



Estimation of Coronary Heart Disease Risk in Indian Hypertensive Patients Using Framingham Predictive Score Sheets

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Background of Study

The incidence of coronary artery disease in India is increasing among urban Indians; estimated to be 9.65% in 1995¹. Cardiovascular deaths in India will be 2.5 million by 2020 and will be the leading cause of death in India^{1,2}. Hypertension is emerging as a major health problem and is more common in urban Indians. Risk factors for young MI in India include smoking (74%), hypertension (18.8%), obesity (18%), hypercholesterolemia (18%), diabetes mellitus (16.4%), and family history (13.4%).³ Framingham coronary prediction algorithm provides estimates of total coronary artery disease risk over a course of 10 years. Separate score sheets are used for men and women. Factors used to estimate risk include age, serum cholesterol, LDL, HDL, blood pressure, cigarette smoking and diabetes mellitus. Relative risk for coronary artery disease is estimated by comparison to low risk Framingham participants.

Introduction

It is well established that cardiovascular diseases have multiple determinants. In most population risk of coronary heart disease increases with age and male gender. After the age of 75yrs risk is similar in males and females. Potentially modifiable factors include hypertension, metabolic abnormality, obesity, smoking, use of alcohol, physical inactivity and control of blood sugar levels. Many developing countries are going through epidemiology transition and impact of increased burden of cardiovascular diseases, the ageing population and changing life styles also contribute to it. Men have increased risk compared to female through out life. Age adjusted risk two times of women. Bethesda conference classifies risk factor into 4. Class 1 intervention have proven to decrease incidence of coronary artery disease; Class 2 intervention likely to lower incidence of coronary artery disease; Class 3 if modified might lower incidence of coronary artery disease; Class 4 is non modifiable. Public health concerned

mainly for 1 and 2. Framingham coronary prediction algorithm provides estimates of total coronary heart disease risk over 10 years⁴. Separate score sheets are used for men and females. Factors used to estimate risk includes age, blood pressure, LDL cholesterol, HDL cholesterol, smoking, diabetes mellitus. Relative risk is estimated by comparison to low risk participants. The total risk score sums the points for each risk factor according to Framingham score and their 10-year risk for myocardial infarction and death estimated from total point as given in chart.^{4,5}

Aims of the Study

- To assess the coronary heart disease risk profile of recently detected hypertensive patients using Framingham score.
- To study any clustering of these risk factors in these hypertensive patient.

Materials and Method

Patients attending Hypertension clinic in Medical College Trivandrum, from 2015 to 2016 were taken for study.

Inclusion criteria

- Age between 20-60 years.
- Hypertensive patients of less than 3 years duration.

Exclusion criteria

- Secondary Hypertension
- Patient with Coronary Heart Disease or ECG changes
- Patient with Valvular Heart Disease
- Patient with CKD, Stroke, Vasculitis. Endocrine disorders

Study protocol

Data on socio-demographic factors and Coronary heart disease, risk behaviour's based on Framingham risk score chart were collected in a structured questionnaire. Treatment details were also collected, the total risk score were estimated and total 10-year risk for Myocardial Infarction and coronary death were estimated from points given in chart.

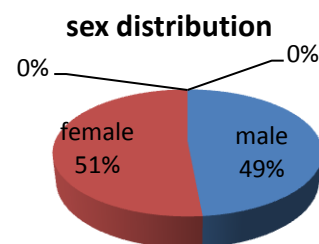
Limitation of this study

- The risk estimations were only for persons without known heart disease.
- Framingham heart study risk algorithm encompasses only coronary heart diseases.
- For some age group number of events were small so may lack precision.
- Assessments of risk factors were for 10 years and not for life time.
- Since age is a prominent determinant of the CHD, risk score is higher in older persons.
- Original study was done in Caucasians; may not fit into other populations.

Results

In this present study 101 patients, who satisfied inclusion criteria, were taken as study group. There were 52 female and 49 males.

Fig 1: sex distribution



Baseline character of study groups were compared and found that tobacco use was prevalent in 43% of male patients and alcohol abuse in 35%.

Table 1: Baseline character of study group

variables	Female n=52	Male n=49
Age(mean± sd)	43±8	45±9
Education status		
Illiterate	26	8
literate	26	41
Religion		
Hindu	86%	84%
Muslims	8%	10%
Christian	6%	6%
Tobacco use	8%	21(43%)
Alcohol abuse	0	17 (35%)

Fig 2: Baseline character of study group.

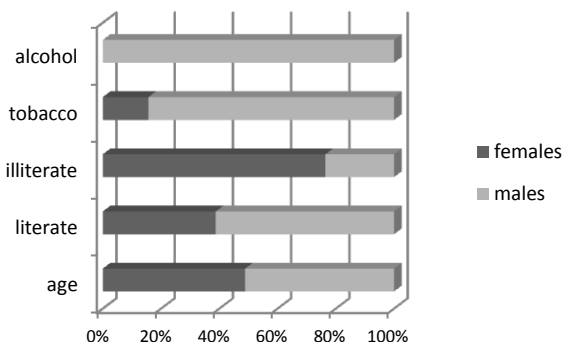


Table 2 : Dietary habits of study groups were compared

Dietary habits	Female	Male
Vegetarian	3 (6%)	3(3%)
Non vegetarian	49(94%)	46(94%)

Table 3: Dietary habits of study group

Dietary habits	female	male
Daily vegetable	19%	20%
Vegetable >3 days/week	44%	51%
Non vegetarian	37%	21%
Preference tofish	59%	48%
Preference tochicken	29%	35%
Preference toMutton	12%	9%
Preference tobeef	0%	8.5%

Only 39% patients ate vegetables daily. 94% were non-vegetarians.

Table 4: Modifiable risk factors in the study group.

Risk factor	Female n=52	Male n=49
Weight(MEAN±SD)	60±12	65±12
BMI		
<25	23(44%)	28(57%)
25-29	14(27%)	18(37%)
>30	15(29%)	3(6%)
WHR high	38(73%)	24(49%)
BP		
SBP mean	142±19	139±19
DBPmean	92±12	93±14
Pulse rate mean	83±7	84±10
RBS mean	91±19	93±18

Obesity BMI >30 was seen in 15% of females against male of 3%; high waist hip ratio (WHR) of 73% in females against male with 49%.

Table 5: Pattern of dyslipidaemia in males and females

	Male n=67	Female=80
Total cholesterol>200	41	40
LDL>130	37	36
Hdl<40	43	56
Tg>160	45	61

Dyslipidaemia, obesity and high waist hip ratio (WHR) were more common in females.

Table 6: Risk factor assessment in males and females other than hypertension

The following risk factors were assessed for clustering of CVD risk factor in study subjects.

1. Hypertension
2. Obesity
3. Smoking
4. Tobacco/ Pan
5. Eating habits
6. Alcohol
7. Dyslipidemia
8. Diabetes Mellitus
9. Post menopause

No of risk factors	females	males
0	0	4
1	4	8
2	10	35
3	17	26
4	40	20
5	21	6
6	6	0
7	2	0

86% of females have >3 risk factors against male 52%. All patients were hypertensive, so hypertension was not included in risk factors.

Fig 3: Distribution of male patients against their respective Framingham score

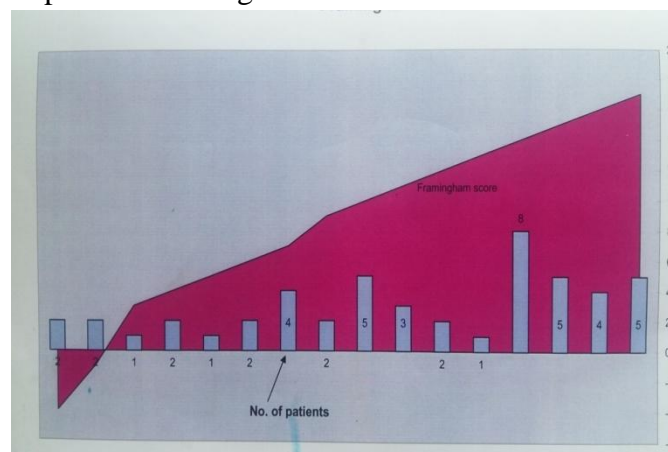
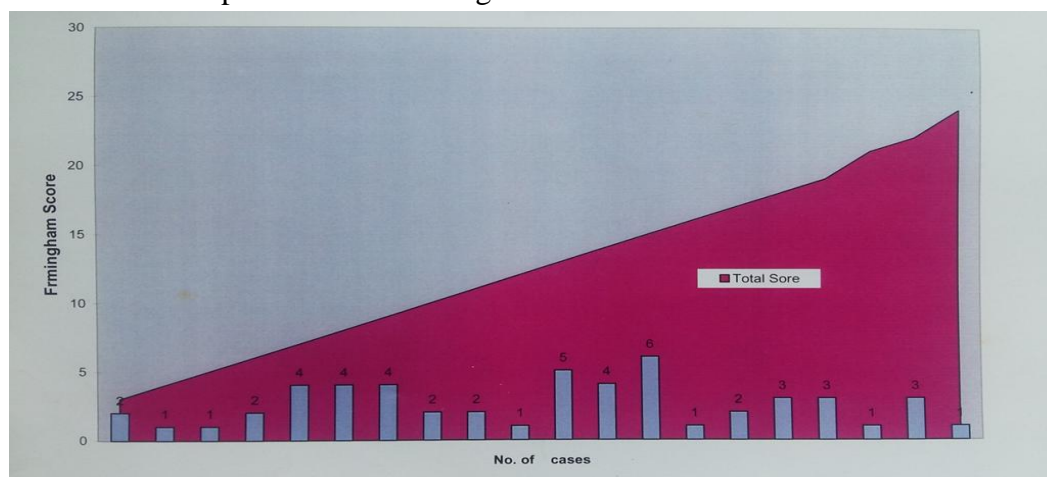


Fig 4 : Distribution of female pattern with Framingham score



Distribution of males and female against their respective Framingham score showed that 22 males had total score of >13 and only 11 females had score of 18. Estimate of 10 year risk showed

that 22 males had >15% 10-year score of developing coronary heart disease compared to 4 females with similar score.

Fig 5: Estimate of 10 year risk for development CAD in male and female

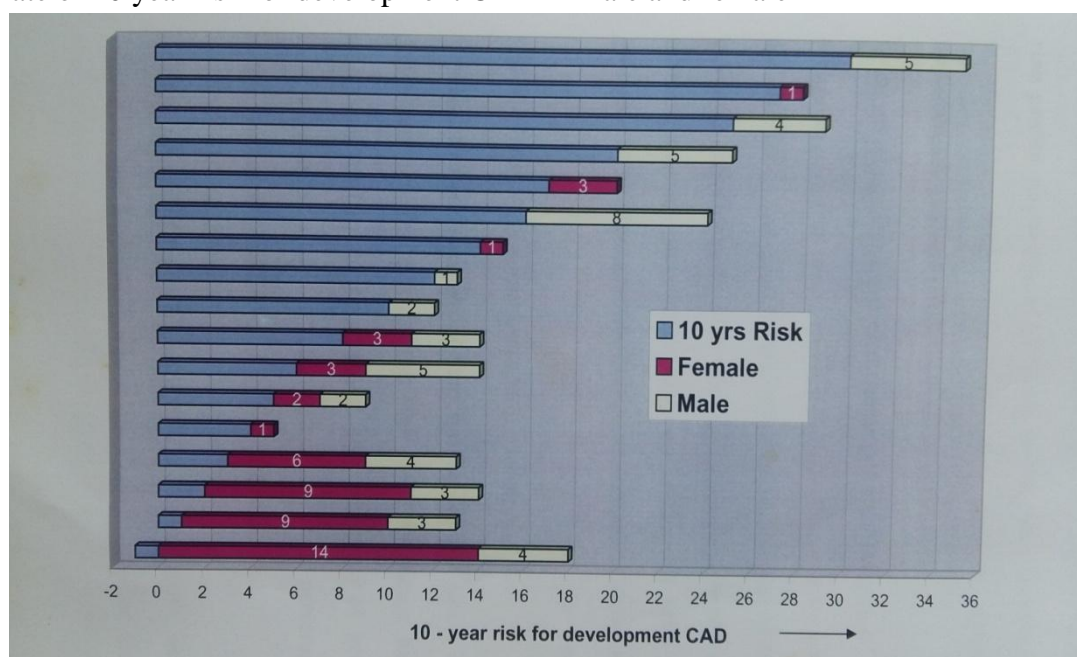
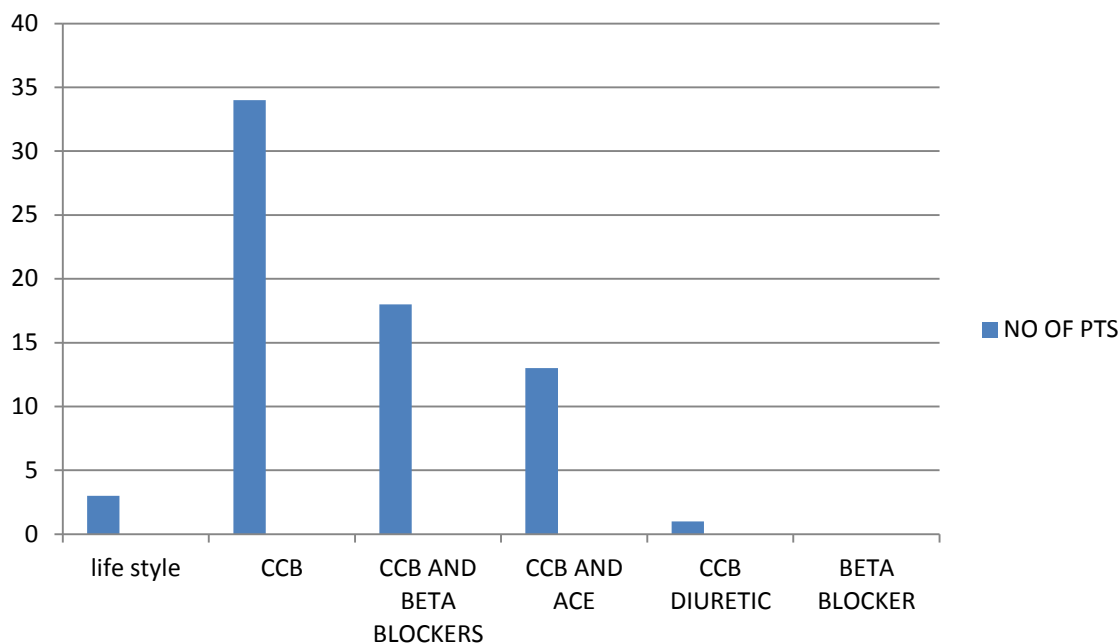


Table 7: Type of Antihypertensive treatment in study group

Treatment modality	No of patient
Life style modification	3
Calcium channel blocker(CCB)	34
CCB and Beta blockers	18
CCB andACE inhibitor	13
CCB and Diuretic	1
CCB ,Betablockers, ACE inhibitors	3
Betablockers	7
BetablockersandACEinhibitors	4
ACE inhibitors	13
ACE inhibitors and diuretic	3
others	2

Fig 6: Comparison of Antihypertensive treatment in study group

Calcium channel blocker was most commonly used anti-hypertensive treatment.

Discussion

One hundred and one patients who satisfied the inclusion criteria were studied; 51% were females. Analysis of risk factors showed that expect for tobacco and alcohol, all other variables were similar for male and female. Dietary habits were similar in both groups. Only 20% of study group took vegetables daily and only 50% took vegetables at least 3 times per week. Significant difference noted in prevalence of obesity, in females than males 29% to 6%. But abnormal WHR ratio was similar; more in females. Dyslipidaemia was noted in 80% of female and 67% of male. Pattern of dyslipidemia in female was with an increase in triglyceride and low HDL cholesterol. No specific male pattern was noted in lipid pattern. Clustering of risk factors were more in female group than in male. More than 5 risk factors were seen in 29% of female. 96% of female had more than 2 risk factors. Majority of patients were using calcium channel blockers and beta blocker as antihypertensive agents.

Distribution of male and female against their respective Framingham score showed that 22 males had total score of >13 and only 11 females

had score of 18. Most female patients have 10-year risk less than males.

22 males had >15% 10-year score of developing coronary heart disease compared to 4 females with similar score.

Conclusion

The study showed that there is clustering of coronary artery risk factors in hypertension patients. All patients with hypertension had dyslipidaemia; both male and female. Framingham score system 10-year risk was higher in males. Majority of risk factors due to urbanization were modifiable and had to be addressed to reduce risk of coronary heart disease in Kerala.

Ethics

No financial grant or ethical issue involved in this study.

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