

## Association of Environmental Risk Factors with Myocardial Infarction

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**ABSTRACT** The term coronary heart disease (CHD) is a disease spectrum caused due to imbalance between myocardial oxygen supply and demand. The symptomatic coronary heart disease may manifest as angina pectoris, myocardial infarction and sudden death. The most common symptoms among the patients of myocardial infarction are the heavy squeezing and crushing pain. There are various factors, which singly and in combination, conspire to cause myocardial infarction. The present investigation examines the association of environmental factors like physical activity, smoking and alcohol intake with myocardial infarction through case-control study. Analysis of data reveals that subjects who smoke and have sedentary life style are more likely to develop myocardial infarction.

### INTRODUCTION

The term coronary heart disease (CHD) is a disease spectrum of diverse aetiology caused due to the imbalance between myocardial oxygen supply and demand. The symptomatic coronary heart disease may manifest as angina pectoris, myocardial infarction and sudden death. Heavy squeezing and crushing pain are the most common symptoms among the patients of myocardial infarction. It is severe, though similar in character with angina pectoris; rest doesn't relieve it and it lasts longer. It involves the central portion of the chest and/or epigastrium typically, and radiates to arms in 30 per cent of cases. 15 to 20 per cent of myocardial infarction are painless, such incidence being greater in patients having diabetes mellitus. There are various factors, which singly, and in combination, conspire to cause coronary heart disease. The following are some of the risk factors:

#### *Tobacco Smoking*

There are such abundant evidences to conclude that tobacco smoking is a major risk contributor in the causation of coronary disease

(WHO, 1979; Rosenberg et al., 1985; Shewry et al., 1990; Benfante et al., 1991). After excluding the deaths due to infectious disease, 80 per cent of deaths in men under the age of 45 years can be attributed directly to tobacco. Nicotine stimulates secretion of adrenaline like chemical, which constricts the small blood vessels, increases blood pressure, heart rate and increases workload and oxygen demand of the heart. It raises cholesterol and increase tendency of blood to clot more easily.

Cumulative effect leads to and aggravates atherosclerosis of coronary arteries, which is responsible for angina and heart attacks.

#### *Physical Activity*

Exercise makes an important contribution to health and sense of well being is universally recognised fact. Incidence of fatal and non-fatal cardiovascular disease, has a strong inverse relationship with exercise (Paffenbarger et al., 1986; Caspersen et al., 1989; Keys et al., 1990; Laws et al., 1990). The mortality rates were significantly lower among the physically active with or without consideration of cigarette smoking, systemic hypertension, gain in body weight or early parental death. Findings of a few prospective studies on female subjects have paralleled findings in men.

#### *Alcohol Intake and Coronary Heart Disease*

Epidemiological studies have consistently shown an apparent protective association between light and moderate alcohol consumption and coronary heart disease (Marmot, 1984; Friedman et al., 1986; Moore and Person, 1986; Narlawar, et al., 1989; Rimm et al., 1991; Jackson et al., 1991; Maclure, 1993). Despite the consistency of the findings, some have argued that the association may be due, at least

partly to the use of a reference group of non-drinkers which may include heavy drinkers who deny their alcohol intake or people who have stopped drinking because of illness (Shaper, 1990; Criqui, 1990). Although alcohol consumption varies with dietary habits, dietary intake has been considered in only a few studies of alcohol intake and coronary heart disease (Thomson et al., 1988). High alcohol intake is associated with excess risk of CHD, hypertension and many other physical, mental and social problems.

The present study investigates the association of physical activity, smoking and alcohol intake with myocardial infarction through case-control study.

## MATERIAL AND METHODS

Freshly diagnosed 200 patients of coronary heart disease especially with myocardial infarction having ECG changes, belonging to different areas of Delhi admitted in the coronary care unit of Lok Nayak Jai Parkash Hospital, Delhi, were selected. An equal number of controls who were free from the coronary heart disease were matched for age, sex and religion and were selected from different wards of the same hospital.

Subjects who were smoking 5 cigarettes per day for a period of more than 2 years were called smokers. Physical activity was classified as sedentary and moderate/or heavy according to the physical activity and type of job of the subjects. Subjects who were drinking more than 75 ml alcohol daily were classified as regular alcoholics and those who were drinking occasionally were classified as having irregular alcohol intake.

## RESULTS AND DISCUSSION

In the present study males constitute 84.5 per cent of the total myocardial infarction (MI) cases while females constitute only 15.5 per cent of the total cases. The frequency of coronary heart disease (CHD) increased with age and was higher in males in all the age groups. The highest percentage of MI was found to be in the age group of 51-55 years.

Table 1 shows the distribution of smoking

habit among cases and controls. 48 per cent of the cases were smokers as compared to 22 per cent in the controls. The Comparison between cases and control showed smoking as a significant risk factor for the coronary heart disease ( $\chi^2 = 29.71$ , d.f. = 1,  $P < 0.05$ ). The relative risk was found to be 3.27 indicating that smokers had 3.27 times the risk of developing CHD as compared to non-smokers. There were no female smokers in cases or control group.

**Table 1: Distribution of smoking habit among cases and controls**

Cases			Control		
Smoker	Non smoker	Total	Smoker	Non smoker	Total
96 (48.0)	104 (52.0)	200 (100.0)	44 (22.0)	156 (78.0)	200 (100.0)

Figures in parenthesis denotes percentage.  
 $\chi^2 = 29.71$  d.f. = 1,  $P < 0.05$  RR = 3.27

Table 2 shows the distribution of physical activity among cases and control. 81 per cent of cases had sedentary habits as compared to 73.5 per cent of control. The comparison between cases and controls with respect to physical activity was found to be statistically not significant ( $\chi^2 = 3.20$ , d.f. = 1,  $P > 0.05$ ). The relative risk between cases and controls with respect to physical activity was found to be 1.6 indicating that patient with sedentary habits were more likely to develop coronary heart disease as compared to patients with physical activity.

**Table 2: Distribution of physical activity among cases and controls**

Cases			Control		
Seden- tary	Moderate or Heavy	Total	Seden- tary	Moderate or Heavy	Total
162 (81.0)	38 (19.0)	200 (100.0)	147 (73.5)	53 (26.5)	200 (100.0)

Figures in parenthesis denotes percentage.  
 $\chi^2 = 3.20$  d.f. = 1,  $P > 0.05$  RR = 1.6

Table 3 shows the distribution of alcohol intake among cases and controls. 9.5 per cent of the cases were consuming alcohol regularly as compared to 11 per cent in controls. The comparison between cases and controls with respects to alcohol intake was found to be statistically

**Table 3: Distribution of alcohol intake among cases and controls**

Cases				Control			
Non Alcoholic	Regular intake	Irregular intake	Total	Non alcoholic	Regular intake	Irregular intake	Total
166 (83.0)	19 (9.5)	15 (7.5)	200 (100.0)	175 (87.5)	22 (11.0)	3 (1.5)	200 (100.0)

Figures in parenthesis denotes percentage.

$\chi^2 = 1.61$  d.f. = 1,  $P > 0.05$  RR = 0.9

non-significant. The present study reveals that subjects who smoke and have sedentary life style are more likely to develop coronary heart disease. Smoking however, is traced out to be a significant risk factor in myocardial infarction.

### REFERENCES

- Benfante, R., Reed, D. and Frank, J.: Does cigarette smoking have an independent effect on coronary heart disease incidence in the elderly? *Am. J. Public Health*, **80**: 897-901 (1991).
- Caspersen, C.J.: Physical activity epidemiology: Concepts, methods and applications to exercise science. *Exercise and Sports Science Reviews*, **17**: 1423-1427 (1989).
- Criqui, M.: The reduction of coronary heart disease with light to moderate alcohol consumption: Effect or artifact? *Brit. J. Addict*, **85**: 854-857 (1990).
- Friedman, L.A. and Kimball, A.W.: Coronary heart disease mortality and alcohol consumption in Framingham. *Am. J. Epidemiol.*, **124**: 481 (1986).
- Jackson, R., Scragg, R and Beaglehaole, D.: Alcohol consumption and risk of coronary heart disease. *Brit. Med. J.*, **303**: 211-217 (1991).
- Keys, S.A., Folsom, A.R., Prineas, R.J. Potter, J.D. and Gapstur, S.M.: The association of body fat distribution with life style and reproductive factors in a population study of postmenopausal women. *Int. J. Obes.*, **14**: 583-591 (1990).
- Laws, A., Terry, R.B. and Barrett-Connor, E.: Behavioural Covariates of waist-to-hip ration in Rancho Bernardo. *Am. J. Public Health*, **80**: 1358-1362 (1990).
- Maclure, M.: Demonstration of deductive meta-analysis, ethanol intake and risk of myocardial infarction. *Epidemiol. Rev.*, **15**: 328 (1993).
- Marmot, M.G.: Does stress cause heart attacks? *Postgraduate Med. J.*, **62**: 683-686 (1986).
- Moore, R.D. and Person, T.A.: Moderate alcohol consumption and coronary heart disease. *Medicine*, **65**: 247-267 (1986).
- Narlawar, U.W., Vasudeo, N.D. and Majumdar, R.D.: Alcohol consumption and tobacco chewing as risk factors for coronary heart disease. *Ind. J. Med. Gazette*, **282-285** (1989).
- Paffenbarger, R.S., Hyde, R.T., Wing, A.L. and Sich, H.C.: Physical activity, all cause mortality and longevity of college alluminin. *N. Engl. J. Med.*, **314**: 605-613 (1986).
- Rimm, E.B., Giovannucci, E.L., Willett, W.C., Colditz, G.A., Ascherio, A., Rosener, B. and Stampfer, M.J.: Prospective study of alcohol consumption and risk of coronary heart disease in men. *Lancet*, **338**: 464 (1991).
- Rosenberg, L., Kaufman, D.W., Helmrish, S.P., Millar, D.R. and Stolley, P.D.: Myocardial Infarction and cigarette smoking in women younger than 50 years of age. *JAMA*, **253**: 2965 (1985).
- Shaper A.G.: Alcohol and Mortality: a review of prospective studies. *Br. J. Addict.*, **85**: 837-861 (1990).
- Shewry, M.C., Tunstall-Pedoe, H., Morrison, C. and Smith, W.C.: Smoking and housing status in Scottish MONICA. Examples of modified Case-Control analysis. *Revue D. Epidemiological Et De Sante Publique*, **38**: 473 (1990).
- Thomson, M., Fulton, M. and Elton, R.A.: Alcohol Consumption and nutrient intake in middle-age Scottish men. *Am. J. Clin. Nutr.*, **47**: 139-145 (1988).
- WHO Tech. Report Series: *Controlling the Smoking Epidemic*. Report of the WHO expert Committee on Smoking Control. No. 636 (1979). \*