Inter-relationship of various factors and risk of Coronary Heart Disease in young adults

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Abstract
Background: Urbanization is on the increase and responsible for many of changes in lifestyle- smoking, a western style diet (high in saturated fat, salt, calories and low fibers) and physical inactivity resulting in obesity[1-3]. More than two thirds of deaths caused by acute myocardial infarction occurred in the age group from 30-35 years[1-3]. Sudden cardiac death was reported in a first-degree relative in 4.5% of decedents[1-3]. Aim of this study is to evaluate the CHD risk profile by diet and anthropometry and to correlate the Five Food Groups with the CHD risk factors. **Methods:** In this study height, weight, body mass index, waist-hip ratio and blood pressure were measured in 30 male and 30 female volunteers. Dietary evaluation was done through a frequency questionnaire called as 'Eating Smart Assessment'. Assessment of Heart Disease risk was done with RISKO Scale[4]. Pearson Correlation was used to calculate 't' and P values. $P < 0.05$ indicates a significant difference. **Results**: The study showed significant correlation between various food groups and risk factors of CHD (BMI, Systolic BP) in the study age group. **Conclusion:** So in this study attempt is made to find out whether risk factors for Coronary Heart Disease are silently affecting our younger generation due to unhealthy life style and are these factors modifiable in any way to prevent risk of heart diseases plus prolonging the life expectancy.
Key words: Coronary Heart Diseases, RISKO Scale, Eating Smart Assessment, Five Food Groups.

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INTRODUCTION

Coronary Heart Diseases (CHD) are accounted for 1/4th of all deaths in India in 2008[5]. CHDs are expected to be the fastest growing chronic illnesses between 2005 and 2015, growing at 9.2% annually.[5] A worrying fact is the CHD incidence has gone up significantly for people between the ages 25 and 69 to 24.8%. With India's Economic growth and urbanization over the past decades, large population has moved towards unhealthy lifestyles with decreased physical activity, increased stress levels and intake of saturated fats and tobacco[3]. Also there are increasing co-morbidities – diabetes, hypertension, dyslipidaemia and obesity. India is not just the diabetes capital of the world with more than 50 million patients, it also has the highest prevalence of metabolic syndrome and obesity - 20 million Indians are obese today with 70 million projected by 2025; 20% of Indians suffer from hypertension[5].

MATERIALS AND METHODS

This is a cross sectional study conducted among apparently normal and healthy 30 female and 30 male students of age 18-22 years from a medical college.

Exclusion criteria

1. Known case of congenital heart disease.
2. H/o diseases affecting weight and appetite e.g. thyroid disorders, Cushing's disease.
3. H/o medications affecting weight and appetite e.g. Steroids, Antidepressants.

Study procedure

Proper informed written consent of the volunteers was taken. Thorough personal and family history taking was collected. Anthropometric measurements- Height, Weight, Waist girth and Hip girth were taken. Blood pressure (in lying down after 15 minutes rest) was

measured with Standard Sphygmomanometer. Body Mass Index was calculated using Quetlet's Index i.e.
Body mass index = weight (kg) / [height (m)] ^{2}
Waist to Hip Ratio (waist girth : hip girth) was calculated. Dietary evaluation – was done with a frequency questionnaire called as 'Eating Smart Assessment'. Assessment of Heart Disease risk was done with RISKO Scale.

Five food groups
- **I** – Cereals and Grains
- **II** – Pulses and Legumes
- **III** – Milk and Meat
- **IV** – Fruits and Vegetables
- **V** – Fat and Sugars

Eating smart score
- 0 to 12 – A warning signal, diet is too high in fat and low in fiber-rich foods.
- 13 to 17 – Not bad, still you can improve.
- 18 to 36 – Eating smartly, limited fats and varied foods. Keep it up.

RISKO score
- 6 to 11 – Risk well below average
- 12 to 17 – Risk below average
- 18 to 24 – Average risk
- 25 to 31 – Moderate risk
- 32 to 40 – High risk
- 41 to 62 – Very high risk

STATISTICAL ANALYSIS
Mean, standard deviation and standard error of mean were calculated for each factor. Coefficient of correlation was calculated using Pearson Correlation. 'P' value <0.05 is significant and <0.01 is highly significant.

Table 1: Distribution of various factors

Factor	Male		Female	
	Mean ± SD	SE of Mean	Mean ± SD	SE of Mean
Height	170.5 ± 5.77	1.05	161.6 ± 7.94	1.45
Weight	62.9 ± 8.33	1.52	51.7 ± 8.62	1.57
BMI	21.6 ± 2.48	0.45	19.9 ± 3.61	0.65
WHR	0.8 ± 0.04	0.01	0.8 ± 0.06	0.01
SBP	114.7 ± 4.88	0.89	110.0 ± 7.04	1.28
DBP	77.6 ± 5.49	1.00	72.9 ± 7.99	1.45

Table 2: Coefficient of Correlation (Pearson Correlation) of various factors including RISKO score with food groups in male participants

FOOD GROUP	RISKO	BMI	WHR	SBP	DBP
I	0.120	-0.111	-0.035	0.069	-0.278
II	0.300	0.118	0.263	-0.167	-0.288
III	**0.379**[*]	-0.010	0.054	-0.143	-0.072
IV	-0.038	**-0.476**[**]	-0.034	-0.075	-0.023
V	**0.734**[**]	0.282	0.271	-0.268	-0.304

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 3: Coefficient of Correlation (Pearson Correlation) of various factors including RISKO score with food groups in female participants
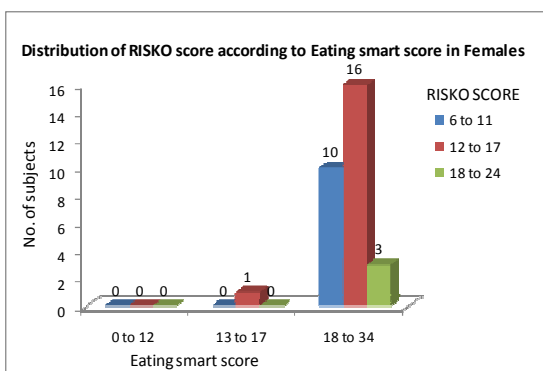
FOOD GROUP	RISKO	BMI	WHR	SBP	DBP
I	-0.201	-0.189	0.099	-0.125	0.138
II	-0.066	-0.325	0.106	-0.003	-0.003
III	-0.245	0.300	-0.004	0.100	0.163
IV	-0.050	-0.058	-0.158	-0.220	-0.183
V	**0.684**[**]	**0.423**[*]	0.231	-0.143	-0.238

**. Correlation is significant at the 0.01 level (2-tailed).
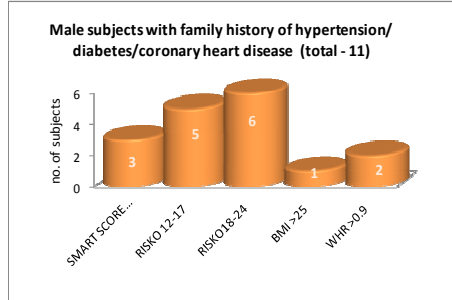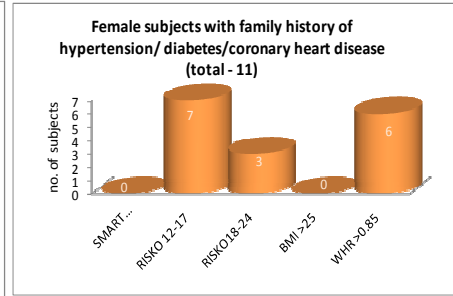*. Correlation is significant at the 0.05 level (2-tailed).
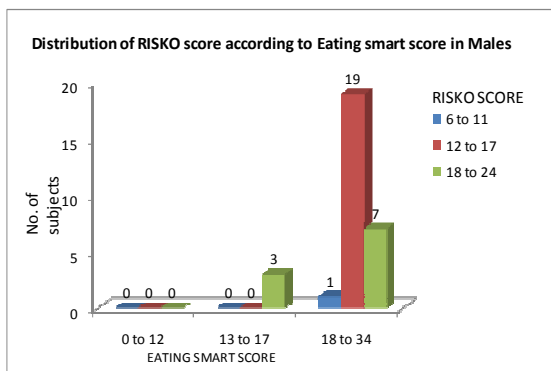
Graph 1

Graph 2

Graph 3

Graph 4

RESULT

As shown in Table 2 & 3, statistically significant correlation was found in;Food group V and BMI in females ('P'<0.05), Food group IV and BMI in males ('P'<0.01) as well as Food group III and SBP in subjects with positive family H/o CHD/Hypertension/Diabetes ('P'<0.05). Assessment of CHD risk (RISKO) scores showed: (Graph I and II); 10% female and 33% male were having Average risk of CHD while 56% female and 65% male were having Risk below average. Maximum subjects (96% female and 90% male) are eating smartly (Eating smart score 18-34).

CONCLUSION

The present study shows significant correlation between diet and various risk factors of CHD in the study age group

LIMITATION

More specific test like Sr. Cholesterol and ECG could have been implemented.

DISCUSSION

Many of risk factors of Coronary Heart Disease are modifiable, what is needed is self consciousness about we being on boundary of unhealthy lifestyle. A study done in Delhi and Bangalore observed a significant and dose-dependent inverse association between vegetable intake and IHD risk. Persons consuming a median of 3.5 servings/wk of green leafy vegetables had a 67% lower relative risk than did those consuming 0.5 servings/wk. Cereal intake was also associated with a lower risk. Use of mustard oil, which is rich in -linolenic acid, was associated with a lower risk than was use of sunflower oil[7]. Unless we actually show somebody his risk score, he assumes himself to be far away from risk of Coronary Heart Disease. This is actually what we found in our study. Heart smart diet is one that incorporates plenty of fruits, vegetables and whole grains that helps in reducing the risk of coronary heart disease, high cholesterol and other complications associated with excess consumption of fatty or overly processed foods (www.heartsmartdiet.com/pubmed/articlereview.html).

All these food constituents have proven benefits in reducing risk of heart disease as follows

	Food Factor		Protection against CHD
1.	**Soluble fiber**(apples and other fruits, soy, legumes, oats)	a. b. c.	Lower blood cholesterol in hypercholestrolemia Lower risk of heart attack Improves LDL:HDL ratio
2.	Omega 3 fatty acids (**flax seeds**, salmon fish, sea foods, algal oils)	a. b. c.	Production of anti-inflammatory cytokines Limit clot formation and platelet aggregation Lower serum cholesterol and triglycerides
3.	Folate, Vitamin B_6, Vitamin B_{12}	a.	Reduce **Homocysteine**
4.	Vitamin E (vegetable oil, some nuts, **wheat germ**)	a. b. c.	Anti-oxidant - Limit lipid peroxidation Limit LDL oxidation Slow progression of plaque formation
5.	**Soy (protein and isoflavone)**	a. b. c.	Lower LDL cholesterol Raises HDL cholesterol Improves LDL:HDL ratio
6.	Alcohol (in moderation)	a. b.	Raises HDL cholesterol Prevent clot formation

FUTURE PERSPECTIVES

This kind of data collection has many perspective so as; For giving advice about dietary, lifestyle and physical activity modifications. Prospective study- further follow-up of same study population can be done. It is a simple way to keep records of subjects having positive family H/o CHD/Hypertension/Diabetes. Also we can additionally implement specific test like Sr. Cholesterol and ECG.

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