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Effect of Exercise on Low Level Lipoprotein (LDL)

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Abstract

Low Level Lipoprotein (LDL) is referred to as "bad" cholesterol can build up on the walls of arteries and increase chances of getting heart disease. In general, doctor is most likely recommend a statin in addition to making healthy lifestyle choices. Therefore, it is necessary to investigate whether there is any positive effect of exercise on level of LDL or not. From this point of view the present researcher is intended to investigate effect of 12 weeks regular exercise on level of LDL. Total 30 subjects mean age ranged (22 $\pm$1) years from B.P.Ed. Semester-I of SevaBharastiMahavidyalaya were taken randomly irrespective of sex by randomization. Six days/week conditioning for one hour/day and two major game practices for 3 hours/day were practiced regularly.After 12 weeks mean LDL decreased to 46.86 from 57.00 which implies 17.78% decrease in level of LDL (t = 2.91615) in Bped-1 and In case of Bped-2 level of LDL decreased to 52.73 from 75.21 which implies that 29.88% decrease (t= 4.98232). The p value of BPED-1 and BPED-2 are 0.006905 and .000032 respectively. The level of significance is 0.05 in both groups. First, exercise stimulates enzymes that help move LDL from the blood (and blood-vessel walls) to the liver. From there, the cholesterol is converted into bile (for digestion) or excreted.

Keywords: Exercise – Low – Level - Lipoprotein.

Introduction: Increased LDL is associated with an increased risk of cardiovascular disease. It is commonly associated with diabetes, hypertension, hypertriglyceridemia, and atherosclerosis. Through typically asymptomatic, hypercholesterolemia could present with metabolic syndrome, in which the body would present with hypertension. In more severe hypercholesterolemia, person may present with xanthomas with yellow nodules or plaques on the Achilles tendon; for example, xanthelasma on the eyelids or corneal arcus with white rings lining the cornea. For this reason, LDL is clinically significant as it is crucial to monitor levels of LDL in patients with hypertension and diabetes. Lifestyle modifications are crucial in overweight patients in order to lose weight, through both exercise and diet control. Diets with lower saturated fats and aerobic exercise can help reduce LDL for patients. Pharmacologic modalities can also be utilized to decrease LDL levels, primarily HMG-Coa Reductase inhibitors, such as pravastatin and lovastatin, help significantly decrease serum LDL levels by inhibiting the conversion of HMG Coa to Mevalonate, which is a precursor to cholesterol. PCSK 9 inhibitors, such as Evolocumab and Alirocumab, also significantly decrease serum LDL levels by inactivation the degradation of LDL receptors on target tissues. With this, more LDL receptors remain on target tissue as they are not degraded, increasing

removal of LDL from the bloodstream. Various studies reveals that exercise may decrease the level of LDL positively. But there is no such studies found in case of normal people it is true or not. So many studies found that in case of obese patient exercise is fruitful with controlled intensity and volume. So, from this point of view the researcher intend to investigate whether the exercise with high intensity and volume of load is effective to reduce the level of LDL or not.

Methods: Total 30 residential female students' age ranged (22±1) years were selected after randomization from 70 students and divided into two groups Bped-1 and Bped-2 group. Six days/week conditioning for one hour/day and two major game practices for 3 hours/day were practiced regularly.

Procedure: Hitachi 704 Analyzer which is serviced by Roche Diagnostics (formerly Boehringer-Mannheim Diagnostics), Indianapolis was used to measure LDL through fasting blood sample. LDL-cholesterol Most of the circulating cholesterol is found in three major lipoprotein fractions: very low density lipoproteins (VLDL), LDL and HDL. [Total chol] = [VLDL-chol] + [LDL-chol] + [HDL-chol] LDL-cholesterol is calculated from measured values of total cholesterol, triglycerides and HDLcholesterol according to the relationship: [LDL-chol] = [total chol] - [HDL-chol] - [TG]/5 where [TG]/5 is an estimate of VLDL-cholesterol and all values are expressed in mg/dL. LDL carries most of the circulating cholesterol in man and when elevated contributes to the development of coronary atherosclerosis. Desirable levels of LDL-chol are those below 130 mg/dL in adults and 110 mg/dL in children.

Table no. 01. Practice schedule of Both Groups.

Conditioning	Activity -1 Athletics	Activity – 2 Ball Games	Activity -3Any Games (own choice)
I hour (6.00 A.M. to 7.00 A.M.)	I hour (7.30 A.M. to 8.30 A.M.)	I hour (8.30 A.M. to 9.30 A.M.)	2 hour (6.00 A.M. to 7.00 A.M.)

Result and Discussion: After 12 weeks mean LDL decreased to 46.86 from 57.00 which implies 17.78% decrease in level of LDL (t = 2.91615) in Bped-1 and In case of Bped-2 level of LDL decreased to 52.73 from 75.21 which implies that 29.88% decrease (t=4.98232). The p value of BPED-1 and BPED-2 are 0.006905 and .000032 respectively. The level of significance is 0.05 in both groups.

Table No. 02: Mean, S.D., t, P Value and percentage change.

Group	Pre Test Mean ± S.D	Post Test Mean ± S.D.	t	P Value	Significance Level
BP Ed-1	57.00 ± 10.3150	46.86 ± 7.9151	2.91615	0.006905	0.05
BP Ed-2	75.21 ±13.7840	52.73 ± 9.4125	4.98232	0.000032	0.05

Test	% Decrease
Two tailed	17.78
Two tailed	29.88

Table No. 03: Raw data of BPED-1 Pre Test and Post Test Comparison.

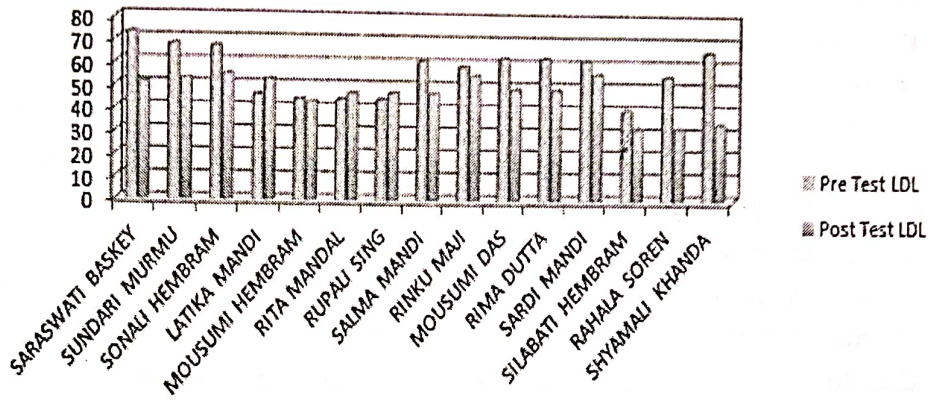


Table No. 04: Raw data of BPED-2 Pre Test and Post Test Comparison.

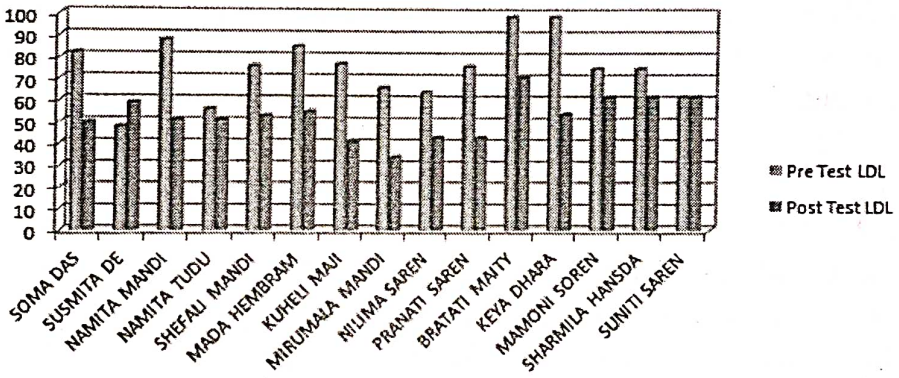
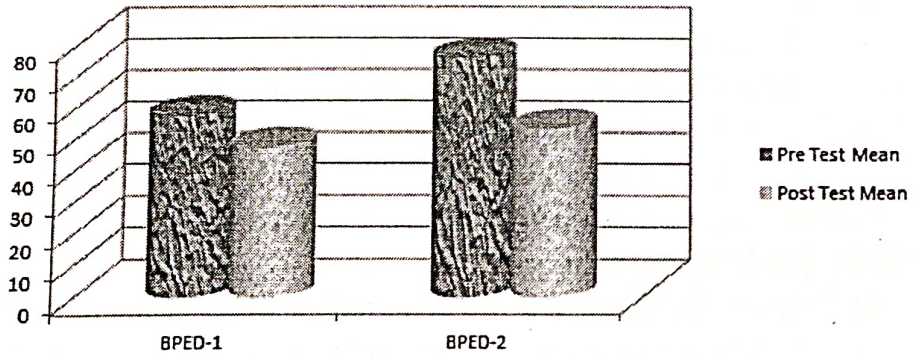


Table No. 05: Comparison of Mean of BPED-1 and BPED-2.



The LDL receptor is on the liver and most other tissues. It recognizes Apo B 100 and Apo E, mediating the uptake of LDL, chylomicron remnants, and IDL, through endocytosis. After internalization, the lipoprotein particle is degraded in lysosomes and cholesterol is released. When cholesterol enters the cell, HMG CoA reductase activity increases, then synthesizes cholesterol and modulates the expression of LDL receptors. LDL receptors on the liver determine plasma LDL levels. When there is a low number or receptors, less LDL can be taken up from the blood by the liver, leading to high plasma LDL levels. Conversely, when there are more LDL receptors, more LDL is taken up from the blood by the liver, leading to low plasma LDL levels. Levels of cholesterol regulate the number of LDL receptors in the cell. If the cell senses a decrease in cholesterol levels, the transcription factor SREBP is transported from the endoplasmic reticulum to Golgi where proteases cleave and activate SREBP which moves to the nucleus and increases expression of LDL receptors. When cholesterol levels are low in the cell, high SREBP remains in the endoplasmic reticulum in an inactive form, and expression of LDL receptors is decreased. Hypercholesterolemia occurs due to excess cholesterol from diet, bile, or intestines. The liver releases triglycerides into the plasma in the form of VLDLS. The intestines release triglycerides into the plasma in the form of chylomicrons. Once in the plasma, the VLDL is converted into LDL. LDL in the plasma then interacts with the LDL receptor on cells in various tissues.**Conclusion:** It may be conclude that due tohigh intensity and large volume of exercise, games and sports participation may decrease the level LDL. Another study is needed for better treatment with more specific exercise and more subjects.

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