coventry. *Br J Nutr*. 1997;78:5-14.

¹³ McBean LD, Miller GD. Allaying fears and fallacies about lactose intolerance. *J Am Diet Assoc*. 1998;98:671-676.

therefore, important to accurately diagnose the condition and provide appropriate treatment, which can include the use of lactose-free milk and lactose-digestive aids.

Reference	Study of Population	Participants	Results of Dietary Intakes
Gupta ¹⁴	US	Asian Indian men and women, 20-45 years of age (n=50)	60% ↑ non-vegetarian dietary habits American foods eaten for breakfast and lunch 80% preferred typical Indian dinner 50% started consuming alcoholic beverages
Sevak et al. ¹⁵	UK	South Asian men, 40-69 years of age (n=173)	Nutrient intake: 46% energy from carbohydrates, 14% energy from protein, 36% energy from fat. High dietary fiber intake 47% did not consume alcohol
Yagalla et al. ⁵	US	Asian Indian men, 29-75 years of age (n=153)	84% non-vegetarians Nutrient intake: 56% energy from carbohydrates, 13% energy from protein, 32% energy from fat American foods consumed for breakfast and lunch Indian food typically consumed for evening meals Vegetarian diet was higher in carbohydrate and high-fat dairy products.
Kamath et al. ⁷	US	Asian Indian men, 26-76 years of age (N=187)	82% non-vegetarians Nutrient intake: 49% energy from carbohydrate, 14% energy from protein, 36% energy from fat 36% had elevated cholesterol levels
Kamath et al. ⁶	US	Asian Indian and Pakistani women, 19.8-38.7 years of age (n=47)	38% vegetarians 19% followed an “all Indian/Pakistani” diet 53% followed an “all American diet” Median Nutrient intake: 58% energy from carbohydrates, 13% energy from protein, 30% energy from fat, 12 g fiber/day ↑ blood cholesterol levels in South Asian women vs. American women
Raj et al. ¹⁶	US	Asian Indian men and women, 20 years of age or older (n=73)	60% non-vegetarians 63% mostly preferred Indian foods ↓ intake of traditional mixed dishes ↑ intake of fruit juices, chips, fruit, margarine, cola and alcoholic beverages

¹⁴ Jonnalagadda SS, Diwan S. Regional variations in dietary intake and body mass index of first generation Asian Indian immigrants in the United States. Accepted by Journal of the American Dietetic Association. Forthcoming.

¹⁵ Gupta SP. Changes in the food habits of Asians Indians in the United States: a case study. Soc Soc Res. 1975;60:87-99.

¹⁶ Yagalla MV, Hoerr SL, Song WO, et al. Relationship of diet, abdominal obesity, and physical activity to plasma lipoprotein levels in Asian Indian physicians in the United States. J Am Diet Assoc. 1997;97:299-301.



Lawson and Thomas ¹⁷	UK	South Asian children, 2 years of age Bangladeshi (n = 139); Pakistani (n=200); Asian Indian (n=279)	20-34% of South Asian children had blood vitamin D levels indicative of deficiency 20-29% of South Asian children had low hemoglobin levels indicative of iron deficiency
Fischbacher et al. ¹⁸	UK	South Asian men and women, 25-74 years of age Asian Indian (n=259); Pakistani (n=305); Bangladeshi (n=12)	32% of Asian Indians rarely or never ate meat vs. 2% of other ethnic groups Anemia due to iron deficiency was 3 times more common in South Asian women
Chambers et al. ¹⁹	UK	Asian Indian males, mean age 52 years (n=518)	Low blood levels of vitamin B12 and folate
*This is not an exhaustive list of the published literature; the intention of this table is to provide an overview of some of the existing literature; ↑ = increased; ↓ = decreased			

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Osteoporosis and iron-deficiency anemia are chronic conditions also known to be related to diet (see Women’s Health chapter). Briefly, osteoporosis is a degenerative bone disease that occurs as a result of lower bone mineral density in Asian women and men,²¹ mainly attributed to smaller body frame size, smaller skeleton size, lower body weight, as well as lower intake of foods rich in calcium and vitamin D, such as dairy products. Cundy et al,²² observed that bone mineral density in Asian Indian women were significantly lower at all sites compared with European women. Dietary deficiencies in calcium intake may begin early in life due to decreased milk consumption. Mal-absorption of calcium can result from deficiencies of vitamin D due to either inadequate diet or decreased exposure to sun-light as a result of cultural norms. Social dogma that prevents the use of hormone replacement therapy by post-menopausal women can

¹⁷ Raj S, Ganganna P, Bowering J. Dietary habits of Asian Indians in relation to length of residence in the United States. *J Am Diet Assoc.* 1999;99:1106-1108.

¹⁸ Lawson M, Thomas M. Vitamin D concentrations in Asian children aged 2 years living in England: population survey. *Br Med J.* 1999;318:28.

¹⁹ Fischbacher C, Bhopal R, Patel S, et al. Anemia in Chinese, South Asian, and European populations in Newcastle upon Tyne: cross sectional study. *Br Med J.* 2001; 322:958-959.

²⁰ McBean LD, Miller GD. Allaying fears and fallacies about lactose intolerance. *J Am Diet Assoc.* 1998;98:671-676.

²¹ National Institutes of Health Osteoporosis and Related Bone Diseases, National Resource Center. Osteoporosis and Asian American Women. Available at: <http://www.osteo.org/docs/164.464725611.html>. Accessed January 17, 2002.

²² National Institutes of Health Osteoporosis and Related Bone Diseases, National Resource Center. Osteoporosis and Asian American Women. Available at: <http://www.osteo.org/docs/164.464725611.html>. Accessed January 17, 2002.



undermine potential options in treatment of osteoporosis.²³ Certain socio-cultural factors also explain the higher prevalence of osteoporosis among Asians.

In addition to correcting diet for prevention of osteoporosis, there is a need to increase iron consumption, particularly among women. The vegetarian diet has been implicated in several nutrient deficiencies, contributed to iron-deficiency anemia and influencing individual functional well-being. These and other diet related practices increase the risk for chronic disease among South Asians.

Dietary practices can play a significant role in susceptibility to disease, and a better understanding of these practices is needed in order to improve overall health for South Asians. However, given the diversity within South Asian groups, it is imperative that future studies be conducted with a more representative sample of the population. Data should be inclusive of and needs to compare age, gender, length of residence in the US, as well as country and region of origin.

Addressing the Gap in Nutritional Guidelines for South Asians Foods

While dietary guidelines and recommendations are targeted for the general population, there is a clear need for assessing nutritional content of South Asian foods. A few groups, such as the American Dietetic Association (ADA), United States Department of Agriculture (USDA), and the Indian American Dietetic Association (IADA), have attempted to address this gap and increase knowledge of dietary requirements.

The Food Guide Pyramid: A Guide to Daily Food Choices provides a translation of traditional South Asian foods into the USDA recommendations. It provides guidelines with respect to the appropriateness of foods within the major USDA food groups and their relative serving sizes. Similarly, the Food Guide Pyramid with Popular Indian Fare by the ADA is helpful in translating the USDA Food Guide Pyramid guidelines into specific ethnic Indian foods. These are useful tools for South Asians who are following a more traditional diet.^{24,25,26} As part of the Nutrition Education for New Americans Project of the Department of Anthropology and Geography at Georgia State University, the USDA Food Guide Pyramid has been translated into several South Asian languages (e.g., Hindi, Gujarati, Bengali) to educate target groups about the positive and negative consequences of Western foods. Guidelines include nutritional information for pregnant women and their growing infants.²⁷

²³ Cundy T, Cornish J, Evans MC, et al. Sources of inter-racial variation in bone mineral density. *J Bone Miner Res.* 1995;10:368-373.

²⁴ Gupta A. Osteoporosis in India-the nutritional hypothesis. *Natl Med J India.* 1996;9:268-274.

²⁵ National Center for Nutrition and Dietetics, American Dietetic Association. Food Guide Pyramid with Popular Indian Fare. Chicago, IL; 1998. Available at: <http://www.eatright.com/catalog/pyramid.html>.

²⁶ Southeastern Michigan Dietetic Association. Indian Food Pyramid. February 2, 1998. Available at: <http://www.semda.org/info/pyramid.asp?ID=2>.

²⁷ USDA. Food Guide Pyramid guidelines. The Food Guide Pyramid – A Guide to Daily Food Choices. Available at: <http://www.nal.usda.gov:8001/py/pmap.htm>.



The ADA has also created a document called the “Ethnic and Regional Practices: A Series: Indian and Pakistani Food Practices, Customs and Holidays.” It provides dietitians working with South Asian clients useful information regarding traditional foods, health beliefs, food practices by region and religion, and contemporary food habits. The prevalence of diabetes among South Asians is addressed, including dietary recommendations for individuals living with diabetes. Recommendations also are interpreted and translated for nutrition management of diabetes, as they apply to the typical food habits of individuals maintaining a traditional South Asian diet and who have Type 2 (non-insulin dependent) diabetes. Sample meals and a brief chart with nutrient content of traditional foods are listed.²⁸

Founded in 1992, the IADA is comprised of volunteer dietitians, working with South Asian communities. They provide medical nutrition therapy to senior citizens, work with physicians to provide dietary counseling for South Asians, organize community health expos to increase nutrition awareness, and deliver nutrition and health-related lectures in various South Asian languages. Familiar with the community’s dietary habits, the IADA serves as a resource for nutritional counseling.²⁹

Recommendations

This review on nutrition and South Asians highlights the complex dietary practices and behaviors of the community as well as the need for in-depth examination of the dietary and nutrient food content. Further studies are needed to identify ways to improve the dietary behaviors and lower risk of morbidity and mortality from chronic diseases. Based on the review, the following recommendations are made:

- Improve overall dietary intake and closely examine nutritional make up of foods.
- Provide nutrition education with regards to making healthful dietary choices in both traditional and non-traditional foods.
- Adapt and translate current dietary recommendations for South Asian populations.
- Examine the influence of socio-cultural factors on dietary practices and on health status.
- Research dietary and nutrient intake for greater understanding and increased efficacy of chronic disease prevention and treatment messages.
- Develop and test nutrition education and intervention tailored to community needs.
- Educate dietitians and health care professionals about South Asian dietary practices in order to increase the effectiveness of their prevention and treatment messages.

²⁸ Nutrition Education for New Americans Project of the Department of Anthropology and Geography at Georgia State University, Atlanta, GA. Available at: <http://monarch.gsu.edu/nutrition/download.htm>.

²⁹ American Dietetic Association Inc. *Ethnic and Regional Practices: A series: Indian and Pakistani Food Practices, Customs an Holidays*. Chicago, IL; American Dietetic Association Inc:1996.



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