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## 5 Management of Health Risk Factors

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ALL human diseases are largely determined by inherited characteristics and environmental influence. Man has been modifying his environments and his way of life bringing about a change in prevalence and severity of various diseases. Today, automobiles and other labour saving devices, urbanisation of population and increased use of alcohol, tobacco and drugs have resulted in more leisure, sedentary way of life and increase in environmental health risk factors with associated diseases. In modern affluent society, coronary heart disease (CHD) and hypertension are the leading causes of death followed by cancer and cerebrovascular disease. In the developing countries, heart disease is the second major cause of death after infection and tuberculosis. It has been estimated that approximately 50 million people are suffering from CHD and hypertension in India. Cardiovascular disabilities have shown almost a two fold rise in the last ten years in our Air Force. There is need for a concerted effort to identify and rectify the risk factors so as to reduce the incidence of CHD. Jogging as a form of habitual physical activity has been under investigation as one of the important methods to manage some of the risk factors leading to various diseases especially CHD.

Risk factors are those habits, traits and abnormalities which are statistically associated with increased incidence of subsequent disease. The environmental factors like pollution of air and water and radiation are shared by large population and are tackled at the national level under community preventive measures. Social factors due to stress of modern living and health practices resulting in increased leisure, sedentary habits, faulty food habits and addiction to alcohol, tobacco and drugs lead to

metabolic abnormality in the form of hypercholesterolaemia, hyperlipidaemia and hyperglycaemia. The associated diseases which are established risk factors for CHD are hypertension, diabetes mellitus, hypothyroidism and routine abnormal ECG.

Physical fitness as acquired in youth and maintained during later life by means of habitual physical activity like sports, running and jogging has beneficial effect especially on the cardiovascular system. There is still controversy if physical activity actually prolongs life. Many studies on athletes have failed to show beneficial effect on longevity. There is no carry over beneficial effect either.

Has physical activity a preventive influence on the development of CHD? Studies have shown that the activity level of job is inversely related to the mortality. In one report it was shown that the incidence of CHD was 1.5 times higher in bus drivers as compared to bus conductors; sudden mortality being twice higher in the driver group. In general, men in physically active jobs seem to have lesser incidence of CHD in middle age than men in sedentary occupations, and if they do get a coronary attack, the disease is not usually severe. A recent study shows that with reduction in the prevalence of risk factors like smoking, serum cholesterol and raised blood pressure, the estimated risk for CHD decreased by 17% among men and 12% among women. Various epidemiological studies thus conclude that men who are physically active and in whom the risk factors are properly managed have lowered chance of suffering from CHD.

Apart from its well known physiological and psychological benefits, habitual physical activity modifies the various risk factors :

(a) *Hypercholesterolaemia, Hyperlipidaemia and Hyperlipoproteinaemia* : Plasma cholesterol is a nonspecific marker for atherosclerosis and CHD. Persons with cholesterol level greater than 300 mg/dl were found to be four times more prone to CHD as compared to those with level of under 200 mg/dl. Optimum level for retardation of atherosclerosis is under 200 mg/dl. In addition, triglyceride and lipoprotein pattern have also been taken as risk factors. Plasma lipoprotein has been associated with atherosclerosis. High density lipoprotein (HDL) is unique in that it is associated with decreased risk of atherosclerosis. The level of HDL is higher in women and is increased by physical activity. On the basis of currently available data and for practical purposes, serum cholesterol is the single best predictor of atherosclerosis. The effect of physical activity is to reduce cholesterol, triglyceride level and to increase HDL. All these protect the arteries against degenerative disease of atherosclerosis.

(b) *Hypertension* : It is a powerful risk factor for premature atherosclerosis resulting in premature coronary and cerebrovascular disease. A rising parallel between hypertension and clinical manifestation of CHD has been widely accepted as proof that sustained high blood pressure plays an important role in coronary atherosclerosis. Modern life style could play a role in the development of essential hypertension. Proper control of hypertension results in reduction in not only cerebrovascular strokes but also in cardiovascular complications. Physical activity lowers the heart rate but working performance is increased at that rate. The blood pressure is stabilised at a lower level. Sportsmen and men engaged in high level of physical activity have in general a low blood pressure and increase of the pressure with age is also smaller. Thus, physical activity exerts a beneficial effect on the control of hypertension and regulation of resting blood pressure. However, exercise is contraindicated if there is evidence of uncontrolled severe hypertension and cardiac decompensation or other major complications.

(c) *Cigarette Smoking* : Men who smoke are at a greater risk of a first major coronary event,

sudden death and CHD. Risk generally increases stepwise with number of cigarettes smoked. Smoking increases heart rate, blood pressure and stroke volume. Substantial quantities of free fatty acids may interfere with metabolic process and may induce cardiac arrhythmias. There is also increased platelet adhesiveness ; platelet aggregates could lead to increased atherosclerosis and ischaemic episodes. Consumption of 20 cigarettes or more per day is associated with a three fold greater risk for myocardial infarction as compared to non-smokers. Association of smoking and bronchogenic carcinoma is well established. Other respiratory diseases like chronic bronchitis and bronchial asthma are also aggravated by smoking. It is seen that those who indulge in regular physical activity are less likely to be heavy smokers possibly because of the change in life style and less time available for smoking.

(d) *Diabetes Mellitus and Asymptomatic Carbohydrate Intolerance* : Increased prevalence of arterial disease has become a major disability in diabetes mellitus. The mortality of myocardial infarction is higher in diabetics as compared to non-diabetics. In diabetics, upto a third of cases of myocardial infarction may be painless and so escape recognition. How diabetes mellitus increases the risk of CHD is not clearly established. This may be due to the direct effect of glucose and insulin on the arterial wall or the indirect effect of disturbed blood clotting and altered fibrinolytic mechanism or even influence of treatment with oral hypoglycaemic agents. Asymptomatic glucose intolerance, the so called latent diabetes, has not proved to be an important risk factor for prediction of atherosclerosis. The effect of habitual physical activity in cases of mild diabetes mellitus and in maturity onset diabetes is to improve the carbohydrate metabolism and facilitate the control of the condition.

(e) *Obesity* : Obesity per se is not a major risk factor. However, obese persons are more prone to suffer from hypertension, diabetes mellitus and hyperlipidemia. These factors increase its association with CHD. Regular physical activity is definitely beneficial by increasing the energy expenditure. A regular jogging of 2 Km per day will lead to a loss of body weight by 1 Kg in one month the diet remaining unchanged.

(f) *Vasomotor Abnormality* : Persons with abnormality of vasomotor regulation show characteristic features of neuro-asthenia, orthostatic tachycardia and hypertension. This vaso regulatory abnormality is accompanied by typical labile ST-T changes in ECG; but heart function is normal. The ECG changes and other features can be completely abolished by the administration of beta-blocking agents. Habitual physical activity is beneficial in this condition.

### Risks of Physical Activity

It is important to be aware of the risks of physical activity because all the good work done can be undone by one adverse reaction. The possible risks of jogging, running or other forms of physical activity are :

(a) *Myocardial Ischaemia and Infarction* : It is often said that exercise does not kill if the heart is normal. But it is not possible to be sure of the normal condition of heart in a middle aged subject. It is also well documented that about a quarter of the patients with first heart attack had the cardiac event when engaged in physical activity. Deaths have been recorded while doing jogging or other exercise. The increased risk applies to unsupervised and unaccustomed exercise or competitive exercise exceeding the physiological tolerance. This problem can be easily controlled by preliminary medical examination and well regulated exercise programme

(b) *Injury* : These are quite frequent although minor and may be responsible for lack of motivation. These can be avoided by proper training.

(c) *Psychological effect of negative nature* : Inability to do the prescribed physical activity may lead to guilt feeling and poor body image. This can be rectified by prescribing a realistic schedule of exercise.

The convenient way to implement the programme of habitual physical activity is in the form of 'Walk, Jog and Walk'. For healthy personnel this should consist of a warm up by brisk walking for 5 — 7½ min, walk — jog for 30 min and a cool down by walking for 5 — 7½ min. For a person with history of heart disease, a proper assessment

is required prior to exercise prescription and activity is to be gradually increased under supervision.

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