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THE EFFECTS OF STEAM SAUNA BATH ON THE LEVELS OF URIC ACID AND SODIUM AND POTASSIUM IN PHYSIOLOGICALLY ACTIVE SUBJECTS

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ABSTRACT

Objective: The aim of the study was to assess the effects of steam sauna bath on the levels of uric acid and sodium and potassium in physiologically active subjects. **Material methods**: Ninety physiologically active subjects between the age group 30 – 50 years were included in our study. There were forty-five males and forty-five females. These subjects were subjected to seven steam sauna baths on alternate days and the temperature was maintained at 50°C. The duration of each steam sauna was 15 minutes. The uric acid and sodium and potassium levels were estimated in physiologically active subjects, before and after steam sauna bath. **Results**: In males, the mean pre -sauna uric acid levels were 5.33 ± 1.42 sd and the mean post-sauna uric acid levels were 5.15 ± 1.53 sd. These were statistically not significant [P=0.320]. In females, the pre-sauna levels of uric acid were 5.36 ± 1.51 and the post-sauna levels of uric acid were 4.34 ± 1.31. These were statistically highly significant [P=0.000]. The sodium and potassium levels in both male and female post-sauna subjects were not changed as compared to pre-sauna levels. **Conclusion**: Steam sauna bath may help in decreasing uric acid levels in females to prevent the consequences of hyperuricemia, but not in males. The sodium and potassium levels are not affected by steam sauna bath.

KEYWORDS: Physiologically active subjects, uric acid, sodium and potassium, 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] Research has repeatedly shown that sweating in a sauna can help detoxify the body of toxic agents such as, lactic acid, uric acid that routinely accumulate in the body. Toxins stored in subcutaneous fat are released through perspiration. As toxins stored in the fat pass through perspiration, toxins that are stored at deeper levels of tissue throughout the body will move up into this layer of fat and continue to be released through sweat. Circulation increases when you are in the sauna and increased blood flow improves blood oxygenation. Enhanced oxygen levels can assist in the dissolution of hidden toxic agents in the blood.[8]

The results of rise in temperature of the body from an external source are not identical to results from an internally generated fever. During fever, the hypothalamus deliberately elevates the core body temperature and keeps it there. In steam sauna bath, the body temperature is elevated by external heat application and the hypothalamus is unwilling to allow a significant rise in core body temperature. As the body temperature rises in steam bath, thermo receptors in hypothalamus detect the rise in temperature and the hypothalamus activates mechanisms to cool the body; these are skin vasodilatation and sweating.[9,10]

In 2002, a study published in the Journal Of American College Of Cardiology, researchers found that spending 15 minutes in a steam sauna daily for 14 days improved the function of the endothelial cells lining the arteries by 40%. They also found that daily steam sauna for 4weeks decreased blood pressure and improved oxygen uptake in patients with serious heart disease.[2,22]

With sweat, waste products like urea and uric acid can be discharged out of the body. This can reduce the workload of kidneys and protect the kidneys from being damaged further. By increasing the blood circulation, external therapy like steam therapy helps oral medicine to go to the nidus quickly and it can be used to the fullest potential.[9,10,11]

There are very few studies on steam sauna bath. Hence the present study was aimed to determine the influence of steam sauna bath on the levels of uric acid and the levels of sodium and potassium in physiologically active subjects.

MATERIAL AND METHODS

The present study was carried out in the Department of Biochemistry, Bharati Vidyapeeth Deemed University Medical College And Hospital, Sangli. The study protocol was approved by the institutional ethical committee of BVDUMC&H, Sangli. The subjects were 90 physiologically active men and women volunteers between the age group 30-50years. They 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^{o}C. The time duration of each steam sauna bath was 15 minutes. The subjects were asked to drink plenty of water before and after the bath. Steam sauna bath was tolerated by all subjects and no intolerances were noted during and after the procedure. Serum uric acid and sodium and potassium levels were assayed in both pre and post sauna bath blood samples on fully automatic biochemistry analyser.[3,4,5,6,7] All values were expressed as mean ± SD. Statistical significance was analysed by student 't' test.

RESULTS AND DISCUSSION

Uric acid levels in pre-sauna and post-sauna male and female subjects

	Pre Sauna	Post Sauna			
	n=90 Mean ± Sd	n=90 Mean ± Sd	T	p	Significance
Total	5.35 ±1.46	4.75 ±1.47	3.763	0.000	Not significant p>0.5
Male	5.33 ± 1.42	5.15 ± 1.53	1.005	0.320	Not significant p>0.5
Female	5.36 ±1.51	4.34 ± 1.31	4.083	0.000	Highly significant P<0.001

Na& K in pre-sauna and post sauna subjects in Male and Female

	Na					K				
	Pre Sauna	Post Sauna				Pre Sauna	Post Sauna			
	n=90 Mean ± Sd	n=90 Mean ± Sd	t	P	Significance	n=90 Mean ± Sd	n=90 Mean ± Sd	T	p	Significance
Total	142.02 ±6.03	141.48 ±5.33	0.822	0.413	Not significant p>0.5	4.36 ±0.85	4.30 ±0.57	0.809	0.421	Not significant p>0.5
Male	141.87 ± 6.67	141.69 ± 5.04	0.187	0.852	Not significant p>0.5	4.45 ± 0.91	4.26 ± 0.55	1.716	0.093	Not significant p>0.5
Female	142.18 ±5.37	141.27± 5.66	0.978	0.334	Not significant p>0.5	4.26 ± 0.79	4.34 ± 0.60	0.824	0.415	Not significant p>0.5

In males, the mean pre-sauna levels were 5.33 ± 1.42 sd and the mean post-sauna levels were 5.15 ±1.53 sd. Statistically not significant [p=0.320]. In males, uric acid levels were not significantly decreased in post-sauna subjects as compared to pre-sauna levels.

The pre-sauna levels of uric acid in females were 5.36 ± 1.51 and the post-sauna levels were 4.34 ± 1.31. Statistically highly significant [P= 0.000]. In females, uric acid levels were decreased significantly in post-sauna subjects as compared to pre-sauna levels.

Hyperuricemia has been associated with acute and chronic diseases including gout, cardiovascular disease and type2 diabetes, though these associations are typically observed among men and post-menopausal women.[15,16,18,19,20]

High levels of uric acid among anovulatory women may also be indicative of an underlying endocrine or metabolic disturbance, even among women reporting regular menstrual cycle[21,23]

Steam bath induced sweat contains 5-6 times more toxins, fats and chemicals than normal sweat. Sweat contains 95-97% water. But after steam sauna bath, sweat contains 80-85% water and the remaining 15-20% is composed of undesirable elements like fat-soluble toxins, uric acid, cholesterol, heavy metals, ammonia. These concentration levels are not found in sweat from natural exercise.[9,10,11,12,13,14,15]

The sodium and potassium levels in both male and female post-sauna subjects were not changed as compared to pre-sauna levels. The pre-sauna levels of sodium and potassium in males were 141.87 ± 6.67 and 4.45 ± 0.91 respectively. The post-sauna levels were 141.69 ± 5.04 and 4.26 ± 0.55 respectively.

In females, the sodium and potassium levels were 142.18 ± 5.37 and 4.26 ± 0.79 respectively and the post-sauna levels were 141.27 ± 5.66 and 4.34± 0.60 respectively. Statistically not significant [P=0.3 for sodium, P=0.4 for potassium].

The subjects were asked to drink water before, during and after steam sauna bath. Thus, there was no dehydration or electrolyte imbalance. The steam sauna bath induced fluid loss should be adequately replaced as early as possible.[13,16,17]

The steam sauna bath may help in preventing hyperuricemia and its consequences.

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