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No Clear Link with Diet and AMI: A Case - Control Study of Risk Factors of Acute Myocardial Infarction Patients in Trinidad

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Abstract
Objectives: Dietary risk factors are considered a major determinant of coronary artery disease. However, dietary components resulting in IHD have been mixed and inconsistent. The aim of this study was to determine traditional and dietary risks for acute myocardial infarction. Methodology: This case control study was conducted at a public health care institute. Confirmed AMI cases were matched against hospitalised age and sex matched non-IHD patients. Data collected from face to face interviews were analysed using SPSS version 21. Descriptive and analytic analyses comprising Pearson's chi squared test of association and conditional logistic regression were conducted. Results: Traditional risk factors such as ischemic heart disease, previous heart attack, diabetes mellitus, hypercholesterolemia, family history of IHD, hypertension, obesity and higher waist circumference increased the odds of AMI. Exercising (less than 4 times a week), alcohol use (frequently) and smoking (frequently) showed significant associations. Overall, there was no association with diet and AMI. However, there were associations identified in certain subgroups with respect to diet and AMI. Predictors of AMI overall were ischemic heart disease, previous heart attack and hypercholesterolemia. Indo-Trinidadians who exercised less than 4 times per week and males who ate less than 3 servings per week had an increased likelihood of having an MI (1.908 times and twice as likely respectively) to have an AMI. Conclusion: Overall, there is no association of diet and AMI. Traditional risk factors still largely determine AMI.

Keywords: AMI, Diet, Risks Factors, Sugar, Vegetables, Fats and Oil

Introduction

Traditional risks factors such as diabetes mellitus, hypertension, hypercholesterolemia, obesity, smoking, family history of IHD have contributed significantly to coronary artery disease (CAD). These have been widely and consistently reported. Dietary impact on CAD, however, resulted in inconsistent results over the decades

(Dehghan et al., 2017; Ahmad et al., 2018; Fung et al., 2009; American College of Cardiology, 2015). The widely accepted Mediterranean diet study and the diet recommended by the PURE study reports contrasting opinions on high fat diets. PURE study (Dehghan et al., 2017) reports no significant association between total fat, saturated and unsaturated fats with risk of myocardial infarction or cardiovascular disease (CVD) mortality, whereas the American Heart Association reports that, a reduction in dietary saturated fat, which is replaced by polyunsaturated and monounsaturated fats is significantly associated with lower CVD rates and mortality (Sacks et al., 2017).

Uncertainty remains as to what is the best diet for prevention of CAD, though a diet that is low in sugar and fat and high in vegetables and fruits is commonly accepted. Limitations of methodology or in obtaining an acceptable measure for diet to reflect the impact on atherosclerosis are extremely challenging. Few studies in the Caribbean have been attempted to determine the association and predictors of dietary components and CAD. CAD in the Caribbean and Latin America is expected to increase by more than 60% between 2000 and 2020, if preventative measures are not implemented (Barcelo, 2006). The aim of this study was to determine traditional and dietary risk factors for acute myocardial infarction (AMI) among patients in public health care institutions in Trinidad using a case – control type study design. A study of this type will assist in the management of ischemic heart disease patients. It will identify the gaps in dietary care and will guide health care providers and policy makers in refocusing their strategies to our local Trinidad and Tobago population.

Methods

This case-control study was conducted among AMI and controls at the San Fernando General Hospital (SFGH). The San Fernando General Hospital is one of the four hospitals providing tertiary care in Trinidad and Tobago. It is a public, 745-bed facility that serves half the population of Trinidad or approximately 600000 people. Annually, there are 46 785 admissions including 15 339 medical admissions (2010) (Ministry of Health, 2012). The incidence of AMI is 90.6 per 100 000 (Bahall, 2013). AMI cases were matched by age and gender with controls (non-CAD) recruited from a sample of 600 non-CAD patients in at least a ratio of 1:1. Suspected cases of AMI were obtained by checking the admission discharge registration books of the cardiac/medical wards. Confirmed AMI cases identified using the AMI criteria (Zimmerman et al., 1999) were approached by a research assistant and given a brief description of the study and asked whether they were willing to participate. The controls were selected from relatively healthy individuals with minor ailments and conditions who were admitted to any ward of the hospital; the majority coming from the medical wards. Consenting patients were recruited for the study in either the AMI or control group if the inclusion and exclusion criteria were met (Figure 1).

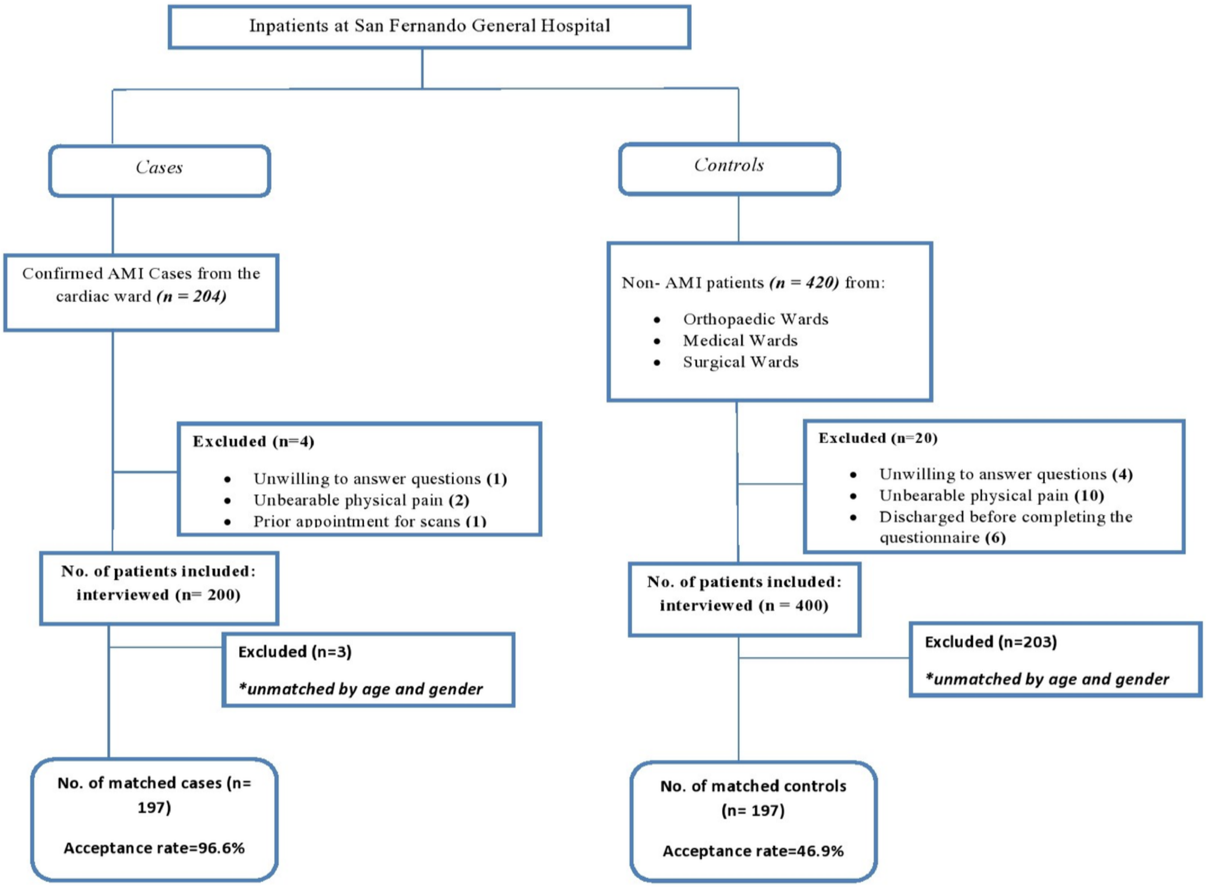

Figure 1. Selection of cases and controls

In keeping with the criteria of Rastogi et al. (2004) inclusion criteria consisted of adults aged over 21 years, who gave their consent and were able to communicate for at least 20 minutes. Patients were excluded if they were unable to communicate due to unbearable physical pain, being discharged before they could complete the questionnaire and whether they suffered from illnesses such as cancer, end stage renal disease, a recent viral infection, liver failure or any condition that would have impacted on their dietary intake. Following consent, face to face interviews was conducted on recruited cases using an 88-item questionnaire comprising of demographic data on age, sex, ethnicity, marital status, employment status, monthly income level, height, weight, waist circumference/ hip circumference, (9 questions); past medical history on ischemic heart disease, previous heart attack, diabetes mellitus, hypertension, renal insufficiency, family history of heart disease, hypercholesterolemia, smoking, alcohol and obesity(10 questions); lifestyle practices on exercise, alcohol, smoking, vitamins and alternative medicines (15 questions); dietary practices on fruits and vegetables, fats and oils, starch and carbohydrates, and sugars and salts, consumption of sugary foods, processed meats, added salts, seasoning, water, snacks, drinks, fruits, vegetables, fats/oils and dairy products (24 questions); eating habits and the frequency of consumption of snacks, drinks, fruits, vegetables, fats/oils and dairy products (16 questions). Mini demonstrations in the form of illustrations were used to show patients portions so they can be aware of the amount they eat, as well as to standardise different patient responses. Patients were asked specific questions and disclosed their dietary intake before admission to hospital. This included the type and frequency of food intake and in some cases, their content. Certain data were obtained from patient records such as weight, height and waist circumference and if unavailable, was done by the research assistant.

Data and Statistical analysis

Data was collected and entered in a secured database using SPSS version 21 which was accessible to the researchers and assistants. Descriptive and analytic analyses were made. Controls were compared with AMI cases using t tests for continuous variables, and chi squared tests for categorical variables. The Pearson's chi square test was used to determine the existence of associations between risk factors and group status (MI/ Control). The chi square test of homogeneity was used to determine if differences existed between MI and control subjects on selected demographic variables. Logistic regression was used to determine the likelihood of MI based on significant risk factors determined by the Chi squared test.

Results

Section A

By the end of the data collection period, 197 confirmed AMI were selected, and 197 controls (acceptance rate – 96.6% and 46.9% respectfully).

Table 1: Demographic data of respondents

Variable	Cases (AMI)	Control(non-AMI)	p-value
Age	n=197	n=197	1.0
21-30	3 (1.5%)	3 (1.5%)	
31-40	13 (6.6%)	13 (6.6%)	
41-50	35 (17.8%)	35 (17.8%)	
51-60	44 (22.3%)	44 (22.3%)	
Over 60 years	102 (51.8%)	102 (51.8%)	
	n=197	n=197	
Sex			1.0
Male	118 (59.9%)	118 (59.9%)	
Female	79 (40.1%)	79 (40.1%)	
	n=197	n=196	
Ethnicity			0.101
African	16 (8.1%)	31(15.7%)	
Indian	163 (82.7%)	146 (74.1%)	
Mixed	18 (9.1%)	17(8.6%)	
Other	0 (0.0%)	2 (1.0%)	
	n=194	n=196	
Marital status			.002**
Single	24 (12.2%)	54 (27.4%)	
Married	115 (58.4%)	99 (50.3%)	
Divorced/Separated	7 (3.6%)	12 (6.1%)	
Common Law	14 (7.1%)	6 (3.0%)	
Widowed	33 (16.8%)	25 (12.6%)	
Other	1 (0.5%)	0 (0.0%)	
	n=192	n=191	
Employment Status			0.473
Employed	53 (26.9%)	63(32.0%)	
Unemployed	125(63.4%)	113(57.4%)	
Self-employed	14 (7.1%)	15(7.6%)	
	n=190	n=130	
Monthly Income Level			0.154
Under TT$ 2,660.00	51 (25.8%)	43(21.9%)	
TT$ 3,000.00- $5,000.00	101(51.2%)	58(29.4%	
TT$ 5,500.00-$8,000.00	20 (10.2%)	8 (4.1%)	
TT$ 8,500.00 - $10,000.00	10 (5.1%)	12 (6.1%)	
Over TT$10,000.00	8 (4.1%)	9 (4.6%)	

*Significant at alpha = 0.05 ** Significant at alpha = 0.01

There were no significant differences between cases and controls by sex, age, ethnicity, and employment status or monthly income level. Respondents were primarily males (AMI: 59.9%; non-AMI: 59.9%; overall: 59.9%), Indo-Trinidadians (AMI: 82.7%; non-AMI: 74.1%; overall: 78.4%) and were aged >60 years (AMI: 51.8%; non-AMI: 51.8%; overall: 51.8%) (Table 1).

Diet and AMI

About 40.9% ate fruits and 56.1% ate vegetables more than 3 to 4 times per week. No associations were found between the frequencies of eating fruits (X^2 = 4.196, p = 0.241), vegetables (X^2 = 4.082, p = 0.395), using fat/oil when cooking at home (X^2 = 0.635, p = 0.888) and frequency of eating fried foods away from home (X^2 = 3.726, p = 0.293). However, the only significant association was found between frequency of eating food that is fried at home and group status (X^2 = 15.867, p < 0.01). Sugar consumption was similar for both MI and Control group participants with no significant difference. However, the usage of sugar was higher in the control group. This is seen for added sugar (for control group, mean = 1.10 tsp/day compared to 0.90 tsp/day among cases) and soft drink/ artificially flavored drinks (control group, mean = 0.90 days/week compared to 0.68 days/week among cases). Significant differences were noted in the consumption of soft drink/ artificially flavored drinks (p= 0.030) in favor of the control group. No significant difference was found in the frequency in consumption of sugar coated breakfast cereals (p = 0.117) or consumption of cakes, sweets, chocolates, biscuits (p = 0.172).

Traditional risk factors

Table 2: Comparison of risk factors for MI and control groups

Risk factor	MI	Control	p-value	OR (95% CI)
Ischemic heart disease (n = 60)	57 (28.9%)	3 (1.6%)	0.000	25.786 (7.913, 84.028)
Previous heart attack (n = 112)	85 (43.4%)	27(13.8%)	0.000	4.765 (2.905, 7.816)
Diabetes Mellitus (n = 171)	107 (54.3%)	64 (33.0%)	.000	2.415 (1.603, 3.639)
Hypertension (n = 194)	117 (59.7%)	77(39.7%)	.000	2.250 (1.501, 3.375)
Renal Insufficiency (n = 45)	28 (14.4%)	17(8.9%)	.098	1.706 (0.901, 3.233)
Family history of heart disease (n = 189)	118 (59.9%)	71(36.4%)	.000	2.609 (1.735, 3.922)
Hypercholesterolemia (n = 128)	93(47.7%)	35(18.2%)	0.000	4.090 (2.577, 6.490)
Smoking (n = 89)	42(21.3%)	47(24.1%)	.511	0.853 (0.532, 1.370)
Alcohol (n = 116)	55(27.9%)	61(31.3%)	.466	0.851 (0.551, 1.313)
Obesity (n = 56)	20 (10.3%)	36(18.6%)	0.021	0.504 (0.280, 0.908)

Note: Percentages calculated based on sample size for MI and Control.

Significant differences between MI and control subjects exist for ischemic heart disease, previous heart attack, diabetes mellitus, hypertension, family history of heart disease, hypercholesterolemia and obesity but not smoking and alcohol consumption (Table 2).

Table 3: Comparison of weight, waist circumference and hip circumference for MI and control samples

	MI			Control			t	p-value
Weight (lbs)	Mean = 169.65	SD = 41.030	n = 157	Mean = 159.30	SD = 35.059	n = 180	2.497	0.098
Waist circumference (inches)	Mean = 36.16	SD = 4.934	n = 174	Mean = 35.21	SD = 4.405	n = 173	1.874	0.004
Hip circumference (inches)	Mean = 39.3935	SD = 13.07469	n = 153	Mean = 37.8333	SD = 5.12847	n = 162	1.408	0.060

The mean waist circumference was significantly higher among AMI cases than the control group. No significant differences were found in weight and hip circumference (Table 3). Among males who reported their waist circumference (n = 223), 83.9% were considered 'Low' and 16.1% were considered 'High'. Among females who reported their waist circumference (n = 123), 43.1% and 56.9% of respondents were considered 'Low' and 'High', respectively.

Exercising (greater than or less than 4 times a week (p = 0.000), alcohol use (hardly ever or frequently (p = 0.000) and smoking (hardly ever or frequently (p = 0.000) were significantly associated with AMI. Persons who reported that they frequently smoked were 1.170 times more likely to have an MI than persons who hardly ever or never smoked.

Section B – Sub group analysis

Table 4: Significant associations based on demographic and lifestyle factors

Demographic group	Lifestyle factor	MI	Control	X^2	p-value
Males	*Vegetable consumption (n = 221)*			5.688	0.017*
	Less than 3	64	79		
	More than 3	48	30		
Females	*Consumption of fried foods at home (n = 81)*			4.307	0.038*
	Less than 4	31	47		
	More than 4	3	0		
Females	*Alcohol consumption (n =155)*			4.053	0.044*
	Hardly ever/never	77	74		
	Frequently	0	4		
More than 50 years old age group	*Consumption of fried foods at home (n = 179)*			10.600	0.001**
	Less than 4	71	100		
	More than 4	8	0		
Indo-Trinidadian	*Exercise (n = 307)*			6.364	0.012*
	Less than 4	108	114		
	More than 4	55	30		
Indo-Trinidadian	*Fruit consumption (n = 308)*			4.764	0.029*
	Less than 3	88	96		
	More than 3	75	49		

Afro-Trinidadian	*Fruit consumption (n =47)*			7.855	0.005**
	Less than 3	14	14		
	More than 3	2	17		

Subgroup analysis identified associations between lifestyle factors and CAD (Table 4). Among males, a significant association was found between vegetable consumption and group status (n = 221, X^2 = 5.688, p = 0.017). Among females, there was a significant association between eating fried foods at home and group status (n = 81, X^2 = 4.307, p = 0.038), and between alcohol consumption and group status (n = 155, X^2 = 4.053, p = 0.044). Among Indo-Trinidadians, significant associations were found between exercise and group status (n = 307, X^2 = 6.364, p = 0.012); and fruit consumption and group status (n = 308, X^2 = 4.764, p = 0.029). Among Afro-Trinidadians, a significant association was found between fruit consumption and group status (n = 47, X^2 = 7.855, p = 0.005). Among persons more than 50 years of age, a significant association was found between fat consumption and group status (n = 179, X^2 =10.600, p = 0.001) (Table 4).

Section C – Predictors of AMI

Table 5: Result of logistic regression for traditional risk factors

Risk factor	**B**	**S.E**	**Wald**	**p-value**	**Exp (B) (95% CI)**
Ischemic heart disease	2.650	.652	16.527	.000	14.150 (3.944, 50.767)
Previous heart attack	1.163	.311	14.021	.000	3.199 (1.741, 5.880)
Diabetes Mellitus	.184	.275	.449	.503	1.202 (.701, 2.062)
Hypertension	.101	.276	.133	.715	1.106 (.644, 1.899)
Family history of heart disease	1.133	.253	20.084	.000	3.105 (1.892, 5.097)
Hypercholesterolemia	1.020	.286	20.084	.000	2.773 (1.583, 4.858)
Obesity	-.931	.385	5.839	.016	.394 (.185, .839)

Logistic regression was used to determine the likelihood of AMI. Factors which were found to be significantly associated with AMI were IHD, previous heart attack, family history of heart disease, hypercholesterolemia and obesity (Table 5).The regression model for traditional risk factors was statistically significant while the regression model for dietary factors was not statistically significant.

The results for traditional risk factors are reported in Table 5. The regression model used explained 32.6% of the variance in MI (Nagelkerke R^2 = .326) and correctly classified 71.5% of cases. Ischemic heart disease, previous heart attack, family history of heart disease, hypercholesterolemia and obesity increased the likelihood of AMI by 14.150, 3.199, 3.105, 2.773 and 0.394 respectfully. However, diabetes mellitus and hypertension were not found to significantly affect the likelihood of MI (Table 5).

Table 6: Lifestyle among sub-groups

Demographic group	**Lifestyle factor**	**B**	**S.E**	**Wald**	**p-value**	**Exp (B)**
Males	Vegetable consumption	0.681	0.287	5.618	0.018	1.975 (0.381, 1.448)
Indo-Trinidadians	Exercise	0.660	0.264	6.267	0.012	1.935 (1.154, 3.245)

Subgroup analysis, revealed otherwise. Indo-Trinidadians who exercised less than 4 times per week had an increased likelihood of having an MI (1.908 times) than those who exercised more than 4 times per week). Males who consume less than 3 servings per week were nearly twice as likely to have an AMI (Table 6).

Discussion

This study reveals significant associations with traditional risk factors and lifestyles factors in selected subgroups, and AMI. Traditional risk factors for CAD remain as consistent risks for CAD. The odds of developing an AMI were higher among IHD patients, previous AMI, hypercholesterolemia, followed by diabetes and hypertension. This is in keeping with other studies (V. Rao, P. Rao, Carvalho, 2014; Saleheen & Frossard, 2004). Waist circumference was significantly higher among the AMI group than in the control group as was found in other studies (Siddiqui, Gulati, Tauheed , Pervez, 2014). However, there was no statistical difference with respect to weight although the mean weight was higher in the AMI group. While obesity is a known risk factor, it has also been identified as having a protective effect, often referred to as "obesity paradox" in other studies (Wang, M. Yang, Zhu, Zhang, Shao, 2014; Bechlioulis et al., 2013).

AMI patients compared to non-AMI patients or the control group gave varying results compared to other studies with respect to lifestyles. There was no difference in the frequency of smoking, exercising and alcohol usage for both groups. This contrasts with the findings of Teo et al. (2006) who found the prevalence of smoking to be 45.2% (AMI cases) and 26.8% (controls) and daily exercise was 14.3% (AMI cases) and 19.3% (controls). Smoking, excess alcohol and sedentary lifestyle leads to increased risk of CAD (American Heart Association, 2018). The lack of difference may imply the overall similarity in lifestyle between groups or under-reporting of lifestyles practices in AMI patients.

Diet: fruits and vegetables

Fruits and vegetables un-expectantly had no association unlike other studies (Guo et al., 2013). This may be related to the lack of use of significant amounts of fruits and vegetables required to make this change. The study reveals 42.6% of MI patients and 39.1% of controls report consuming fruits greater than 3 times per week. Regular or daily consumption of fruit is necessary to make meaningful changes to CAD (Saita, Kondo, Momiyama, 2014). In general fruits and vegetables are associated with a lower risk of AMI (Iqbal et al., 2008). The lack of consistency in this finding in all subgroups reflects other confounding factors or limitations resulting from this methodology. This contrasts with studies done by Dauchet, Amouyel, Hercberg and Dallongeville (2006) which reveal that the consumption of fruits and vegetables is inversely associated with the risk of CHD. In their study, it was observed that the risk of CHD decreased by 4% [RR (95% Cl): 0.96 (0.93-0.99), P= 0.0001] for each additional portion per day of fruit and vegetable intake and by 7% [0.93 (0.89-0.96), P<0.0001] for fruit intake. Liu et al. (2000) also found that higher fruit and vegetable intake was associated with a lower risk of MI, with an adjusted RR of 0.62 for extreme quintiles (95% Cl: 0.37, 1.04; P for trend = 0/07). In this study, vegetable servings of less than 3/week is associated with an increased prevalence of AMI (OR: 1.975). Vegetables are helpful in protecting patients from coronary disease. (Liu et al., 2000). Several studies alluded to the decreased prevalence among vegetable users. In a study by Joshipura et al., (2001) it was found that each 1-serving/d increase in the intake of fruits or vegetables was associated with a 4% lower risk for coronary heart disease (relative risk, 0.96 [Cl, 0.94 to 0.99]; P =0.01, test for trend). Green leafy vegetables (relative risk with 1-serving/d increase, 0.77 [Cl, 0.64 to 0.93]), and vitamin C-rich fruits and vegetables (relative risk with 1-serving/d increase, 0.94 [Cl, 0.88 to 0.99]) had the highest contribution to the apparent protective effect of total fruit and vegetable intake. Bazzano et al., (2002) concluded that there was an inverse association of fruit and vegetable intake with the risk of cardiovascular disease in the US population. The study found that consuming fruit and vegetables >3 times/d was associated with a 27% lower stroke incidence, a 24% lower ischemic heart disease mortality, a 27% lower cardiovascular disease mortality and a 15% lower all-cause mortality after adjustment for established cardiovascular disease risk factors. The protective effect may result from a number of mechanisms such as anti-inflammatory benefits (Johnston, 2009). The blood pressure-lowering effect of potassium is a major mechanism which may contribute to a reduction in CHD risk with an increased fruit and vegetable consumption, because they are rich sources of potassium (He, Nowson, Lucas, MacGregor, 2007; Appel et al., 1997). Fruits and vegetables contain high levels of folate which is a determinant of plasma homocysteine level and many studies link high plasma homocysteine levels with CHD risk. Folate lowers plasma homocysteine levels and may reduce the risk of CHD (Wald, Law, Morris, 2002).

Diet: Sugars

There are no significant differences in usage between MI and control groups, although the mean use of sugars was higher in the control group. One study showed that MI patients consumed a slightly higher intake of sugar in their hot drinks, and had a slightly higher consumption of refined sugars overall in comparison to control patients. However, the differences seen were not statically significant (Burns-Coxt, Dollt, Ball, 1969). The lack of significant differences in the use of sugars may reflect the population eating habits are the same. The average daily requirement for sugar according to the ACC is 150 calories per day (37.5 grams or 9 teaspoons) for men and 100 calories per day (25 grams or 6 teaspoons) for women (Heart.org, 2018). Sugars are being recognised as independent risk factors for inflammation and CAD development (Q. Yang et al., 2014). Sugars are commonly used as added sugars, sugar coated breakfast, artificially flavoured drinks, chocolate biscuits etc. However, Rippe and Angelopoulos (2016) concluded that singling out added sugars as unique culprits for diseases like cardiovascular disease appears inconsistent with modern evidence. While added sugars should be consumed in moderation, the reduction in diet without other reductions of caloric sources wouldn't yield any significant benefit. However, a number of studies have identified sugar as a major cardiovascular risk, where a significant relationship has been identified between sugar consumption and increasing CVD mortality risk (Q. Yang et al., 2014; Yudkin, 1986). Trinidad and Tobago's sugar consumption per capita reached 51.6 kg in 2013 (HelgiLibrary, n.d. -a). Chocolate, carbonated, drinks, candy, cakes, ice cream, snow cones, and traditional sweets like sugar cake, barfi, kurma etc. are some examples of sugars consumed on a regular basis. Trinidad and Tobago was found to have the highest average consumption of sugar sweetened beverages (SSBs) at 2.5 servings/day (95%UI: 1.5, 4.0) across 187 countries (Singh et al., 2015). Trinidad and Tobago's centrifugal sugar human domestic consumption in 1990 was 62 (1000MT) and in 2017, it increased to 75 (1000MT) (Indexmundi, n.d.). The contribution of carbohydrates in total dietary consumption for Trinidad and Tobago from 1990-2002 was 66% and from 2015-2007, it was 65% (ChartsBin, n.d. -a).

Diet: fat

There were no significant differences in terms of cooking with oil and eating fried food at home or outside the home. No differences were found in use of fats and oil except the use of fried food which is more common among the AMI group. There is a greater association with the use of fried food consumption at home in the AMI group. There is however, no association with fat use and AMI. The recent PURE study found no association and this emphasis on reducing fat to reduce AMI may not be appropriate (Dehghan et al., 2017). The PURE study reports that total fat and types of fat were not associated with cardiovascular disease, myocardial infarction, or cardiovascular disease mortality (Dehghan et al., 2017). Similarly, another study suggested that the association between saturated fat intake and non-fatal myocardial infarction may be non-existent among women (Kim, 2016). This contrast with other findings, where Zong et al., (2016) found that increased dietary intakes of major saturated fatty acids does have an association with an increased risk of CHD. One study found an association between consuming hydrogenated fats and full-fat yoghurt with a higher risk (OR = 2.12 (1.23-3.64) and 2.35 (1.32-4.18), respectively (Amani, Noorizadeh, Rahmanian, Afzali, Haghighizadeh, 2010). Trinidad and Tobago's dietary fat consumption was 70g/person/day between 1990-1992, 71g/person/day between 1995-1997, 75g/person/day between 2000-2002 and 76g/person/day between 2005-2007 (ChartsBin , n.d. -b). Total animal fat consumption reached 5.07 kilotons in 2013 in Trinidad and Tobago (HelgiLibrary, n.d. -b). WHO recommends that total fat shouldn't exceed 30% of total energy, (World Health Organization, n.d.) which means that Trinidad and Tobago's fat intake lies at the upper end of WHO recommendations.

Limitations

This is a single centre study with a catchment that is relatively poor and predominantly Indo - Trinidadian. Extrapolation may not be reasonable in developed countries. There is difficulty in documenting data because of recall problems and reproducible responses. Patients' rely on recall of their dietary practices and consumption patterns over the last 3 months can be very challenging. Disclosure of frequency may be a challenge because of wide variation in doses. To avoid changes in quantity, patients were demonstrated the size of various portions so they can be aware of the amount they eat as well as to standardise different patient responses.

The methodology for diet is challenging because diet taken at the time of study, is a snapshot of an individual's overall diet at that point in time, which doesn't fully reflect their food consumption pattern over years whose cumulative impact determines the extent of CAD and the development of AMI.

Conclusion

Traditional risk factors are still the most reliable associations and predictors of CAD. Dietary factors though important has produced inconsistent results as was found in the literature. No associations were found with vegetables and fruits, added sugar and fatty food products. However subgroup analysis identified males and vegetable consumption; females and fat; females and alcohol consumption; more than 50 years of age and fat consumption; Indo-Trinidadian and exercise; Indo-Trinidadian and fruit consumption and Afro-Trinidadian and fruit consumption as associated factors. However, predictors of AMI were males who consumed less than 3 servings of vegetables and Indo-Trinidadians who exercised less than 4 times per week. More novel markers are needed to identify cumulative use of different types of diet to determine the contribution to CAD.

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