A Close Comparison of Clinical Risk Factors for Coronary Artery Disease of a Small Group of Immigrant Asians and Caucasian Americans Working in an Urban Medical Center in Los Angeles County, California: A Pilot Study

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Abstract

Coronary artery disease (CAD) is the leading cause of morbidity and mortality in the United States. Asian immigrants are found to have a higher risk of developing CAD compared to Caucasians [1]. We compared the CAD risk factor profiles of a small group of Asians with those of a small group of Caucasian Americans employed in an urban medical center in Los Angeles, California. Sixty participants (30 Asians, 30 Caucasians) self-reported presence of the following CAD risk factors: smoking, sedentary lifestyle, family history of CAD and heart related diseases in the family, high cholesterol level, and hypertension among others. Findings revealed non-significant differences in most risk factors for participants. The only significant risk factor between the two groups was Body Mass Index (BMI) in males. Asian males had a higher BMI risk compared to Caucasians (p=.04). The results showed that although Asians had more risk factors compared to Caucasians, this did not mean they were more prone to CAD than the Caucasian Americans.

Keywords: Coronary artery diseases, Risk factors, Asian Americans, Caucasians

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1 Introduction

Coronary artery disease (CAD) is the leading cause of mortality in the United States with Asian immigrants identified as the group with the highest risk for the disease [1]. Asians are among the most visible and rapidly growing sector of the U.S. population. The number of Asians in the country has increased due to the immigrations of professionals in recent times, particularly those who are in healthcare and education. As of the 2000 census, there are about 11.9 million Asians in the U.S. with Chinese and Indians being the most populous among the different groups. This figure is expected to rise in the coming years as more professionals are attracted to the opportunities available in the country. There are also those who would come to the U.S. to escape the on-going conflicts in their native countries. Other groups come from Pakistan, the Philippines, Sri Lanka, Hong Kong, Cambodia, Laos, Thailand, Korea, and Japan [2].

Asian nations are noted for the low incidence of chronic diseases, like CAD, among their populations. It is unexpected then that those who are now residing in the United States have become at risk for CAD. More alarming is the fact that Asians have been shown in many studies to have the highest risk for developing coronary artery disease among all of the ethnic groups, and even in comparison with Caucasians [3]. This trend is surprising considering how CAD is not common for those who are living in their home countries. According to several studies, South Asians' risk for CAD is three times compared to that of Caucasians, regardless of gender, religion, diet, home country, and social class. The rate is even similar among vegetarians and non-vegetarians. Among all Asians, Indians suffer the most number of fatalities from this disease. About 33% of Indian women have died from CAD, a figure that is higher compared to any other ethnic groups. This is even higher among Asian groups [1].

There have been many speculations concerning the Asian immigrants' risk for CAD, including changes in their diets or activities and the accumulation of psychosocial stress in their new environments. These speculations are not unfounded because the Western lifestyle can be quite different for many of the Asians who lived in areas that can be considered rural before coming to the U.S. Immigrant Asians may also feel the need to become accustomed to the Western lifestyle and force themselves to adopt habits that would become stressors in the long run. These speculations cannot, however, be generalized and applied to the entire ethnic group because there are subgroups and subcultures that may affect their lifestyles and habits. There is a significant lack of research and data on the risk factors, characteristics of the disease, and the health outcomes [3]. Most studies were unable to provide clear evidence on why Asians have become the most affected by CAD.

In this study, the researcher did not attempt to provide more information about the risk factors that can contribute to the number of CAD cases among Asians. Instead, the study would verify if the trend was true on a small group of Asian and Caucasian workers using factors that have been widely identified as risk factors for CAD, such as age, gender, family history, smoking, high blood pressure, high cholesterol level, diabetes, obesity, and physical inactivity [4]. These risk factors are generally known to lead to CAD. There may be other factors that contribute to the rate of CAD among Asians but they are not part of this paper. Knowing the traditional risk factors among Asians will already help confirm how certain habits, genes, and lifestyles could expose this group to the leading cause of death in the country.

The study was focused on the health workers of the urban medical center in Los Angeles,

California. The purpose of this pilot study was to find out if a small convenience sample of Asian immigrants has more risk factors associated with CAD than American born Caucasians. Two groups of participants were assessed for their risk factors for CAD. The first group was composed of Asians who have come to the U.S. within the last five years and not those who have been born in the country. Asians strictly meant people who have only recently come to the U.S., particularly in the urban medical center. In particular, the Asian samples should not have been in the country for more than five years. Many of the Asian workers in the medical center are nurses who have been in the U.S. for less than five years. The Asians' nationalities, religious affiliations, and diet were not taken into account. Their only commonality was that they were Asians. The other group was comprised of Caucasians. Meaning, they were not of mixed heritage (not Asian-American or African American) and they have been born in the United States. This group did not include Caucasians born outside of the U.S. Both groups were health workers, exposing them to the same work schedules and stressors. They varied, however, in terms of lifestyles and habits.

Determining the group with the most number of risk factors would show whether or not CAD trend among Asians even in a small population was true. Rather than prove that a trend is true in a bigger population, this research would show if the general trend is true in a convenience sample. It was initially assumed that Asians would be more at risk for CAD in accordance to the trend. Should the Asian samples have more risk factors, this would point to a more serious problem facing not only Asians but the healthcare industry as well. If not, it is likely that developing CAD would occur after Asians have been in the country for more than five years.

1.1 Study Design

The study was cross-sectional, observational in nature [5]. In this study, certain variables related to CAD risk were determined to know if CAD risk differed among a small Asian immigrants and American-Caucasian sample.

1.2 Study Participants and Recruitment

In a cross-sectional study, all members of the population will be included if their number is small enough [6]. However, this was difficult and too costly in the present study to do since the area of study was quite large. In this regard, convenience samples for both Asian and Caucasian groups working at urban medical center in Los Angeles, California volunteered for the study. Potential study volunteers were made aware of the study by handing them a flyer with an attached prepared survey for the research study, as well as, an overview of the study. The prepared survey contained information related to the identified clinical risk factors for CAD as determined through an extensive search of the literature and information published in national scientific governing bodies, such as the National Heart, Lung, and Blood Institute of the Department of Health and Human Services. Study participants completed the survey without indicating their names or addresses to ensure confidentiality and anonymity. Completed surveys were placed in an envelope, sealed, and then placed in a secure drop box only accessible to the researcher.

1.3 Evaluation

A survey was used to determine the participants' CAD risk. The survey assessed the following for each participant: ethnic background, years of stay in the United States, age, sex, height and weight, family history of CAD, hypertension or other cardiac disorders, diabetes, sedentary lifestyle and hypertension. The survey was based on the identified clinical risk factors for CAD outlined by the National Heart Lung and Blood Institute. Answers to this survey were taken into account when evaluating the participants' clinical risks for CAD.

1.4 Statistical Analysis

For each group, the presence of the risk factors for CAD was tabulated. The measures of central tendency, particularly the mean and the mode, were used as an initial comparison between the two groups to determine which group has more risks factors. In calculating for the mean, each participant got one point for each risk factor. The total points were then divided by the total number of risk factors. The means of each group was able to show if Asian immigrants or Caucasian-Americans in the study sample differed significantly in CAD risk factors. The mode determined which risk factor was the most prevalent in each group. The number of participants reporting each risk factor was summed using an Excel sheet. The means and standard deviation were computed for each group to be able to calculate the t-values and p-values. These statistical measures were computed using the software QuickCalcs.

The second part of the statistical analysis was to determine which group had more clinical risk factors. This was accomplished using the t-test and the chi-square method. The null hypothesis for these tests was that there is no difference in the number of CAD risk factors between a small group of Asian immigrants and American-Caucasians working at urban medical center in Los Angeles, California. The alternative hypothesis was that there is a difference in the number of CAD risk factors between a small group of Asian immigrants and American-Caucasians working at urban medical center in Los Angeles, California.

2   Main Results

There were 82 people who answered the survey questions. After the surveys were returned, each participant was prequalified based on ethnicity (should be Caucasian or Asian). Eight did not qualify based on ethnicity (non-Caucasian or non-Asian); while 10 were rejected even if they were Asians or Caucasians because the Asians (n = 6) were born in the U.S. and the Caucasians (n = 4) were born outside of the country; and four participants (all Asians) were not included because the study sample was limited to 30 for each group. The baseline characteristics of the 60 participants (Asian: n = 30; Caucasian: n = 30) are found in Table 1. There were 12 male participants and 18 female participants in the Asian group while there were nine male and 21 female participants in the Caucasian group. Overall, there were 21 male participants compared to 39 female participants. The baseline characteristics remained the same for the study period.

2.1 Sample Description

Demographic characteristics and risk factors for heart disease are listed in Table 1. Most participants (65%) were female, and the average age was 41 with standard deviation of 8.20. In terms of gender, both groups had more female participants. The Asian group had more participants (27%) with sibling or parent with heart disease before the age of 45, compared to only 17% in Caucasians. The same trend was true for participants with parents or siblings diagnosed with heart disease before the age of 65 (47% among Asians compared to 27% of Caucasians). Of all the participants, 25% had high cholesterol levels (30% among Asians compared to 20% among Caucasians). Eight (27%) Asians had high blood pressure (HBP) compared to 7 (23%) Caucasians. Between the two groups, the Caucasians had a higher prevalence of diabetes (17%) compared to Asians (7%). Smokers for both groups were about the same in number. Based on lifestyle, more Asians reported having a sedentary lifestyle (80%) compared to Caucasians (53%). Height and weight for both groups varied; Asians were shorter but not necessarily lighter in weight. In fact, both male groups were in the same weight level while their height differed. There were differences in the mean BMI of each group but calculating the p-value (p= 0.25) showed that these differences were not significant.

Based on BMI, the females of each group were not at risk for CAD because their BMIs fell within the normal weight category: Asians (23.4) and Caucasians (23.0). Among males, Asians (26.20) were at risk for CAD compared to Caucasians (24.7). The p-value for the males showed that the difference in the BMI was statistically significant (p = .04).

2.2 Risk Factors for Asians

The most common risk factor for CAD among Asians was sedentary lifestyle; 24 (80%) of participants did not engage in regular physical activities. This was followed by smoking at 15 (50%). Other risk factors: sibling/parent with CAD before 65 (47.11%), high cholesterol level (30%), sibling/parent with CAD before 45 (27.42%), HBP (27%), and diabetes (7%).

2.3 Risk Factors for Caucasians

The Caucasians reported sedentary lifestyle (53%) as the most prevalent risk factor, which was similar to the Asians. This was followed by: smoking (47%), sibling/parent with CAD before 65 (27%), HBP (23%), high cholesterol level (20%), sibling/parent with CAD before 45 (17%), and diabetes (17%).

An unpaired t-test was conducted for the seven risk factors (sibling/parent with CAD before 45, cholesterol level higher than 200 mg/dL, HBP, diabetes, smoking, overweight, sedentary lifestyle) associated with CAD. The Asian participants had a mean of 9.78 risk factors with standard deviation of 7.19 compared to Caucasians' mean of 8.00 with standard deviation of 4.47. Although their means were different, there was no assurance that the difference occurred not because of chance (p = -0.27). The null hypothesis (difference is due to chance) was not rejected.

The Chi-Square method was used for comparing the difference for each risk factor. In all of the risk factors, except for the BMI, the p-values obtained from Chi-Square showed

that they were all not statistically significant (p = 0.19 to 0.44). Meaning, the differences between each group for each risk factor was only due to chance. The difference in the BMI values in males was the only statistically significant risk factor in the group.

Table 1: Results of Survey

Characteristics		Asian (n=30)		Caucasian (n=30)		Total (n=60)		p values
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	
Gender								
Male		12	40	9	30	21	35	
Female		18	60	21	70	39	65	
Sibling/Parent with HD before 45		8	27.42	5	17	12	20	0.20
Older than 55		0	0	2	7	2	3	0.25
Sibling/Parent with HD before 65		14	47.11	8	27	22	37	0.19
Cholesterol Higher than 200 mg/dL		9	30	6	20	15	25	0.34
High Blood Pressure		8	27	7	23	15	25	0.40
Diabetic		2	7	5	17	7	12	0.25
Smoker		15	50	14	47	29	48	0.44
Sedentary Lifestyle		24	80	16	53	40	67	0.22
BMI	Female	23.40	2.33	23.0	2.98	23.20	2.66	0.40
BMI	Male	26.20	2.01	24.7	3.36	25.45	2.69	0.04

Note: All values are reported as N (%) unless otherwise noted. HD = Heart disease, BMI = Body mass index

3 Discussion

CAD is one of the most important diseases in the country in terms of disability, morbidity, and mortality. Among all cardiovascular diseases, CAD has the greatest toll on the population, especially among Asian immigrants whose risk for CAD is significantly higher compared to other groups. This illness impacts quality of life aside from the economic loss it presents to the individual. The presence of CAD risk factors can predict the occurrence of the disease in individuals. The more risk factors an individual has, the greater is the possibility that he would be developing the disease. Since Asians are found to have the greatest risk for CAD, this would mean that this group has the most number of risk factors for CAD. Asians may or may not be aware of their risk factors, hence, the higher incidence of mortality.

The purpose of this study was to find out if a small convenience sample of Asian immigrants has more risk factors associated with CAD than American born Caucasians. This expectation was in line with findings from previous researches identifying Asians as the most high-risk group for CAD [1, 2]. Knowing the answer to this question can help

urban medical center create focused intervention techniques to reduce the possibility of developing CAD among this group of employees.

Having more risk factors mean that the Asians had the higher probability of getting CAD compared to their Caucasian counterparts. In the process of determining if the Asians were more at risk, it was important to establish if the differences in the results were statistically significant. Statistical significance would help show that the difference between the groups was due to chance or not. Even if the two groups would show differences in the number of risk factors, this would not be useful in predicting greater CAD risk if the differences were not due to chance. In other words, Asians or Caucasians could have more risk factors without facing the greater risk compared with the other group. The statistical significance does not predict how likely an individual will have CAD, regardless of the group's results. A person can have CAD if he has more risk factors compared with the rest of the participants.

In the present study, a survey was used to assess the presence of CAD on each participant. The total risk factors for each participant were then tallied to come up with a total for each group. The results showed that although there were many differences in the number of participants with risk factors, the statistical tests showed that these differences were merely due to chance. For instance, about 80% of Asians had reported a sedentary lifestyle compared to 53% of Caucasians. Despite this gap in this risk factor, statistics showed that the result was not significant. This means that the Asians at urban medical center in Los Angeles, California were not at a greater risk for CAD simply because they were not engaged in physical activities after work. The lack of significance in this aspect was attributed to chance. One likely reason for this was that the participants were not randomly selected. They were selected based on who signed up for the survey.

Overall, the Asian group had individuals with the presence of more than one risk factor. The same was true for Caucasians. An Asian male could be a smoker, did not engage in physical activities, and could have a parent older than 65 who had been diagnosed with heart-related diseases. But these risk factors did not necessarily raise his risk for developing CAD probably because of his age and probably because he did not have the other risk factors that

were more closely-linked with CAD, like diabetes and high blood pressure. More importantly, there must be something about their length of stay in the U.S. that could have lessened their risk for CAD. It has to be remembered that none of these Asian participants were in the country for more than five years. Being in the country for less than five years may not have caused them to adopt behaviors that were different from what they were used to. This consideration can be the subject of future researches. Another possible reason for the lack of statistical significance was that more of the Asian participants were young (less than 35 years of age) than the Caucasian participants. People belonging to that age group are young enough to withstand stressors or the presence of risk factors. They may or may not exhibit greater propensity for CAD in the future depending on their lifestyles or the habits they would develop later in life.

Although the results of the study did not reflect on the trend found in other studies comparing Asians with other groups, this divergence can help future researchers determine if length of stay in the U.S. has significance for this group. Alternatively, these results may also mean that CAD can occur in Asians without symptoms or warning as shown in some studies. The Asian participants could already be at risk for CAD even when statistics showed that their risk for the disease was at par with the Caucasian participants.

CAD risk is significantly higher for South Asians than White Americans [7]. An Asian then may be smoking the same number of cigarettes and may have normal blood pressure like another person who is Caucasian but his chances for CAD is higher. This can also help explain why there was no statistical significance among Asians and Caucasians at urban medical center when it comes to most of the risk factors for CAD. Asians should not take this as a positive sign because the disease could attack with little to no warning.

While the study results showed that most of the risk factors were not statistically different between Asians and Caucasians, there was one risk factor that was statistically significant and more noteworthy for being the only one in the group to exhibit occurrence not due to chance. Between the two groups, the BMI was found to be significantly different in males only. A person with a high BMI often has more weight in the abdomen, which is an early sign for developing heart disease. BMI was obtained by getting the weight and height of each individual. BMI is accepted as the best measure for obesity. A person who has a high BMI, particularly one that reaches the overweight level has an increased risk for developing the other risk factors for CAD, like hypertension and diabetes [2]. Obesity is one important factor in the development of many cardiovascular diseases.

The female Asians and Caucasians had BMI < 25 while the male Asians had BMI > 25 compared to Caucasians < 25. The females in this study were generally on the right weight level appropriate for their height. Among the four groups (male and female), the male Asians exhibited the highest average BMI, suggesting that they were the persons more prone to CAD. 26.20 BMI is considered overweight [8]. Obesity in men does not automatically mean having too visible excess fats. This can manifest as having larger bellies or waistlines. Asian men at the medical center have a greater risk for CAD using the BMI alone. This risk is exacerbated if that male individual has other risk factors like smoking and a sedentary lifestyle.

This study showed that understanding the prevalence of CAD among Asians requires taking the study outside of the hospital to include more people and more geographic areas.

4 Conclusions

Different studies on risk factors for CAD and the prevalence and incidence of CAD on Asian Americans suggest that this group of people may or may not exhibit the traditional risk factors for CAD. Smoking, hypertension, diabetes, family history, lifestyle, high cholesterol level, and sedentary lifestyle are good indicators of the possible development of CAD but they are often undiagnosed, making it unlikely to predict the likelihood that an Asian immigrant will suffer from this disease. There are many cases wherein seemingly healthy adults who take care of their health have suffered from sudden attacks. The presence of CAD was only diagnosed only after the disease has already progressed to the more fatal stage. It is reasonable then to suggest that the Asian participants in the study may be at a higher risk for CAD despite the fact that statistical analysis has shown that their risks for this disease is not significantly different from that of the Caucasians.

CAD and being Asian remains a complex and not well-understood phenomenon. Although studies have established that ethnicity plays a central role in the development of CAD, there are no evidence yet that would fully explain why this is so. There were established trends like Asians leading more sedentary lives, smoking a lot more than the average American, and experiencing more incidence and prevalence of diabetes and hypertension. When taken together, these trends would probably explain why Asians in

the U.S. are the most at risk for CAD.

The participants from the urban medical center can take the results of the study as a challenge and as an encouragement to engage in physical fitness activities, cut on the smoking habit, and become more aware of the nutritional value of their foods. Leading a healthier and more active lifestyle can somehow mitigate the possible development of CAD.

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