Short Communication

Pranayama, a simple counterattack on obesity, via its impact on the serum leptin levels

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ABSTRACT

Overweight (i.e. BMI of 25- 29.9) and Obesity (BMI ≥30) continues to be one of the neglected global health problems. Leptin is one of the chief adipokines in the body that is basically involved in maintaining a balanced appetite in association with the various other adipokines like the adiponectin, ghrelin etc., *Pranayama* is the simplest and the ancient, dateless, venerable, non- pharmacological intervention that could be potentially used to maintain a healthy life. To determine how the regular practice of *pranayama* could significantly alter the deranged serum leptin levels in the obese. The correlative study was carried out in Sree Balaji Medical College & Hospital. The subjects included were 60 obese student volunteers of 17-19 years with no other known complications. We measured their serum leptin levels using ELISA method in the central laboratory, both before and after the *pranayama* training for 6 months. After 6 months of regular *pranayama* practice, there was a significant decrease in both their serum leptin levels and their BMI as well. Thus, it was concluded that we can potentially turn off our fat switch by beneficially reducing the serum leptin levels and enhancing the leptin receptor sensitivity in the obese with the regular practice of *pranayama.*

Keywords: Obesity; *pranayama;* serum leptin.

INTRODUCTION

Today's generations are more obsessed with the fast food cultures mainly because of their busy life schedule and the easy availability of these hyper palatable junk foods. This in association with their confined sedentary lifestyle, ultimately results in the unchecked increase in their BMI (body mass index) status (1). Thus, even kids with normal family genes tend to become obese early in life.

Leptin which is chiefly secreted by the adipose tissue in the body is one of the major adipokines that is said to be one of the main gatekeepers / regulators of body metabolism and satiety. The mean leptin levels for the obese were found to be in the range of 26.2 – 77.4 ng/ml (2). Leptin levels in the obese are generally found to be higher when compared to their peers with normal BMI levels as increased amount of adipose tissue in the obese ultimately results in the increased production of the neurohormone-leptin. This emphatically results in the down regulation/development of resistance in the leptin receptors, mainly owing to the increased exposure to the excess levels of circulating leptin levels in the obese (3). Therefore, the high level of the circulating leptin is not recognized by the receptors, thus increasing the appetite/craving for food that results in obesity when left unchecked (3). *Pranayama*- an ancient Indian practice, chiefly involves in controlling our breath. Numerous previous authorized studies have proved its significance in combating various other health issues such as asthma, stress related disorders like anxiety and depression etc., (4).

The aim of the study was to determine and establish the effects of practicing *pranayama* in the obese and its impact on the serum leptin levels and the BMI.

MATERIALS AND METHODS

It was a correlative study conducted in the premises of Sree Balaji medical college and hospital, Chrompet. We chose 60 student volunteers with obesity (30 boys and 30 girls, BMI obese ≥ 30 kg/m^2; 1) of 17-19 years, with no other health issues and no relevant family history. All the participants were explained in detail about the health benefits and the need to practice *pranayama.* They had few yoga sessions conducted in the college about the proper techniques to be followed, for practicing *pranayama* under the guidance of an experienced *yoga* instructor. We then asked them to practice 30 minutes of *pranayama* every day in the mornings, continuously for six days a week for a total period of 6 months i.e. 24 weeks.

Two laboratory parameters were measured on two occasions:

- Their serum leptin levels by ELISA (Sandwich Enzyme Linked Immunosorbent Assay) technique done in the central laboratory of Sree Balaji Medical College and Hospital, Chrompet, Chennai. The kit called ab 179884-Human leptin Elisa test kit was used (5). According to the manufacturers protocol the normal serum leptin

levels was 0.3-13.4 ng/mL in males and 4.7-23.7 ng/mL in females.

- Their BMI was calculated using the Quetelet's index i.e. BMI= weight in kgs / height in m^2 (1).

Exclusion criteria: Positive family history of obesity, hypothyroidism, any drug history, diabetes mellitus, any endocrinal disorders like Cushing's syndrome etc.

Statistical analysis: MS excel sheet and software package for the social sciences version SPSS 18.

Limitations of the study: It was a self-reported study and there were no restrictions / major alterations in their diet patterns. All the participants were explained in detail about the significance of the study, and their consent was obtained in written format as well, prior to the study. The ethical committee approval was also obtained for the same.

RESULTS

The mean serum leptin levels came down from 27.48 to 26.02ng/ml after 6 months of regular pranayama practice with a statistically significant p value i.e. ($p < 0.05$) as well. Both males and females responded the same way.

Their mean BMI levels also came down significantly from 31.03 to 29.48 after regular practice of pranayama for 6 months, with a statistically significant p value ($p < 0.05$). They stated to have attained a relaxed state of mind, improved flexibility, and enhanced health awareness after practicing pranayama for a regular duration.

Table 1: Serum leptin levels before and after pranayama

Trials	n	Mean serum leptin levels	Standard deviation
Before *pranayama*	60	27.48	1.28
After *pranayama*	60	26.02	1.39

Table 2: BMI levels before and after *pranayama*

Trials	n	Mean BMI	Standard deviation
Before pranayama	60	31.03	0.90
After pranayama	60	29.48	0.98

DISCUSSION

Obesity is one of the chief global threats that could result in various health complications if not treated early in life. In today's society, where most often both the parents tend to be working, the kids are more subjected to sedentary lifestyle and unhealthy eating habits which are the two leading, preventable causes of childhood obesity and obesity in teenagers. Leptin, which is produced mainly by the adipose tissue in the body, besides being the gatekeeper of fat metabolism and satiety, also serves as a neurotransmitter that chiefly regulates our brain, which in turn regulates food intake by inhibiting hunger, and enhancing the satiety state (5). In obese individuals though their circulating levels of leptin in the blood, is high in comparison with the normal levels, yet the leptin receptors being subjected to excessive exposure of this leptin becomes down regulated and fails to recognize the circulation leptin (3). Resulting ultimately in the increase in hunger sensations and impaired satiety effect that culminates in overeating and ultimately leads to obesity (5).

Among the various known commonly followed/ practiced yoga techniques globally, Pranayama is chiefly a breathing technique, which ultimately results in good flow of energy in our body, thereby enhancing the optimum functioning of our respiratory system, thus increasing the basal metabolic rate (6). It increases the oxidation in our body leading to weight loss. When there is weight loss there is a decrease in the adipose tissue content, thus there is the comparative decrease in leptin production as well, that ultimately results in enhancing the leptin receptor sensitivity.

Pranayama also serves to clean and detoxify our body organs, when done on a regular basis. It helps to regulate our system, alters our mood favorably and offers longevity thus providing good emotional and physical health. Thus, practicing pranayama regularly serves to supercharge the body. The results of our study proved the same by decreasing the mean serum leptin levels in the obese subjects from 27.48 to 26.02 ng/mL with a statistically significant p value i.e. $p < 0.05$. Thus, by decreasing the serum leptin levels, it up regulates or improves the leptin receptor sensitivity that helps the receptor to recognize the circulating available leptin thereby producing the satiety effect (7). In the long run it can also prevent the development of metabolic syndrome (8).

CONCLUSION

The results of our study yet again proved the health benefits of practicing pranayama on a day to day regular basis, especially among the obese population. The mean serum leptin levels are reduced, and their BMI levels came down as well in most of the obese study group population with both males and females, showing equally

significant response.

Thus, pranayama has been proved to be one of the simplest practicable forms of yoga, when compared to *suryanamaskar* (9), to counterattack the universal threat called obesity. Henceforth it can be considered as one of the simplest counterattacks on obesity because it's cost effective, easy to practice, doesn't need any special equipment, there are no specifications or age limitations to practice pranayama. And besides all, if practiced regularly using proper technique it has no major side effects. More detailed longer duration studies are required to determine its mechanism of action and the various other added health benefits of practicing pranayama among all age groups. Thus, the health benefits of practicing pranayama regularly can be ultimately compared to an iceberg phenomenon (because its true added benefit, remains hidden/unrecognized to the world; 5).

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