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Risk factors for coronary heart disease among Asian Indians living in Australia

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Abstract

The aim of this study was to assess the coronary heart disease risk factors in the Asian Indian community living in a large city in Australia. A cross-sectional survey was conducted at the Australia India Friendship Fair in 2010. All people of Asian Indian descent who attended the Fair and visited the health promotion stall were eligible to participate in the study if they self-identified as of Asian Indian origin, were aged between 18 and 80 years, and were able to speak English. Blood pressure, blood glucose, waist circumference, height, and weight were measured by a health professional. Smoking, cholesterol levels, and physical activity status were obtained through self-reports. Data were analyzed for 169 participants. More than a third of the participants under the age of 65 years had high blood pressure. Prevalence of diabetes (16%) and obesity (61%) was significantly higher compared with the national average. Ten women identified themselves as smokers. Physical activity patterns were similar to that of the wider Australian population. The study has provided a platform for raising awareness among nurses and promoting advocacy on the cardiovascular risk among Asian Indians. Strategies involving Asian Indian nurses and other Asian Indian health professionals as well as support from the private and public sectors can assist in the reduction of the coronary heart disease risk factors among this extremely susceptible population.

Keywords

Asian Indians, heart disease, risk factors, hypertension, diabetes, obesity, abdominal obesity, physical activity, smoking, migrant, cardiovascular, transcultural health

Disciplines

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The aim of this study was to assess the coronary heart disease risk factors in the Asian Indian community living in a large city in Australia. A cross-sectional survey was conducted at the Australia India Friendship Fair in 2010. All people of Asian Indian descent who attended the Fair and visited the health promotion stall were eligible to participate in the study if they self identified as of Asian Indian origin, were aged between 18-80 years; and were able to speak English. Blood pressure, blood glucose, waist circumference, height and weight were measured by a health professional. Smoking, cholesterol levels and physical activity status were obtained through self reports. Data were analysed for 169 participants. More than a third of the participants under the age of 65 years had high blood pressure. Prevalence of diabetes (16%) and obesity (61%) was significantly higher compared to the national average. Ten women identified themselves as smokers. Physical activity patterns were similar to that of the wider Australian population. The study has provided a platform for raising awareness among nurses and promoting advocacy on the cardiovascular risk among Asian Indians. Strategies involving Asian Indian nurses and other Asian Indian health professionals as well as support from the private and public sectors can assist in the reduction of the coronary heart disease risk factors among this extremely susceptible population.

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Introduction

Contemporary nursing involves the delivery of not only safe and efficient patient care but also care that is culturally appropriate and sensitive to the needs of diverse groups of people. This is particularly important for Australia which has fast become a nation of migrants arriving from various cultural backgrounds. In the last decade, there has been a significant growth in migration rates from India (Productivity Commission, 2010). According to Australian Bureau of Statistics (ABS) Census data, the number of Indian-born Australian residents has increased by more than 60% nearly from 2006 to 2008, making them the second largest overseas-born Asian group in Australia, and the sixth largest overseas-born group overall (Australian Bureau of Statistics, 2009).

The rapid growth in Asian Indian population in Australia has implications for health service delivery. The prevalence of heart disease which is responsible for high rates of disability and mortality (Australian Institute of Health and Welfare, 2010) is extremely high among Asian Indians (Gupta, 2008; Reddy, 2007). Nurses are at the forefront in providing primary and secondary prevention strategies for care for these patients. Hence, a greater understanding of their cardiovascular risk profile is imperative in order provide culturally sensitive and effective ways of cardiovascular risk minimisation.

Literature Review

In 2004 the age standardised mortality rate per 100,000 due to CHD was 207.7 (World Health Organisation (WHO), 2008) among Asian Indians which is approximately three times more than the national averages for Australia and double that of America (Roger et al., 2011). Mortality due to CHD in this population is up to 10 times higher in those aged under 40 years, and 3-fold higher in men <45 years of age (Enas, 1998). In addition, hospital

admissions for acute myocardial infarction (AMI) among this group have been reported to be between 2- 6 times higher than migrants from other countries (Wilkinson et al., 1996). The increase in migration rates of Asian Indians has also exposed them to acculturative stress which has been identified as a risk factor for CHD among new migrants (Mohan, Wilkes, & Jackson, 2006).

The increased prevalence of CHD in this population has been attributed to the high rates of the conventional risk factors for CHD including hypertension (Satyavan, 2008), diabetes (Joshi & Parikh, 2007), hypercholesterolaemia and depression (Bromet et al., 2011). Asian Indians also have higher levels of most of the other emerging biochemical risk factors lipoprotein(a) (Lp[a]), homocysteine (Hcy), and C-reactive protein (CRP) placing them at additional risk for CHD (Reddy, 2007).

Although there has been a phenomenal growth in the Asian Indian population in Australia there is limited research related to CHD in Asian Indians residing in Australia. A review of the literature identified only one small study (Mahajan & Bermingham, 2004) that compared coronary risk factors among South Asian Indians in Australia and India. The results demonstrated that Asian Indians living in Australia had a mean body mass index (BMI) of $25\text{kg/m}^2 \pm 3.3$, total cholesterol 5.3 ± 1.3 mmol/l, exercise time of 23.7 ± 32.7 hours/week and waist circumference of $83 \text{ cm} \pm 10.0\text{cm}$ (Mahajan & Bermingham, 2004).

Undertaking research in multicultural communities requires collaborations and partnerships with key community leaders (Woulfe, Oliver, Zahner, & Siemering, 2010). Therefore, the researchers contacted the Consul General of India in Australia who provided the researchers with details of the Indian community associations and medical organisations in the city.

Purpose

The purpose of this study was to assess the coronary heart disease risk factors in the Asian Indian community in a large city in Australia. Approval to undertake the project was obtained from the Institutional Review Board. Numerical unique identifiers and password-protected files were used to maintain participant privacy and confidentiality.

Methods

Design

A cross-sectional study using a convenience sampling design was chosen to construct a cardiovascular health profile of Asian Indians living in a large city in Australia.

Sample and setting

Participants in this study were people who attended Australia India Friendship Fair on 15th August, 2010. The Australia India Friendship Fair is an annual event conducted by the United Indian Association. High attendance by Asian Indians has been reported at these Fairs. One of the features of this fair is the health promotion activity undertaken by the Australia Indian Medical Graduate Association (AIMGA). AIMGA is an association of Asian Indian doctors in Australia, which works to protect and enhance the professional interests of its members.

Selection Criteria

All people who visited the health promotion stall at the Australia India Friendship Fair were eligible to participate in the study if they self identified as of Asian Indian origin, were aged between 18-80 years; and were able to speak English. Participants were informed of the study by a research assistant, given an information sheet and requested to sign a consent form. Participants were informed that all data collected would be kept confidential and that only the principal researchers would have access to their information.

Data collection

Data were collected on a single day through an assessment of a set of commonly agreed-upon cardiovascular risk factors and a self administered questionnaire regarding health-related issues.

Assessment of cardiovascular risk factors

Hypertension

Blood pressure was measured using the automatic device Dinamap^{TM} 1846 SX monitoring system (Critikon, Norderstedt, Germany). Presence of hypertension in participants less than 65 years of age was determined if the blood pressure value was greater than 130/80 mmHg (National Heart Foundation of Australia & Cardiac Society of Australia and New Zealand, 2007). Participants who were 65 years or older were determined to be hypertensive if the blood pressure value was greater than or equal to 140/90 mmHg (National Heart Foundation of Australia & Cardiac Society of Australia and New Zealand, 2007).

Blood glucose measurement

A portable sensor (Accu-Chek Advantage^{TM}; Roche Diagnostics, Indianapolis, IN) was used to obtain a random whole-blood glucose level from a capillary (finger stick) sample from each participant. The likelihood of diabetes was considered if the random blood glucose level was greater than 11.1 mmol/L (200 mg/dl) (Diabetes Australia, 2011).

Overweight and obesity

Waist circumference, height and weight were measured according to recommended procedures. (NSW Department of Health, 2007) Overweight and obesity were determined according to the guidelines for South Asians (Steering Committee, 2000). As per these guidelines, BMI values greater than or equal to 25kg/m² is considered as obese and a waist

circumference greater than 80cms for women and 90cm for men is considered as abdominal obesity.

Self administered questionnaire

The self administered questionnaire consisted of items relating to demographic details (age, gender, level of education, and employment status) and current cardiac risk factor status. Participants were asked if they had a family or personal history of high blood pressure, high cholesterol, or diabetes and if they if they were taking any medications for the treatment of the same. A cholesterol level greater than four mmol/L (154.6 mg/dl) or if participants reported that their cholesterol level to be 'high' was considered as hypercholesterolemia. Smoking status was assessed by asking participants whether they smoked. Participants were considered to be non-smokers if they had never smoked or those who had stopped smoking completely at least one month before the time of survey. (Hansen, Andersen, & Von Eyben, 1993) Exercise habits were assessed using the Active Australia Survey (AAS)(Armstrong, Bauman, & Davies, 2000) The AAS was found to be a reliable measure of physical activity where all items demonstrated good to excellent reliability (correlation coefficients: 0.71 to 0.86; and Spearman's Rho: 0.54 to 0.77).(Australian Institute of Health and Welfare, 2003)

Statistical analysis

All analyses were undertaken using SPSS Version 17. Categorical data have been presented as percentages and continuous data are presented as means and standard deviation (SD). Differences between continuous variables were assessed using *t*-tests, and the Chi-square test was used for categorical variables. Where data did not meet criteria for parametric testing,

non-parametric tests of difference between groups (Mann-Whitney) were used. Comparisons were considered to significant at $p < 0.05$.

Results

Approximately 350 people visited the health promotion stall, however not all wanted their anthropometrics measured and a large proportion only wanted to know their blood pressure reading. Therefore data could be collected from 169 people, (males $n=68$; 40.2%). The age of the participants ranged from 18-77 years with a mean age of 46 years (SD 13.8). Eighty-one percent of the participants ($n=137$) were less than 65 years of age. Approximately 40% of the participants had migrated the country in the past four years. The median length of stay in the country was eight years (SD 11.7; Range 1-76 years). Of the 146 people who provided information on their level of education, approximately 84% ($n=123$) had a Bachelors degree or higher, 20 had a high school certificate and only three had less than 10 years of study. More than half the participants (62%) were in paid employment, 60 % had private insurance and nearly half indicated that they were able to speak English. Hindi and English were the usual languages spoken in the home by 21% and 15% of the participants respectively. Table 1 presents demographic data of the participants.

Cardiovascular risk factors

Hypertension

Twenty-nine participants (17%) indicated that they had a medical history of hypertension, however only 19 indicated that they were taking medications for its control. Further analysis demonstrated that over a third of the participants ($n=53$) who were aged below 65 years had a systolic BP of greater than 130 mmHg and more than half ($n=79\%$) had a diastolic BP greater than 80 mmHg. The mean diastolic blood pressure among these 79 participants was

significantly higher in the males (90.6 mmHg; SD 8.9) compared to the females (88.6 mmHg; SD 5.5) $p < 0.05$. Among the 32 participants who were 65 years of age or older, 14 had a systolic blood pressure of greater than 140 mmHg and nine had a diastolic blood pressure greater than 90 mmHg (Table 2).

Hypercholesterolemia

Twenty participants (15%) reported having a history of high cholesterol. A cholesterol level of greater than four mmol/L was reported by 20 participants, and 59 participants were unsure of the results of their most recent cholesterol tests (Table 2).

Blood glucose

Twenty seven participants indicated that they had a history of diabetes, however only 14 reported taking medications for the same. Results of the random blood glucose test demonstrated that six participants (3%) had a blood glucose level greater than 11.1 mmol/L and three a level of 3.4 mmol/L and less. The blood glucose level ranged between 2.2 mmol-19.4 mmol/L (Table 2).

Overweight and Obesity

Waist circumference

Data relating to waist circumference were analysed for 157 participants. The waist measurement ranged from 62 to 140 cms (Mean 95.9; SD 11.5). A significantly greater number of women ($n=91$; 90%) compared to men ($n=37$; 58%) had a waist circumference greater than the recommended values (80cms for women and 90cm for men) (Table 2). In addition, the mean waist circumference for women (97.5 ± 11.2) was also significantly greater when compared to men (93.5 ± 11.7) ($p=0.03$).

Body Mass Index

BMI was calculated for only 160 participants as data relating to either height or weight was not available for the remaining participants. According to the definition of obesity for Asian Indians (Steering Committee, 2000) more than half the males (n=32) and sixty eight percent (n=67) of the females had BMI values greater than or equal to 25kg/m^2 (Table 2).

Smoking

Of the 149 participants who reported on their smoking status, 10 indicated that they were smokers. All 10 smokers were females aged between 29 and 59 years. One participant indicated that she smoked 15 cigarettes per day while the remaining indicated that they smoked from 1-6 cigarettes each day (Table 2).

Physical activity

Data regarding physical activity status was obtained from 139 participants. More than a quarter (n=45) of the participants stated that they walked 3-4 times in the previous week for at least 10 minutes for recreation, exercise or to get to or from places. The total time these participants spent walking ranged from 20 minutes – 20 hours (Mean 2.9 hours; SD 3.5). A third (n=42) reported that they had walked for more than 150 minutes in the previous week. Insufficient physical exercise was identified in 65% of males and 71% of females ($p>0.05$) (Table 2).

Family history of risk factors

More than a third of the participants reported that they had a family history of high blood pressure (n=47) and diabetes (n=52). Twelve participants reported that they had a family history of high blood cholesterol (Table 2).

Total number of cardiovascular risk factors

Seven risk factors including BP, BMI, Waist circumference, smoking status, physical activity, history of diabetes and cholesterol were used to calculate the total number of risk factors. Thirty percent of the participants had at least three risk factors. The mean number of risk factors was 2.6 (± 1.3). Females had a statistically significant higher number of risk factors (Mean 2.9 ± 1.1) when compared to their male counterparts (Mean 2.0 ± 1.4). There were no statistically significant difference in the number of risk factors according to age group, education level and socioeconomic status. Socioeconomic status was assessed by employment status and the presence/absence of private health insurance (Table 2).

Discussion

Globally, Asian Indians have been reported to have a high prevalence of CHD. Although there are a large proportion of Asian Indian migrants in Australia, there is no data regarding their CHD risk factors. Therefore this study was undertaken to identify the presence of cardiovascular risk factors in people of Asian Indian origin living in Australia. Collecting data to monitor health status and inform culturally appropriate health interventions is critical to improving community health and eliminating health disparities.

Our findings are of concern and support those of other researchers regarding the high incidence of cardiovascular risk factors among Asian Indians in other countries. The findings have implications for support the need for greater efforts to improve health prevention and protection from CHD, in Asian Indians particularly among women living in Australia.

In this study, only 17% and 12% of the participants reported having a history of hypertension and high cholesterol levels, which is significantly lower when compared to the wider Australian population where the incidence of hypertension is 30% and hypercholesterolemia is 51% (Australian Institute of Health and Welfare (AIHW), 2011). Although only 17% of the participants indicated that they had a history of high blood pressure, actual measurements revealed that a total of 82% and 66% participants had a systolic and diastolic blood pressure value that were not in line with the recommendations from the NHF. This anomaly was despite attempts to measure blood pressure after the participant was seated for a period of five to 10 minutes. High blood pressure among those in the young age group and increased diastolic pressure in males less than 65 years is congruent with evidence from the literature which indicates Asian Indians have a greater prevalence of hypertension at an earlier age than non Asian Indian populations (Eagle, 2008). This finding is of major concern as it impacts on the productivity of young Asian Indians as well as adds to the social and financial burden.

In contrast, history of diabetes was significantly higher (16%) when compared to the national average (4%) (AIHW, 2011). Blood glucose levels of greater than 11.1mmol/L were noted in only six participants, however the high values noted remain of concern. The high values could be due to the fact that this was a random blood glucose sample and could have been taken after the participant had a carbohydrate dense meal at the Fair. It is well known that Asian Indians are at risk of developing diabetes due to their diminished sensitivity to insulin (Sandeep, Gokulakrishnan, Deepa, & Mohan, 2011) as well as their high protein intake. Therefore, tighter blood glucose control is vital given the evidence of the prognostic significance of this risk factor.

What is alarming is that only about half of those who indicated that they had a history of hypertension or diabetes were taking medications for its control. This could be due to cultural beliefs relating to illness and health and the fact that Asian Indians use complementary and alternate medicine for many illnesses (Misra, Balagopal, Klatt, & Geraghty, 2010).

A large proportion of participants in this study were unaware if they had hypertension, high cholesterol or high blood sugar levels. The lack of awareness could be due to the fact that a large proportion of Asian Indians do not have a regular general practitioner and are less likely to visit a doctor for preventive services (Disparities Policy Project, 2008). In addition, there is a paucity of health promotion materials targeting risk factors for CHD among Asian Indians. These results indicate that culturally appropriate strategies need to be developed to educate Indian Australians about screening and early detection of these risk factors. These strategies may include health promotion materials with ethnic specific data about cardiovascular risk factors, coupling the data with prevention messages relating to obesity and screening and availability of these brochures at cultural events and in ethnic specific shops and stores.

The cardiovascular risks associated with abdominal adiposity are now universally recognized (Wang, Rimm, Stampfer, Willett, & Hu, 2005). However, in this study 90% of the females and more than half the males were determined to have abdominal adiposity which is congruent with published research on migrant Asians (Fernandez R *et al.* 2011) This result is a cause of concern as in many Indian communities abdominal adiposity is associated with high socio-economic status. In addition, the high incidence of obesity (61%) according to BMI among participants in this study is well above the national average of 25% (Australian Institute of Health and Welfare (AIHW), 2011). However it should be noted that these results among Asian Indians was due to the cut-off value of greater than or equal to 25 kgm² which was used to determine obesity. This finding is particularly concerning given that the people in

this study are representative of a much larger group in the Australian community which has an impact on the obesity epidemic in Australia (Australian Institute of Health and Welfare (AIHW) & National Heart Foundation of Australia, 2004). Dietary patterns and intake could also play an important role in the high incidence of overweight and obesity in this study. However it was beyond the scope of this study to assess the diets of the participants. Further studies assessing the diets of Asian Indians needs to be undertaken to understand the impact of migration and diet on increased weight.

Cigarette smoking has been reported to be an independent risk factor for cardiovascular disease. In this study only 10 participants reported to be cigarette smokers and all were women. The low prevalence of cigarette smoking in this study is consistent with other research findings that cigarette smoking is generally lower in immigrant Asian Indians {Delnevo, 2011 #34} compared to the Western population. However, information relating to smoking status was collected solely on the basis of self report rather than by objective markers. In addition, participants were asked if they smoked cigarettes and not other forms of tobacco, which could also result in low smoking rates. What is interesting however is that all participants who indicated that they were smokers were females. This result could be due be attributed to cigarette smoking as a symbol of freedom for Indian women in western cultures (Amosa & Haglundb, 2000).

Physical inactivity is another traditional modifiable cardiovascular risk factor. In this study, 139 participants stated that they walked 3-4 times a week for 10 minutes or more, however only a third (n=42) of them walked for 150 minutes or more in the previous week which is well above the national average of 24% who participate in moderate physical activity (Australian Institute of Health and Welfare (AIHW), 2011). This finding is consistent with physical activity patterns in this population (Mohan, Wilkes, & Jackson, 2008).

In our study 71% of females and 65% of males did not get sufficient physical exercise which is consistent with national data where 76% of Australian females and 68% of males do not get sufficient physical exercise. This result has significant implications for clinicians and health promotion as it demonstrates the lack of knowledge among participants about the amount of physical activity required to obtain cardio-protective benefits.

Approximately 40% of the participants had migrated to the country in the past four years which exposes them to acculturative stress an additional risk factor for CHD among new migrants (Mohan, Wilkes, & Jackson, 2006).

Limitations of the study

Although this study has provided important information about Asian Indians some of the limitations need to be considered when interpreting the results. Firstly, the small sample which was due to limited resources that enable data collection on only one day. Data collection at future cultural events is urgently needed to support the findings of this study. Evaluation of some outcome variables were based solely on participants' self-report which the researchers acknowledge is subject to recall and social desirability bias resulting in underreporting of actual values (Fisher, 1993). Measurement of blood cholesterol level although an objective marker of cardiac risk was beyond the resources available for this study. Future studies should incorporate cholesterol measurements as part of cardiac risk assessment. Furthermore, greater understanding of the barriers and enablers to health behaviour change within this unique population is also required. Culturally safe, gender appropriate and effective interventions need to be developed and tested for efficacy with the aim of reducing both risk factor burden as well as the progression toward CHD itself.

Relevance to clinical practice

This collaborative project between the Indian Consulate, AIMGA and the researchers has explored the cardiovascular risk factors among Asian Indians living in Australia. The project has provided a platform for raising awareness among clinicians and promoting advocacy on the cardiovascular risk among Asian Indians. Nurses in their role within the clinical setting and in health promotion activities are well positioned to minimise risk factors for CHD in the Asian Indian patient and their families. Nurses can educate and encourage patients to adopt healthy behaviours that can reduce their risk factors and hence the chance of developing or progression of CHD. Strategies involving health professionals as well as support from the private and public sectors can also assist in the reduction of the cardiovascular risk factors among this extremely susceptible population.

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Table 1 Heart Disease Risk Factors

Risk Factor	N	(%)
Hypertension		
History of hypertension	29	17%
Taking medications for hypertension	19	11.2%
Systolic Blood Pressure > 130 in those aged < 65 years	53	38.7%
Diastolic Blood Pressure >80 in those aged < 65 years	53	38.7%
Systolic Blood Pressure > 140 in those aged $\geq$ 65 years	14	44%
Diastolic Blood Pressure >90 in those aged $\geq$ 65 years	9	28%
Hypercholesterolemia		
History of hypercholesterolemia	20	15%
Cholesterol level > 4 mmol/L	20	15%
Diabetes		
History of diabetes	27	16%
Taking medications for diabetes	14	8.3%
Blood glucose level > 11.1 mmol/L	6	3
Overweight and Obesity		
Waist circumference > 80cm for females	91	90%
Waist circumference > 90 for males	37	58%
Body Mass Index $\geq$ 25 (<i>Obesity in Asian Indians</i>)	100	61%
Smoking	10	5.9%
Physical activity		
Walking more than 150 minutes /week	42	37%

Table 2 Number of risk factors according to age group, education level and socioeconomic status

Total No. of Risk Factors		
	Mean (SD)	p
Gender		
Male	2.0 (1.4)	0.000
Female	2.9 (1.1)	
Age Group		
< 65years	2.5 (1.4)	0.38
≥65years	2.8 (1.0)	
Educational level		
Less than 10 years	2.3 (0.5)	0.286
High School Certificate	2.9 (1.1)	
Bachelors degree	2.4 (1.4)	
Masters degree	2.6 (1.4)	
Doctorate	3.8 (1.7)	
Socio economic status		
Employed	2.6 (1.4)	0.77
Unemployed	2.6 (1.3)	
Has Private health Insurance	2.4 (1.2)	0.124
No Private health Insurance	2.8 (1.5)	