Effect of steam sauna bath on lipidprofile in physiologically active individuals

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Abstract

Objective: The aim of the study was to assess the effects of steam sauna bath on lipid profile in physiologically active subjects.

Material methods: Ninety physically active subjects [30-50 years], forty-five males and forty-five females were subjected to seven steam sauna baths with 50^0C temperature was maintained. The duration was 15 min. for each sauna bath. We estimated serum cholesterol, serum triglycerides, low density lipoprotein (LDL)&high density lipoprotein (HDL)in physiologically active study subjects before and after steam sauna bath.

Results: Serum total cholesterol, triacylglycerides (TG), & low density lipoprotein (LDL) were significantly decreased and High density lipoprotein (HDL) was significantly increased in physiologically active study subjects after seven steam sauna baths as compared to pre steam sauna bath study subjects.

Conclusion: Steam sauna bath may help in preventing atherosclerosis and its consequences. It is also beneficial for healthy, asymptomatic and subclinical subjects. The steam sauna is an important modality for the physical and mental well-being of the society.

Keywords: Physiologically active individuals, Lipid profile, Sauna bath.

INTRODUCTION

Steam sauna baths have been used in various parts of the world for health, fitness and relaxation. Steam sauna bath induces sweating at different atmospheric conditions. When the body raises its temperature higher than normal, it goes into a state of hyperthermia. The physiological changes that occur during the bath are rise in body temperature and influences reflexes of the hormonal and nervous system which attempt to increase the heat loss[1,2]. The proper concentration of individual elements of the lipid profile is a significant factor in preventing atherosclerosis and in consequence the development of myocardial ischemia[3]. Moreover, there are studies suggesting that long term sauna bathing may help lower blood pressure and can be an effective therapeutic modality for patients with cardiovascular diseases, especially for patients with congestive cardiac failure, improving vascular endothelial function and the left ventricular ejection fraction [1,4,5]. The results of the research conducted so far show that physical activity has beneficial effects on the changes in lipid profile in which low density lipoprotein (LDL) and triacylglycerides (TG) concentration were significantly decreased in serum [6].

There are very few studies on steam sauna bath. Hence the present study was aimed to determine the influence of steam sauna bath on lipid profile in physiologically active subjects.

MATERIAL AND METHODS

The present study was carried out in the Department of Biochemistry, Bharati Vidyapeeth Deemed University Medical College & Hospital, Sangli. The study protocol was approved by the institutional ethical committee of BVDUMC&H, Sangli. The subjects were 90volunteershealthy men and women between the age group 30-50 years. They did not practice any sport and had not used sauna before. The female subjects did not report any menstrual irregularities. None of the female subjects used any hormonal contraception. First blood samples were collected before steam sauna bath and second blood samples were collected after 7 steam saunas. The temperature of sauna was maintained at 50^0C. The time duration of each steam sauna bath was 15minutes. The subjects were asked to drunk plenty of water before and after the bath. Steam sauna bath was well tolerated by all subjects and no intolerances were noted during and after the procedure. Serum lipid profile that is sr. cholesterol, triacylglycerides, LDL & high density lipoprotein (HDL) was assayed in both pre and post sauna bath blood samples on fully automatic biochemistryl analyzer [7,8,9,10,11]. All values were expressed as mean $\pm$ SD. Statistical significance was analyzed by student't' test.

RESULTS AND DISCUSSION

Table shows; mean serum total cholesterol level was found to be 206.64$\pm$46.99SD in pre-sauna condition while it was 185.47$\pm$30.82SD in post-sauna. It indicates that there was significantly decreased serum cholesterol in post sauna blood samples [$p< 0.001$] as compared to pre-sauna steam sauna bath. This is may be due to an increase in metabolic rate resulting from excitation of the sympatho-adrenal system and an increase in the internal temperature of the body [12,13,14,15].

Hormones may be influence the lipid metabolism mainly by modification of the activity of lecithin cholesterol acyl transferase enzymes which are involved in cholesterol metabolism. Steam sauna bath gives many benefits of moderate exercise without exertion [16,17] and increasing reverse cholesterol transport system[18].

Table reveals serum TG levels were 131.04$\pm$53.17SD in pre sauna condition, while in post sauna it was 101.74$\pm$32.31 SD.There was significantly decreased serum TG in post sauna blood samples [$p<0.001$].

This is may be owing to increased activity of the enzyme hormone sensitive lipase. The main function of this enzyme is to mobilize the stored fats. The enzyme hydrolyses TG into fatty acids and glycerol [19].

Table demonstrates mean serum LDL levels in pre-sauna subjects were140.51±43.97SD. The levels of serum LDL in post-sauna subjects obtained were 118.64±29.22SD. There was significant decrease in LDL levels in post sauna as compared to pre sauna [p<0.001].
This is may be due to steam sauna stimulating LDL & cholesterol metabolism [20].
Table indicates mean serum HDL levels before steam sauna to be 37.47±9.66 SD and after steam sauna the levels were 46.89±8.26 SD. It shows that there was significant increase in HDL levels in post sauna as compared to pre sauna [p<0.001].

Steam sauna bath stimulates reverse cholesterol transport along with HDL. It may be increase the production of Apo-AI and Apo-C I &III in the liver. Second, it increases the size of the protein particles that carry cholesterol in the blood lipoproteins.

HDL is involved in the down regulation of expression of adhesive molecules on the surface of vascular endothelium, inhibition of platelet aggregation, prevents formation of oxidized LDL by inhibiting nitric oxide synthetase and up regulation of ATP binding cassette protein A I and activation of intracellular signaling leading to stimulation of cholesterol metabolism.[16].

CONCLUSION

The overeating, hoteling, eating of junk food with soft drinks, lack of exercise, sedentary lifestyle are causingobesity in adults as well as inyoung and school going children. For these people steam sauna bath is a boon. Thus steam sauna may help to prevent atherosclerosis and consequently development of myocardial ischemia. It is also beneficial for healthy, asymptomatic and subclinical persons. Thus, steam sauna is an important modality for the physical and mental well being of the society.

Table Cholesterol, TG, LDL, HDL in pre-sauna and post sauna subjects

	Pre Sauna	Post Sauna			
	n = 90 Mean ± SD	n = 90 Mean ± SD	t	p	Significance
CH	206.64 ±46.99	185.47 ±30.82	5.049	0.000	Highly significant P<0.001
TG	131.04 ±53.17	101.74 ±32.31	6.110	0.000	Highly significant P<0.001
LDL	140.51 ± 43.97	118.64 ±29.22	4.923	0.000	Highly significant P<0.001
HDL	37.47 ±9.66	46.89 ±8.26	8.212	0.000	Highly significant P<0.001

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