Effect of Life Style Intervention on Risk Parameters in Young Indians Suffering Cad

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ABSTRACT
Coronary artery disease (CAD) in young (ages≤35-yr) is increasing in the Indian subcontinent. It constitutes 11-14% of total CAD burden in this country. In the background of dual epidemic of communicable and non-communicable diseases prevailing in India, the crucial issue is can we prevent the risk of CAD in young by appropriate health intervention? We conducted a case-control interventional study in young CAD subjects and collected data from first episode CAD in patients (age≤35 yrs) admitted in coronary care unit of the GTB Hospital and studied the effect of life style intervention with the help of power point presentation and booklet on risk factor profile (smoking, hypertension, diabetes mellitus, dyslipidemia, obesity, sedentary life, dietary habit) and short term mortality at three and six months follow up in the experimental and control groups. 49 (9.8 %) subjects were young (≤35yrs). Majority of them were male (81.6%), belonging to low socioeconomic group (85.7%) and were smokers, (69.4%). We observed a significant reduction in smoking (p<0.008) and significant difference in decreasing total cholesterol [Median(IQR) from170(133-179) mg/dl to 131(87.25-171.5)mg/dl] p<0.046 and fat intake [Median(IQR) from 56.35(41.95-78.35) g/day to 42.97(28.93-65.28) g/day ] (p<0.048) in study groups after six months follow up, whereas control group showed significance difference in the increase of total cholesterol [Median(IQR) from 159.5(118.75-197.5) mg/dl to 162(81.5-196.5) mg/dl ] p< 0.038 and total fat [Median(IQR) from 53.56(31.28-79.01) to 63.5(47.41-71.01)] (p<0.028). During six months follow up one patient in study group who was both a smoker and an alcoholic died. The findings of this study revealed that by adopting lifestyle changes and food habit modification CAD, risk factors like as smoking, hypercholesterolaemia and fat intake can be modified which may be beneficial for the individuals in preventive future episodes of acute coronary syndrome.

Key words: Lifestyle intervention, CAD, Young Indians.

1. INTRODUCTION
Cardiovascular disorders have emerged as major public health problem all over the world, particularly in the Indian subcontinent (1). It is estimated that India presently has 29.8 million individuals with coronary heart diseases (2-5). The most worrying part of the whole scenario is its extent in younger people (age≤35-yr) (6) which constitutes 11-14% of total CAD burden in this country (7). Various autopsy, epidemiological and clinical studies indicate that the CAD has percolated into lower and middle socioeconomic group and comparatively younger segment of the society (8-11).

The socioeconomic implications of the CAD in young are colossal because an otherwise healthy person in the prime of his life may become disabled or die without warning. The tragic consequences for individual and his family, friends, and employer are particularly catastrophic (12). In the year 2005, the reported loss to Indian National income from cardiovascular disease, stroke and diabetes was about $9 billion, projected to rise to staggering $200 billion within next 10 years (13). It is therefore essential for the social and economic health of the nation to look into the causes of CAD epidemic particularly so in the young and devise a suitable strategy to prevent its occurrence at such...
a young age. Present study shows the prevalence of various risk factors in young CAD patients both in men and women and the effect of intervention in reduction of risk factors.

2. MATERIALS AND METHODS

We conducted a randomized control trial study in young CAD subjects and collected data from first episode consecutive CAD patients (age≤35 years) admitted in coronary care unit of the GTB Hospital in east Delhi. Both males and females were diagnosed as per Monica criteria, i.e. 1) Two or more ECGs Showing specific changes; 2) ECG showing probable changes plus abnormal cardiac injury enzymes; or 3) Typical symptoms such as retrosternal pain plus abnormal enzymes. The cases were confirmed by the expert cardiologist working in CCU/ICU ward. Pregnant women and/or individuals with severe psychiatric illness were excluded. Subjects were randomly allocated to study and control group using random allocation by computer generated random numbers, then numbers were written on behind of envelopes and based on random number tables for each group a piece of paper that had been written on them experimental and/or control group were prepared and put inside the envelopes and sealed. These envelopes were selected for each subject coming to CCU/PCC by researcher or nurse educator. The study group received interventional package. The intervention was in the form of "one to one basis" respecting individual’s privacy. After each intervention, there was an interactive session with patients to fulfill their counseling needs. In the second intervention at the third months the same message was reinforced. Comprehensive lifestyle interventional package was administered using a power point presentation detailing aspects of healthy lifestyle (Table 1).

We considered six modifiable risk factors in this study: smoking, systemic hypertension, diabetes mellitus, physical inactivity, dyslipidemia and obesity. The major results obtained from this study showed that nearly more than one-half and 75% of our population were smokers and had lipid profile disorders respectively. Hypertension and diabetes mellitus were presented according to these classifications: systolic blood pressure more than 140 mmHg, diastolic blood pressure more than 90 mmHg and FBS > 126 mg/dl, PPB > 200 mg/dl and more than one-half of patients had high blood pressure and diabetes. Overweight and obesity were found in more than one-third of young CAD subjects and a vast majority had sedentary lifestyle (Table 1).

Table 1. Distribution of some cardiovascular risk factors in young CAD subjects

| Risk factors         | %    | n   |
|----------------------|------|-----|
| Smoking              |      |     |
| Current Smoker       | 69.4 | 34  |
| Never Smoker         | 30.6 | 15  |
| HTN                  |      |     |
| SBP>140mmHg          | 12.2 | 6   |
| DBP>90mmHg           | 16.3 | 8   |
| Diabetes Mellitus    |      |     |
| FBS>126mg/dl         | 12.2 | 6   |
| PPB>200mg/dl         | 12.2 | 6   |
| Lipid Profile Disorders |    |     |
| Cholesterol >200 mg/dl | 24.5 | 12  |
| Triglyceride>150 mg/dl | 36.7 | 18  |
| HDL-Cholesterol <40 mg/dl | 77.6 | 38  |
| LDL-Cholesterol >140 mg/dl | 51   | 25  |

3. RESULTS AND DISCUSSION

A total of 500 subjects diagnosed with acute coronary syndrome from Sept 2008 to Jun 2010 admitted in coronary care unit of the GTB Hospital in east Delhi were enrolled for this study. The main objective was to determine the effectiveness of life style intervention package in reduction of coronary heart disease risk factors amongst young CHD patients. About 10 % (49) of the subjects were young (≤35-yrs) with average age 32.6±2.65. Majority of them were men 40(81.6%), belonging to low socioeconomic group 42(85.7%). We considered six modifiable risk factors in this study: smoking, systemic hypertension, diabetes mellitus, physical inactivity, dyslipidemia and obesity. The major results obtained from this study showed that nearly more than one-half and 75% of our population were smokers and had lipid profile disorders respectively. Hypertension and diabetes mellitus were presented according to these classifications: systolic blood pressure more than 140 mmHg, diastolic blood pressure more than 90 mmHg and FBS > 126 mg/dl, PPB > 200 mg/dl and more than one-half of patients had high blood pressure and diabetes. Overweight and obesity were found in more than one-third of young CAD subjects and a vast majority had sedentary lifestyle (Table 1).
Sedentary <1.4 & 98 & 48  
Very active >1.7 & 2 & 1  

| BMI & Sedentary | Very active | Obesity |
|---|---|---|---|
| <25 & 22.4 & 11 & 5  
| >30 & 10.2 & 5 |  

Table 2. Comparison of smoking before and after intervention in the study and control groups of young CAD subjects

| At the time of admission | Study Group | Control Group | p value |
|---|---|---|---|
| | smoker | non smoker | | smoker | non smoker | |
| n=14 | 1 & 8 | 0.008 | 5 | 3 | 0.25 |
| n=10 | 5 | 3 | 0.008 | 2 | 2 |

Median and interquartile changes in total cholesterol [Median (IQR) from 170 (133-179) mg/dl to 131 (87.25-171.5) mg/dl] p < 0.046 and fat intake [Median (IQR) from 56.35 (41.95-78.35) g/day to 42.97 (28.93-65.28) g/day] were found in study groups after six months follow up (p<0.048). In contrast Wilcoxon Signed Ranks test in control group showed significance difference in increasing total cholesterol [Median (IQR) from 159.5 (118.75-197.5) mg/dl to 162(81.5-196.5) mg/dl] (p < 0.038) and total fat [Median(IQR) from 53.56(31.28-79.01) to 63.5(47.41-71.01)] (p<0.028) (Table 3).

Table 3. Comparison of some risk factors before and after intervention in the study and control groups of young CAD

| Risk factors | Study Group | Control Group | p value |
|---|---|---|---|
| BMI | 23.42(20.23-25.59) | 22.57(20.93-24.70) | 0.51 |
| MSBP | 120(109.5-137) | 105(100-112) | 0.34 |
| MDBP | 80(69-92) | 80(70-80) | 0.66 |
| FBS | 92(84-121) | 82(79.25-96.25) | 0.46 |
| PPG | 123(106.50-154) | 139(99-129.5) | 0.81 |
| Cholesterol | 170(153-179) | 131(87.25-171.5) | 0.046 |
| TG | 129(84.5-177.5) | 120(74.75-168.75) | 0.34 |
| HDL | 35(29.25-43.5) | 30.50(26.75-39.95) | 0.63 |
| LDL | 105(84-123) | 69.5(41.75-111.75) | 0.48 |
| CAL | 1.31(1.28-1.32) | 1.30(1.29-1.32) | 0.08 |
| Fat | 25.64(1639.9-2595.1) | 1814.66(1499.5-2244.3) | 0.124 |

Wilcoxon Signed Ranks Test

During six months follow up one patient in study group who was a smoker and an alcoholic died. The present study aimed to determine the effectiveness of life style intervention in reduction of coronary heart disease risk factors among young CAD subjects. In spite of two years of study, the number of young CAD cases was small, more so in the case of females, thus it was not possible to discuss sex and age categories for adjustment. In this study, incidence of young CAD subjects among first episode patients was 9.8% which was in agreement with CAD burden in the young reported by Dwivedi S (7) and Tewari et al (14) whereas the incidence of CAD in western population is up to 5% as compared to 12-16% in the South East Asia (15, 16). Tobacco smoking is one of the most powerful modifiable risk factors for the development of CAD in all age group (17). Our data showed that prevalence of smoking was very high in young population. In the study done by Goel PK et al (18) too the commonest risk factor in younger age group was smoking. Several studies in the past have shown higher prevalence of smoking in younger patients along with a relationship between smoking and CAD (19-23). Dyslipidemia is a widely accepted risk factor for CAD. Although South Asian have been known to have acceptable TC and LDL-C
level compared to Afro-Caribbeans and whites, they do have a lower HDL-C and a higher triglycerides level (24, 25). Our study has shown that the prevalence of HDL-C < 40 mg/dl was higher, compared to the study by Tewari et al (14) whereas prevalence of TC > 200 mg/dl was lower than that study. This study confirms previous observation systemic hypertension and diabetes mellitus. Nearly all of the subjects in our study had sedentary life style that was proved by most studies in India (19) (26). In Iran a study that was done by Hatmi et al (27) showed around 80% had sedentary lifestyle. Regarding the effectiveness of lifestyle intervention, after six month follow up in the study group, we found significant decrease in smoking habit that shows patients can quit and prevent the second episode of CAD by psychological counseling effectively, moreover decrease in median of cholesterol and fat intake show lifestyle changes and dietary habit to be completely preventive. Whereas in the control group, we observed increase in cholesterol and fat intake. Our study has shown changes in other risk factors like physical activity level but the change was not significant. Hospital-based interventional study done in Sweden proved our study. In this study prevention program was successful in stopping smoking and improving food habit (28). Another study was done by Satario et al with body weight reduction program and consisted of a 3 weeks integrated energy restriction diet associated with moderate aerobic program and consisted of a 3 weeks integrated energy restriction diet associated with moderate aerobic psychological counseling and educational lecture and the results showed the reduction of total cholesterol with relatively moderate decrease in weight (29).

4. CONCLUSION
Premature Coronary Artery disease is quite common in our young population. Smoking is commonest risk factor followed by dyslipidemia. Other risk factors like hypertension, diabetes mellitus and obesity also have medium risk. Based on our study early coronary artery disease can be prevented by modifying life style, dietary habit and regular exercise. However, present findings indicate that smoking can be effectively stopped and, with modifying dietary habit, cholesterol will be under control.

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AUTHORS CONTRIBUTION
This work was carried out in collaboration among all authors.

CONFLICT OF INTEREST
The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

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