

The Effect of Risk Factors on Cardiovascular Vascular Diseases in Mauritius

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Abstract: Problem statement: Recent studies provided clear evidences that Cardiovascular Diseases (CVD) and risk factors of CVD are on the rise worldwide. It has been shown that countries which are in the developing stage are more at risk. Mauritius, being an island in its full swing of development and economic boom, is facing a huge problem in terms of health hazards, CVD being a major cause of concern. **Approach:** According to research, CVD is the leading cause of death in Mauritius and its contribution to mortality is rising. In this study, the risk factors of CVD had been assessed among the Mauritian population where qualitative and quantitative data was collected using detailed questionnaire, food frequency questionnaire and an in depth interview was conducted. Respondents were among the age group of 20-60 years of age taken from both rural and urban region and comprised of all ethnic groups. **Results:** CVD among the Mauritian population is highly prevalent with 10.2% of the studied population already suffering from this type of disease. Several risk factors and causes such as inappropriate eating habits, lack of physical activities, tobacco use, alcohol consumption, stress and tension, hyperlipidemia, obesity, high blood pressure and being overweight, amongst others, had been found to be very much prevalent among the studied individuals. **Conclusion:** Various factors can be attributed to this, among which eating habits, food consumption and lack of exercises prime. Furthermore, based on the results obtained from this survey, which had confirmed quite a lot of theories, it had been found that a change in diet and lifestyle can be highly beneficial for health and prevention of CVD and lower the threat of contracting risk factors of CVD as well.

Key words: Cardiovascular diseases, risk factors, obesity, hyperlipidemia

INTRODUCTION

In today's highly hectic and very fast moving life, diseases of all types are erupting at an alarming speed. Among these, Cardiovascular Diseases (CVD) emerges as a very prominent disease. Along with the rest of the world, Mauritius too has been affected by this emergence. The situation, however, is quite alarming in Mauritius with an increase in all the Non Communicable Diseases where in 2008, 35% of death was accounted by circulatory system diseases (Health Statistics Report, 2008). Cardiovascular diseases is becoming a major health burden in developing countries (Sturmer *et al.*, 2006). Mauritius is actually experiencing a rapid health transition, with large rising burdens of chronic diseases. There is not just one type of CVD. In fact, there is quite a range. Some of the most common ones are coronary heart disease and myocardial infarction, amongst others. These diseases can, in turn, lead to a series of complications and problems, which may further deteriorate the state of

health of a person. Various studies conducted previously have revealed that there is a multitude of risk factors of CVD. These include: Increase in hypertension, family history, dyslipidaemia, diabetes, overweight, obesity, physical inactivity and tobacco use, amongst others (Reddy *et al.*, 2006).

MATERIALS AND METHODS

As mentioned above, hypertension is a risk factor of CVD. A high blood pressure enhances an increase in blood pressure can result in environmental factors, genetic factors and also an interaction between these two factors. Among these, dietary factors have a much major role in affecting blood pressure (Lichtenstein *et al.*, 2006). Considering family history, family tendency of hypercholesterolemia is hereditary and normally characterized by elevated levels of LDL-C and premature Coronary Heart Disease, (Jansen *et al.*, 2005). A positive parental history of MI is assumed to occur before the age of 60, (Stampher *et al.*, 2000).

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However, a parental history of MI beyond the age of 60 is still a strong predictor of CVD risk mainly in maternal history of MI and should not be discarded on the age factor (Howard *et al.*, 2001). CVD is considered as the main cause of death worldwide, particularly in type II diabetes individual. Among people suffering from diabetes, there is a 2 to 3 fold increase in the risk of them developing atherosclerotic diseases (Centers for Disease Control and Prevention, 1991). Diabetes is the major risk factors for CVD in both sexes and all adult age groups. Altered lifestyle like physical inactivity can cause development of obesity, the increase in the rate of diabetes, hypertension and dyslipidemia which are considered as risk factors (Sturmer *et al.*, 2006). Various causes have been identified for the increase of CVD. "The differences in eating patterns or in the consumption of specific nutrients have been found to contribute to observed differences in the prevalence of Cardiovascular Diseases (CVD) between populations" It was found that saturated fat intake was directly related to LDL cholesterol. Concerning HDL cholesterol, it was found to be inversely related to carbohydrate intake (Paul *et al.*, 2005). Moderate alcohol consumption has been associated with a reduction in cardiovascular events. However, alcohol can be addictive and high intake of alcohol can lead to serious adverse health hazards (Lichtenstein *et al.*, 2006). The level of education plays an important role in the incidence of CVD. It has been noted that there is a progressive decrease in the incidence of CVD events with an increased in the level of graduate education and increasing levels of income (Michelle *et al.*, 2006). High serum cholesterol has been identified as a cause of CHD and mortality in many clinical studies and "in the last 30 years, the carriers of blood lipids and their carrier proteins, lipoproteins, have come to the forefront as predictors of risk (Mahan and Escotte-Stumpm, 2000). Moreover, it was inferred that there is a direct positive relationship between total serum cholesterol and Coronary Heart Disease. Age is a factor which has to be born in mind when the issue of CVD is raised whereby hypercholesterolemia in the twenties is strongly associated with Coronary heart disease incidence (Klag *et al.*, 1993). As for obesity, it is an independent risk factor of CVD (Lichtenstein *et al.*, 2006). Increase in body weight can adversely affect the cardiovascular risk factor, that is, it can cause an increase in Low Density Lipoprotein (LDL), triglyceride levels, blood pressure and blood glucose levels. It also causes a reduction in high density lipoprotein cholesterol and increases the risk of developing coronary heart disease, heart failure, stroke and cardiac arrhythmias (Lichtenstein *et al.*, 2006).

Permanent stress at work or home has shown to increase the incidence of myocardial infarction (Sturmer *et al.*, 2006). As for the socio-economic factors, they also have an impact on the prevalence of CVD. Individual with low socioeconomic status have a higher incidence of CVD as compared to these who are on the higher socioeconomic strata (Lichtenstein *et al.*, 2006). Globalization has led to a drastic change in lifestyles, trends and eating habits. The global availability of cheap vegetable oils and fats has resulted in an increase in purchasing power and increased fat consumption among low income countries. Moreover, the effect of globalization of food production and trade is giving a helping hand to the increase in the consumption of energy dense foods which are however, poor in dietary fibers and several micronutrients ((Reddy and Yusuf, 1998).

RESULTS AND DISCUSSION

As for the prevalence of CVD in the studied population, the study revealed that 10.2% of the population was affected by this type of disease. However, other diseases like hypertension, diabetes and hyperlipidemia were also present and there exist a strong correlation between these diseases, which are risk factors of CVD. Among those individuals who have CVD, there are 44.4% of them who have hypertension, 20.4% who have diabetes, 6.5% who have hyperlipidemia and 8.1% who have other types of CVD. The risk factors for CVD are seen as being very present in the Mauritian population. The study reveals that CVD is more prevalent among the males, thereby placing the male sex on a higher predisposition to have CVD. This can also be attributed to the fact that males are more affected by CVD or the risk factors associated with CVD may be because this group is more prone to tobacco smoking and alcohol use, which can accentuate the risks of contracting CVD. These confirm the statements put forward by World Health Organization (2002) which identified "physical inactivity and tobacco use", amongst others as being contributors to risk factors of CVD. Moreover, concerning the age factor, cardiovascular diseases show the same pattern as HBP, diabetes and hyperlipidemia in the male population where there is a gradual increase in the prevalence of the disease as age advances. However, concerning the female subjects, CVD onset seems to be earlier as compared to the males. The percentage of CVD in the female respondents is more in the 41-50 years age group than the oldest studied group. This, according to World Health Organization (2002) can be accounted for by a decrease in activity level as the

people grow older. As for females, along with a probable decrease in activity level, there is also the impact of pre-menopause which might contribute to increasing the risks of getting CVD. Considering the age factor and hypertension, the study reveals that the prevalence of HBP is more among the oldest studied age group. Furthermore, it was observed that the disease progresses with the advancing age, again confirming the findings by World Health Organization (2002). Although the older population is the most affected by HBP, the middle age respondents are also very much affected and so is the younger population group. HBP at younger age increases the predisposition of developing other complications of CVD and thus increases the risk of CVD more as compared to those individuals who do not have hypertension. This may be due to a shift in lifestyle and eating patterns occurring as a consequence of the economic transition and it was stipulated that "there is a high level of CVD risk factors that are common in many economically developing countries" (Gu *et al.*, 2005). Concerning diabetes, it is almost equally distributed among the males and the females. Similar to HBP, the prevalence of diabetes also seems to be heightening with increasing age. The most affected age group is the one above 50 years old where the amount of individuals affected is 69.6%. Moreover, the middle age group is also very much affected by diabetes. Though, the least affected group is the age group 20-40 years, they are very much prone to developing CVD later in life if proper care is not taken. Here again, the socio-economic factors and a change in eating habits might be faulty. The individuals from the 20-40 age group might be prone to developing risk factors to CVD due to the spread and availability of pre-packed and fast food, which despite being tasty and convenient, are very detrimental to health. The study reveals that hyperlipidemia is also following the same trend as HBP and diabetes, that is, an increasing prevalence with an increase in age. The age group the most affected by lipid disorder is the age group between 51-60 years. However, high lipid profile was not detected in the respondents below the age of 30 years. Positive family history of CVD predisposes an individual to have higher chance of developing CVD later in life, it is considered as a surrogate for coronary risk factor (Howard *et al.*, 2001). Considering this study, family history among those who have CVD are higher than those who do not have CVD. This is an indication that there is a strong correlation between family history of CVD and the development of CVD later in life. Moreover, among those individuals who do not have CVD, parental history of CVD is more pertinent as compared with positive history with other

members of the family. The study therefore shows the predisposition of non CVD patient and the tendency for them of developing these diseases. Considering the gender issue, age and positive family history, the study reveals that the male subjects have more positive family history than their counterparts, thus augmenting their risks of developing CVD. Positive family history at younger age is a rather determining risk factor on the onset of CVD in the males. This can also be the reason for more male of the older age group being affected by CVD. Considering the female subjects, a higher positive family history at an older age would not be significantly a risk factor of developing CVD later in life. The development of CVD beyond the age of 60 will depend on other factors such as age and degenerative factors amongst others. As for dietary implication, nutrition is shown as playing a considerable role in preventing chronic diseases like CVD. The major protective factors of diet have been well established and the consumption of higher intake of fruits and vegetables has been demonstrated to prevent heart diseases and mortality (Voutilainen *et al.*, 2006). The Mauritian population is rather a mixed diet type of population with the majority of individuals consuming non vegetarian diet more than 3 times weekly. As for the consumption of green leafy vegetables, although it has a rather protective effect on the heart and helps in the prevention of CVD, seems to be less in the Mauritian diet. The Mauritian residents can therefore increase the consumption high amount of green leafy vegetables to protect them from potentials effect of other risk factors of CVD. As for other types of vegetables, the study reveals that majority of the population consumes them more than 3 times in a week. The consumption of vegetables in general has protective effect on the circulatory system. Apart from the nutrients present in these vegetables, there is also the presence of high amount of fibers which helps prevent CVD. A high fiber diet helps to scavenge excess of sugars and cholesterol from the body, thus reducing the risk of plaque formation and hence, decreasing the risks of CVD development. As for salads and fruits, there is quite a high percentage of individuals who do not consume these types of foods more than 3 times per week thus placing them at higher risk of developing CVD later in life. As for milk, being an animal product is rich in saturated fat. However, if taken moderately, it would not pose any threat to the development of CVD. Considering the amount of milk consumed by the citizen of Mauritius, the study reveals that 58.9% consumes between 0-250 MI of milk daily, 36.5% consumes 250-500 MI of milk daily. However, the type of milk consumed may also act as a risk factor

for CVD where the consumption of high amount of high fat milk may be a positive risk factor for CVD. From the survey, it was observed that the majority of the residents consume high fat milk and 37.3% consumes low fat milk. As for non vegetarian food products, they can be very good sources of 'high biological value of protein' but they are also very rich in saturated fat, especially the animal meat. If the consumption of non vegetarian food products exceeds the normal quantity, it may lead to problem like hyperlipidemia and also it may cause additional load on the kidneys if there is excess of protein. Among the studied population, there are more than 60% of the individuals who consumes more than 1 kg of non vegetarian food weekly. It has been proved that the consumption of non vegetarian food increases blood pressure as compared to vegetarian diets. Some other studies have also shown that the replacement of non vegetarians diets by vegetarian diet decreases the blood pressure in both hypertensive patients as well as normotensive individuals (Rouse *et al.*, 1983; Zarraga and Schwarz, 2006). However, reducing meat consumption among those who eat too much meat will help them decrease their risk of getting CVD by reducing the risk of hypertension, as well as hyperlipidemia. The study reveals that the consumption of fish is quite a very common practice among the Mauritian. Although fish is available, it is now becoming more expensive and less affordable as other food products. Consumption of fish has proved to be very beneficial to the heart health, especially the oily fish which is rich in omega 3 and omega 6 fatty acids which help to prevent atherosclerosis by acting as antioxidants. Types of oils and fats is very determinant risk factor of CVD. The Mauritian population is however not safe as regards to the consumption of trans-fatty acids except for the small percentage who are not consuming this type of oil. This can therefore place them at higher risk of developing lipid disorders, the consequence of which can lead to the development of CVD. The study reveals that the citizens of Mauritius consume quite a high amount of oil. There are 41.3% of individuals who consume less than 1 L of oil monthly and the majority of them, that is, 54.3% consume between 2-3 L of oil monthly. Oil consumption is important in the diet, especially for proper development and proper absorption of fat soluble vitamins, that is, Vitamins A, D, E and K. Dietary fat restriction have shown to cause essential fatty acids deficiency which consequently, can cause somnolence, visual problems and tachyarrhythmias (Zarraga and Schwarz, 2006). However, high fat consumption can have adverse effect on health. High fat consumption can lead to obesity, high lipid profile

and therefore, highly increases the risk of developing atherosclerosis and thus, CVD. However, there is a small percentage of the studied population who are consuming more than 3 L of oil monthly, which is too much. This will definitely place them at high risks of developing CVD (Lichtenstein *et al.*, 2006) have identified sedentary lifestyle as a leading preventable cause of death. Physical activity is not a common practice among the individuals of Mauritius. The study reveals that more than 70% of the studied population does not perform physical activities. This lack of exercises places the residents at higher risk of developing CVD due to their inactive lifestyle. A sedentary lifestyle is a high risk factor for CVD. Moreover, physical exercises for more than 30 min and at a pace of more than 3 times weekly have proved to be cardio protective. Concerning involvement in regular physical activities, it is known to decrease the risk of cardiovascular diseases (Marcus *et al.*, 2006). As mentioned in the Reddy *et al.* (2006) and other researchers, tobacco consumption and smoking are serious threats to contracting CVD. From the survey, it was found that 15% of the studied population smokes cigarettes. However, active smoking is considered as a well established modifiable risk factor for CVD (Venn and Britton, 2007). The study reveals that alcohol consumption is not a very common practice among the Mauritian population. Only 7% of the studied population claimed the use of alcohol among which, almost one quarter of them are frequent abusers where they consume alcohol more than 4 times weekly. However, the majority of those who consume alcohol are not alcohol addicts and they do so just occasionally. "Moderate alcohol intake has been associated with reduced cardiovascular events in many population" (Lichtenstein *et al.*, 2006). However, alcohol can be addictive and cannot be recommended exclusively for CVD risk reduction as high intake is associated with adverse health effects (Lichtenstein *et al.*, 2006).

CONCLUSION

This study revealed that the risk factors of CVD among the Mauritian population are highly prevalent. Various factors can be attributed to this, among which eating habits, food consumption and lack of exercises prime. Furthermore, based on the results obtained from this survey, which have confirmed quite a lot of theories, it has been found that a change in diet and lifestyle can be highly beneficial for health and prevention of CVD and lower the threat of contracting risk factors of CVD as well.

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