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RELATION BETWEEN ISCHEMIC HEART DISEASE AND PHYSICALLY ACTIVE TRIBAL'S OF JHARKHAND PRESENTING WITH CHEST DISCOMFORT

General Medicine

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ABSTRACT

AIMS: Cross sectional observational comparative study in a tertiary care hospital on Relation between Ischemic Heart Disease among Physically Active Tribal's of Jharkhand presenting with chest discomfort.

MATERIAL AND METHODS: 102 physically active Tribal subjects (53 male and 49 female) were selected for the study, who had presented with chest discomfort.

RESULTS: The incidence of I.H.D. is 1.41% among tribal population of Jharkhand. The incidence was found exclusively in tribal female living in urban area mostly due to adopting sedentary pattern of life style.

CONCLUSION: The tribal population of Jharkhand has inversely proportional relation to Ischemic Heart Disease and physical activity.

KEYWORDS

physical activity, Ischemic Heart Disease, Tribal's of Jharkhand, Chest discomfort.

INTRODUCTION:

Ischemic heart disease has become the most common cause of Mortality and Morbidity, and incurs greatest economic cost than any other illness in the modern era.

India has the highest incidence of Diabetes and Heart ailments in the entire world. According to the World Health Organization (WHO) report, 'Preventing Chronic Diseases: a vital investment -2005, India is estimated to have lost US$ 9 billion in national income from premature deaths due to heart disease, stroke and diabetes.

A recent analysis shows that 37% of cardiovascular deaths are attributable to physical inactivity; this is second only to raised blood cholesterol *[1]*.

Our state Jharkhand with its rich culture and heritage is also in increasing pace of development, urbanization, changing trends in life style, with growing modernization and is also facing increased risk to I.H.D. The risk factors like diabetes, hypertension, and obesity for I.H.D. and are frequently seen in hospitals. Although, dynamic improvement has been made in management of I.H.D. and its complication, the reduction in case fatality is marginal, and far more expensive to reach of major population. It is fact that myocardial infarction, angina are manifestation of late atherosclerosis, and secondary prevention would not be as effective as primary prevention.

The studies that have been undertaken in India so far, only few studies have been done in the tribal population of Jharkhand. Our clinical experience suggests that prevalence of Ischaemic heart disease is low in rural tribal in contrast to urban tribes who have adapted to urbanized way of life. The rural tribes are thin built, physically fit and hardworking in hilly terrain of Jharkhand, down the centuries. Among illnesses malaria, tuberculosis, diarrhea and worm Infestations are life threatening for tribes. Their staple diet is rice followed by maize, madua, bazra, wheat, lentils. They partake in locally brewed liquor. The diet is strikingly lacking in animal protein and fat. They are hard workers engaged in cultivation in hilly land, wood cutting etc, and migrate to nearby town to work as unskilled laborers during non cultivation season. Their traditional way is slowly changing, but still they are leading a life segregated from modern civilization, in contrast to urban tribes who have easy access to modernization and lead a more or less sedentary life.

The Objective of present study is to establish the Relation between Ischemic Heart Disease among Physically Active Tribal patients of chest discomfort in a tertiary care centre of Jharkhand, India.

METHODLOGY

This study is a part of a major study entitled "A study on prevalence of ischaemic heart disease in tribes of Jharkhand" was conducted in Rajendra institute of Medical sciences, Ranchi, in department of Medicine. This hospital is responsible for catering medical services to tribal as well as non tribal community. The target of present study is those tribes of Jharkhand hailing from rural as well as urban background and who attend medical outdoor patient's department with complain of chest pain and palpitation.

PROCEDURE:

Occupational and leisure time activities were noted and divided into following categories.

Minimal activities: Minimal physical activity during work was recorded when the job predominantly involved sitting or standing irrespective of arm activity. Leisure activity was recorded minimal when the person did no more than stroll leisurely twice a week or play on occasional vigorous sport.

Moderate activities: included all activities that could not be classified as minimal or heavy. At work it included regular walking. Moderate leisure activity included any sports or off work activity that fell short of being classified as heavy and yet was performed regularly for three days or more a week.

Heavy activities: Heavy physical activity during work was recorded when the job predominantly involved constant leg activity. Heavy leisure activity includes regular (more than three times weekly) leg exercise as running, swimming, tennis, football etc.

The average weekly time spent on walking or hiking outdoors, jogging (<6 mph), running (≥6 mph), bicycling, lap swimming, tennis, squash or racquetball, calisthenics, or rowing was recorded beginning in 1986. Heavy outdoor work was added in 1988 and weight training in 1990. Walking pace, categorized as casual (≤2 mph), normal (2-2.9 mph), brisk (3-3.9 mph), or striding (≥4 mph), was also recorded. The time spent at each activity in hours per week was multiplied by its typical energy expenditure, expressed in metabolic equivalent tasks (METs) *[2]*. One MET, the energy expended by sitting quietly, is equivalent to 3.5 ml of oxygen uptake per kilogram of body weight per minute, or to 1 kcal/kg of body weight per hour. Vigorous exercise was defined as those requiring 6 METs or more: jogging, running, bicycling, lap swimming, tennis, squash or racquetball, and rowing. Nonvigorous activities (<6 METs) include walking, heavy outdoor work, and weight training.

RESULTS:

In this study 102 subjects were examined. Male percent constituted 51.96% of total study subjects (Table-2). 11.76% were males residing in urban area and 40.20% in rural area. Female subject studied constituted 48.04% out of which 9.80% resided in urban area This table reveals that out of 53 male subjects studied in this series 28 (i.e.52.83%) were engaged in heavy activity. Out of 53 males 23

(43.39%) were engaged in medium activity, and 5(9.43%) had history of heavy work. Out of 12 Urban male's all were engaged in medium activity, which was 22.64% of total subjects studied. Heavy work was exclusively done by rural tribes.

Table-3 reveals that out of 49 female subjects examined in the study, 19 (38.77%) were engaged in heavy activity. 30(56.60%)) were engaged in medium activity, of which 13 26.53%) were previously engaged in heavy activity. Out of 10 females 8 (16.32%) of them examined performed medium activity and 2 (4.08%) of them did heavy work.

The current study shows 1 E.C.G features of left ventricular hypertrophy in electrocardiogram compatible with or predictive of coronary heart disease was found. The questionnaire regarding exertional chest pain did not elicit a positive response from even a single subject.

Thus among the tribal population of Jharkhand, has very little prevalence of coronary heart disease and appears to be relatively free of the factors known to put people at risk of Ischaemic heart disease. The incidence of I.H.D. is 1.41% among tribal population of Jharkhand. The incidence was found exclusively in tribal female living in urban area mostly due to adopting sedentary pattern of life style.

DISCUSSION:

In present study 52.83 percent of male tribal (Table-2) were engaged in heavy activity and 33.96 percent was engaged in medium activity. 9.43 percent male engaged in medium activity with past history of heavy activity were in the age group 40-49 and 60 years and above. Among females (Table-3) 38.77 percent were engaged in heavy activity and 34.69 percent in medium activity. All female subjects engaged in medium activity with a past history of heavy activity were 26.53 percent and were mostly of age group 60 and above, except three who belong to age group 50-59. From this study it may be concluded that heavy activity has protective effect against coronary heart disease.

The regular exercise have many advantages including an increase in stroke volume at rest and during exercise, improvement in myocardial contraction and its electrical stability, and leading to a higher maximal cardiac output. There is also decrease in heart rate at rest. It also improves endothelial function. In addition, the diameter and dilatory capacity of coronary arteries are increased, as is collateral formation. Regular exercise also has beneficial effects on the tendency of blood to clot; it also reduces platelet aggregation and increases fibrinolytic activity. *[3].* It also improves the sensitivity of liver, skeletal muscle and adipose tissue to the actions of insulin. It results in decreasing in fasting insulin levels and the insulin response to glucose, associated with increases in the disposal rate for glucose *[4].* Irregular heavy physical exertion is associated with increased risk of acute myocardial infarction in the first hour after exertion *[5].* An 8-year follow-up study suggests that in men without pre-existing CHD those participating in moderate or moderately vigorous activities had a 50% reduction in risk, compared to those who were inactive *[6].*There is an inverse relationship between physical activity and blood pressure. In about 75% of patients with hypertension through regular moderate physical activity Reductions in systolic and diastolic blood pressures of up to 11 mmHg and 8 mmHg, respectively. *[7].* Moderate exercise can cause greater reductions in systolic blood pressure than vigorous exercise. Moderate activity is sufficient to lower BP in normotensive. *[8].*

Physical activity improves systolic blood pressure, angina symptoms and exercises tolerance in patients without re-vascularisation *[9].* In re-vascularised patients, physical activity can improves quality of lives and exercise tolerance, as well as 29% of cardiac events and around 20% lower re-admission rates *[10].* Physical inactivity was cited as one of 9 major contributors to heart disease mortality worldwide in the 2004 INTERHEART study *[11].* Lifestyle modifications are multidimensional and include improved dietary practices, achieving optimal body weight, smoking cessation, compliance with medications, stress management, and increased physical activity or structured exercise *[12].* Frequently, myocardial ischemia is associated with exercise intolerance, which limits patients' day to day activities. [*13]*

Regular moderate-to-vigorous physical activity has been shown to promote good anti-atherosclerotic, anti-thrombotic, anti-ischemic, and anti-arrhythmic effects. *[14].* Specific anti-ischemic effects include reducing myocardial oxygen demand by lowering heart rate and systolic blood pressure at rest, as well as increasing the period of diastole, during which coronary perfusion predominate. It also improves coronary blood flow and endothelial function *[15],* as well as production of endothelial progenitor cells and increased nitric oxide delivery. *[16 & 17]* Thus, exercise exerts cardioprotective effects in the entire arterial bed. *[16].* For ischemic heart disease patients, contemporary guidelines recommend 30 to 60 minutes of moderate intensity aerobic activity at least 5 days per week, supplemented by an increase in daily lifestyle activities. Complementary resistance training at least 2 days per week also is strongly recommended *[18].* Aerobic exercise augments maximum or peak oxygen uptake and modifies several cardiovascular risk factors. *[19].* Muscular strengthening activities promote the maintenance or enhancement of metabolically active lean muscle mass, which improves glucose metabolism and helps maintain basal metabolic rate. *[20 & 21]*

Increased physical activity is universally recognised as a desirable lifestyle modification for improving cardiovascular health, as exercise has been shown to be an important adjunct to reduce atherosclerotic risk factors such as hypertension, hyperlipidaemia, hyperglycaemia, obesity and tobacco use (22-26). Regular physical activity has potential benefits on the autonomic nervous system, ischaemia threshold, endothelial function and blood coagulation. A randomised controlled trial also demonstrated slower disease progression and significantly fewer ischaemic events in patients with stable IHD who regularly exercised (27).

Pathological findings suggested that a considerable number of fatal myocardial infarctions (MIs) were not always due to significant stenosis of the coronary arteries but rupture of unstable coronary atherosclerotic plaque possibly during exercise may occur (28).

However in present study among male subjects 52.83 percent were engaged in heavy activity and 49.39 percent were engaged in medium activity with past history of heavy activity and belonged to age group 40-49 years and 60 years and above. Among female subjects, 38.77 percent were engaged in heavy activity and 61.22 percent were engaged in medium activity with previous history of heavy activity. Those engaged in medium activity with past history of heavy activity belonged to age group 60 and above except three who belonged to age group 50-59 years. In males, there was no significant rise in mean systolic pressure with advancing age. In male tribal the mean systolic blood pressure was found to be significantly lower in older age groups, than younger age groups. The mean systolic blood pressure did not show rise in female subjects with advance in age. In female tribal the mean diastolic blood pressure did not show rise with advance in age.

CONCLUSION:

The tribal population of Jharkhand has inversely proportional relation to coronary heart disease and physical activity. The prevalence of I.H.D. is 1.41% among tribal population of Jharkhand exclusively in tribal female living in urban area mostly due to adopting sedentary pattern of life style.

TABLE NO -1

Sex ratio of the population examined			
SEX	NO OF SUBJECTS		PERCENTAGE
	Urban	Rural	
MALE	12 (11.76%))	41 (40.19%)	51.96%
FEMALE	10 (9.80%)	39 (38.23%)	48.03%
TOTAL	22 (21.56%)	80 (78.43%)	100

Table-1: In this study 102 subjects were examined. Male patient constituted (53) 51.96% of total study Subjects. (12) 11.76% were males residing in urban area and (41) 40.19% in rural area. Female subject studied constituted (49) 48.03% out of which (10) 9.80% resided in urban area and (39) 38.23% in rural area.

TABLE 2

Physical Activity In Male Subjects					
Age Groupt	Total No. Of Subjects	Sedentary Habits	Medium Activity	Heavy Activity	Medium Activity, With History Of Heavy Activity
30-39Yrs	08	0	2	4	2
40-49Yrs	22	0	6	14	2
50-59Yrs	16	0	6	10	0

60yrs And Above	07	0	4	0	3
Total	53	0	18	28	7
Percentage Of Male Studied	100%	0%	33.96%	52.83%	13.20%

Table-2 reveals that out of 53 male subjects studied in this series 28 (i.e.52.83%) were engaged in heavy activity. Out of 53 males 23 (43.39%) were engaged in medium activity, and 5(9.43%) had history of heavy work. Out of 12 Urban male's all were engaged in medium activity, which was 22.64% of total subjects studied. Heavy work was exclusively done by rural tribes.

TABLE-3

	Physical Activity In Female Subjects				
Age Group	Total No. Of Subjects	Sedentary Habits	Medium Activity	Heavy Activity	Medium Activity, With History Of Heavy Activity
30-39Yrs	8	0	4	4	0
40-49Yrs	8	0	3	5	0
50-59Yrs	21	0	8	10	3
60Yrs AND ABOVE	12	0	2	0	10
TOTAL	49	0	17	19	13
Percentage Of Female Studied	100%	0%	34.69%	38.77%	26.53%

Table-3 reveals that out of 49 female subjects examined in the study, 19 (38.77%) were engaged in heavy activity. 30(61.22%)) were engaged in medium activity, of which 13 (26.53%) were previously engaged in heavy activity. Out of 10 females 8 (16.32%) of them examined performed medium activity and 2 (4.08%) of them did heavy work.

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