Chapter I

INTRODUCTION

Sports have very prominent role in modern society. Today sports have become an inseparable phenomenon of our social life. It is important to an individual, a group, a nation indeed to the world. As it is well understood, “fit body fit nation” Sports have ever reflected developments in society. Sports indeed, have been a mirror of society.

Sports form an important aspect of life. They play a vital role in bringing about physical, mental and social growth of the nation. The past few decades have witnessed innovations in this area. Sports are becoming increasingly sophisticated and technical with growing popularity as separate profession. More young people are taking part in sports as a daily feature of their life. The participation in sports and physical fitness increases an individual’s productivity; it also promotes social harmony and discipline.¹

Sporting success and rich physical culture are today considered as statement of nation’s existing political system. The richness in

physical education is considered as product of governing system to that extent that a successful political system can only ensure sporting excellence and success through effective physical education culture. Hence, existence of better physical education culture is interpreted as prevalence of good work and culture, better public health, lesser wasteful expenditure on medical health services and ultimately more national productivity due to better public health. So, it is obvious in larger context health, recreation and human development is ultimate purpose of physical education.

India is considered to be at cross road of becoming a developed nation. This seems to be obvious and quite happening. The rapid and constant G.D.P. rate within the range of eight to ten percent almost for last ten years is also indication of India rapidly progressing towards becoming a wealthy nation.

Last fifteen years to be precise since early nineties open market policy and globalization has brought unprecedented economic prosperity. All these years have seen intense industrialization, round the clock work culture, etc.
Economic prosperity has been attained at the cost of tireless effort, drastic alternation of life style, increased level of environmental pollutions etc.

All this has caused excessive professional stress due to high competition, change in dietary habits and life style due to 24 hour work culture, inactive life style due to rampant mechanization. All these have increased health hazards and risk factors. Add to these are factors like junk food, and environmental pollution which have compounded critically the health of Indian population.

Life style diseases like obesity, heart ailments, hypertension, acute depression, diabetes are rampant and have become epidemic.

The gravity of this health situation can be well understood from a recent medical survey, which reported 55.98% of age group 25 to 35 years is physically unfit. The population is at risk of:

- High coronary heart disease - 67.08%
- Blood Press - 30.4%
- Diabetes - 16.92%
- High blood cholesterol - 47.12%
- Psychosomatic stress - 84.79%
Respiratory disorder - 10.89%
Digestive ailments - 24.12%
Joint problem - 32.16%
Immune disorder - 13.88%

It is also reported 64.67% of Indian population are obese.\(^2\)

Obviously the solution lies in a healthy and active life style. Because 70% of all illness is lifestyle related and 50 percent of our medical cost is incurred while treating them.

Obesity is related to a number of diseases including diabetes, coronary heart diseases, hypertension, stroke, liver ailments and mechanical difficulties like back and foot problem. This is bane of inactive mechanized lifestyle and dietary habits.

Cholesterol and triglycerides are the two most common lipids associated with CHD risk. These lipids do not circulate freely in the plasma but are transported in combination with a carrier protein to form a lipoprotein.

Overwhelming evidence links high levels of blood lipids, especially low density lipoprotein with increased incidence of CHD. In

\(^2\) Chatterjee Sudeshna, *Young India Unfit*, Times of India, March 18, 2007 page no. 1 Times Life.
many cases raised levels of these lipoproteins are related to consumptions of diets high in saturated fatty acids and cholesterol.

The distribution of cholesterol among the various lipoproteins is a more powerful predictor of heart disease than the total blood cholesterol. Specifically, elevated levels of high density lipoprotein are associated with a lower heart disease risk, even among individuals with total cholesterol below 200 mg. dL⁻¹. Elevated levels of low density lipoprotein on the other hand, represent an increased CHD risk. An effective way to evaluate lipoprotein status is to divide total cholesterol by HDL cholesterol. This ratio is a superior measure of heart disease risk than either total cholesterol or LDL levels. A ratio greater than 4.5 indicates a high heart disease risk, whereas a ratio of 3.5 or lower is more optimal.

Although controversy exists regarding the precise role of lipoproteins in the heart diseases process, it is generally believed that the LDL and VLDL are means for transporting lipids throughout the body for delivery to the cells, including those of the smooth muscle walls of the arteries. When LDL cholesterol is oxidized, it become available for involvement in the arterial-clogging, plaque forming process of atherosclerosis. Prevention of LDL oxidation, on the other
hand may slow the progression of this disease. In this regard, the potential benefit of dietary antioxidants such as vitamins C and E and β-carotene on heart-disease risk may lie in their role in blunting the oxidation of LDL cholesterol.

Whereas LDL is targeted for peripheral tissue and is associated with arterial damage. HDL facilitates reverse cholesterol transport by promoting the removal of cholesterol from peripheral tissues including arterial walls for transport to the liver for bile synthesis where it is then excreted through the small intestine. There is considerable evidence to show a causal association between low levels of HDL cholesterol and the increased risk for developing CHD.³

Since long back exercises in various forms have been suggested as remedy and solutions for managing lipid profile improvement, body fat reduction etc. to ultimately reduce risk of CHD, diabetes, hypertension, liver ailments, renal dysfunction etc.

Even in simplest form of exercise, brisk walking of one hour daily is said to reduce chances of heart disease by 30-40% of a stroke by 25-30%, breast cancer by 20% and diabetes by 50%.

Hence, obviously any other forms of exercise like running, jogging, calisthenics, cycling, rowing, playing games etc. will effect far better results with other associated health benefit.

In a nutshell exercises of various intensities and durations said to effect a) improved blood circulation, b) increased cardiac output, c) increased glycogen oxidation, d) increased blood capilarization, e) heart hypertrophy, f) glycogen sparing effect with free fat burning, g) increase in muscular hypertrophy, etc.

Resistance training especially in the form of weight training provides various advantages like separate exercise for various muscle groups, objective planning of load intensity, options of variety of exercises. This makes weight training as highly preferred forms of exercise among young generations of city dwellers. Weight training is said to effect increase in lean body mass and decrease in body fat percentage.

With increasing health hazards and risks, irony of situation is also that the people’s awareness about health has also tremendously improved. It is quiet seen people from every section of age group, economic class, and professions are involved in one or other forms of
physical exercises. Today the scenario is such that people have plenty of economic resource, fitness training facility as well as awareness about it. The only problem is time availability and good understanding about exercises and how to follow a result oriented exercise programme.

Weight training has become ultimate pursuits among modern fitness freaks. Though public at large for variety of reasons intends to follow exercises program due to lack of awareness and pure insight about variety of exercise programs and their benefits, majority lands up attending the health clubs. Where principal exercises is just weight training. The exercise benefits to most of problems like fitness development, weight reduction, body weight control, rehabilitation depends on appropriate intensity of exercise programme.

Hence in this regard jogging, walking, running, callisthenic were most often suggested. Today there is significant percentage of population are health club visitors. Where other than weight training exercise are rarely offered. Hence a great need was felt to investigate how various and different intensity of weight training exercise might affect body mass, body fat and blood lipids. With this concern in mind
research scholar was keen to take up this study on the above mentioned area.

**Statement of the Problem**

The ultimate purpose of this study was to understand resistance exercises specifically various forms of weight training and how it affects lipid profiles and body fat.

Conceptualization of this study was mainly based on the facts that lipid profile and body fat are two principal health as well as health risk indicators. The level of lipids constituents namely – HDL and LDL, signifies health risk factors depending on its proportionate presence. Similarly high fat percentage is indication of obesity, which is also categorized as primary health hazard, bane of modern lifestyle and increases an individual’s proneness to diabetes, heart ailment, arthritis etc.

Today an overwhelming majority of fitness freak, health conscious population visits health club. And almost every health club services were based on weight training programme. India having no standard system of monitoring health services, personal trainer quality
and certification etc. which makes the health club visitors vulnerable to
more health hazards.

Hence weight training based fitness programme needed to be
designed to find out its effect on health parameters, reducing health
risk, weight control, etc. Further it was felt that it is urgent need of the
hour that effects of weight training based programme at par with other
forms of training needs to be understood. Whether weight training
programme can substitute other forms of training for health benefit.

Though resistance training for fitness improvement in terms of
strength, endurance, speed, flexibility etc. is well established, but a
means of reducing body fat, weight control and lipid profile
improvement is yet to be established comprehensively and
convincingly. Hence research scholar conceptualized this study to
design comprehensive weight training programme with specific
purpose and to investigate its effect. Their by keeping the very purpose
of the study in consideration the study was titled as “Effect of High
Intensity and Low Intensity Weight Training on Blood Lipids and
Body Fat”.
**Delimitations**

Since the study was conceptualized with specific purpose within a distinct reference and context, it was precisely confined within purposive area and features as follows:

1. The study was delimited to blood lipids (HDL and LDL) only.
2. The study was further confined to body fat percentage.
3. The data for blood lipids was collected before and after eight weeks of weight training programme.
4. The blood lipids data was analyzed in well reputed pathology lab of Indore (MP).
5. Keeping in view the administrative feasibility, the study was done on a total of sixty male subjects.

**Limitations**

Certain factors like genetical constitution, dietary habits, subjects internal motivation, life style and their effect that might accrued was considered limitation of the study.
Hypotheses

Based on extensive review of literature that scholar could avail, present research trend and scholar’s own understanding of the issues, corresponding to the present study, following hypotheses were formulated:

1. Weight training programme of high and low intensity both will significantly affect lipid profile i.e. HDL and LDL.
2. Weight Training program of high and low intensity will significantly affect body fat percentage.
3. The effect of high and low intensity weight training on blood lipid HDL, LDL and body fat percentage will be significantly different.

Definition and Explanation of the Terms

Lipids

The lipids are heterogeneous group of compounds related, either actually or potentially to the fatty acids. They have the common property of being relatively insoluble in water and soluble in non polar
solvent such as ether, chloroform, and benzene. Thus the lipids include fats, oil, waxes, and related compound.4

Low density lipoprotein and high density lipoproteins

Low density lipoprotein contains relatively few triglycerides but a very high percentage of cholesterol.

L.D.L. is a remnant of a V.L.D.L. The V.L.D.L. contains 95% lipid, of which about 60% is in the form of triglyceride. It transports to muscle and adipose tissue the triglycerides formed in the liver from lipids carbohydrates, alcohol and cholesterol. Once acted only enzyme lipoprotein lipase, it becomes a denser LDL molecule because it contains less lipid.

HDL is produced in the liver and small intestine. Of all the lipoproteins they contain the greatest percentage of protein (about 50%), the least total lipid (about 20%) and the least cholesterol (about 20%).

High density lipoprotein contains about 50% protein with smaller concentration of the lipids.5

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5 Mc Ardle William D., Katch Frank I & Katch Victor L., Exercise Physiology.
Significance of the Study

The very purpose of the study was to understand and find out efficacy of weight training based programme on improvement of blood lipid profiles and body fat reduction. Hence findings of this study will clearly have larger implication in health risk management, body weight control, fitness improvement etc.

Further, findings of this study will help to understand the intricacies and implications, while designing a weight training programme. It will also make one understand the finer aspects of training programme implementation. In addition it will contribute significantly in following ways:

1. The findings of this study might establish efficacy of weight training exercise at-par with other forms of exercise for blood lipid profile improvement and body weight management.

2. The study will throw insight to weight training exercises – it’s nature, category, suitability, that can be incorporated in various programme with specific purpose.
3. The findings of this study will significantly help health trainer, exercise therapist, sports trainer, etc. for weight training exercise prescription.

4. Findings will add to knowledge of training and exercise physiology.