



## Additive Advantages of Utilization of a Combination Therapy of High Intensity Interval Training (HIIT) and Vitamin D Supplementation for Overweight/Obese Individuals in Appetite Reduction, Favourable Metabolic profile-A Short Communication

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Currently regulation in addition to avoidance of weight accrual, represent factors of maximum significance existent regarding factors in avoidance of mortality along with disease globally [1]. Regulation of appetite is based on variation of neurological, psychological along with cultural factors. Regarding the physiological angle, appetite controlling gut hormones possess significant part in hunger in addition to satiety [2]. PYY represents an anorexigenic peptide generated from the L cells of the intestine along with liberation in the blood stream. Regarding this ghrelin is an orexigenic peptide that is an acylated peptide further gets liberated from the stomach [3]. With the information that exercise results in reduction of the orexigenic peptide (alias acylated ghrelin) besides enhancing the anorexigenic peptide (alias PYY) [4]. Outcomes of numerous studies have illustrated an association amongst physical activity besides physiological modes of appetite regulation [4]. On the escalation of inactivity, a positive energy equilibrium develops that is followed by weight accrual. Nevertheless, physical activity possesses a major part regarding the management of body weight by generating a negative energy equilibrium along with impacting the appetite controlling hormones [5]. Of the maximum necessary

issue regarding exercise is the impact on appetite control might be based on how vigorous the exercise is [6].

The American College of Sports Medicine (ACSM) documented that High intensity interval training (HIIT) possessed equivalent effectiveness to moderate intensity continuous training (MICT) in alleviating body constitution along with Insulin sensitivity in overweight along with obese individuals [7]. Regarding this HIIT that implicates short recurrent time duration of activity whose potency is > 85% of  $VO_{2max}$  has been illustrated to be akin besides in certain individuals greater physiological besides metabolic adjustments contrasted to moderate intensity bearing work [8]. More recently, it was corroborated that HIIT changes appetite controlling hormones, restricts energy utilization [8], along with causing an important decrease in body fatmass [9].

Conversely Vitamin D deficit has assumed Public Health importance worldwide [10]. As per certain calculations greater than one billion people worldwide are afflicted with Vitamin D deficiency [11]. Certain studies have illustrated the existent of considerable Vitamin D3 deficiency implicating the adult population of variable

countries (35% in US, > 80% in Bangladesh along with Pakistan, 90% in Turkey, 96% in India besides 67% in Iran [11]. An inverse association has been observed amongst the quantities of 25 (OH) D along with body fatmass [12]. Enhanced fat accrual result in enzymatic conditions, like reduction in action of  $\alpha$ -hydroxylase the crucial enzyme implicated in the transformation of 25 hydroxy Vitamin D3 to 1,25 hydroxy Vitamin D3. This resulted in accrual of inactive kind of Vitamin along with reduction of bioavailability of Vitamin D [13]. This Vitamin D deficiency is correlated with overweight along with obesity [14]. Explanations for reduction of Vitamin D quantities at the time of obesity takes place are secondary to escalated absorption by adipose tissue (AT) along with reduction of Vitamin D formation by the liver secondary to hepatic steatosis besides enhanced clearance of Vitamin D at the time of situations of inflammation [15]. Additionally, this inadequate Vitamin D quantities result in enhancement of parathyroid hormone quantities, activation of lipogenesis, Hence resulted in more fat accrual [16]. Vitamin D deficiency is correlated with obesity with the illustration regarding supplementation of Vitamin D possess akin actions of glucose metabolism along with Insulin sensitivity in overweight along with obese subjects [17].

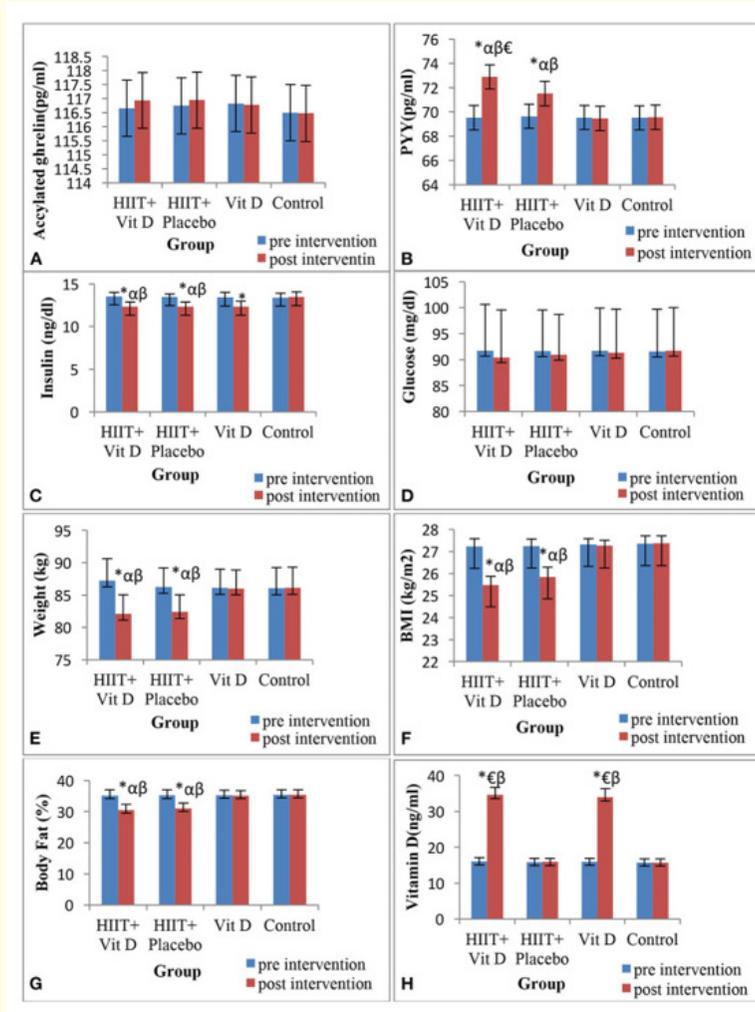
It is thought that hypothalamus would escalate appetite along with reduction in energy expenditure secondary to lesser calcidiol amounts in view of Vitamin D deficiency, These adaptations are feasible via the transcription pathway of neuropeptide Y (NPY) or Agouti related protein (AgRP) [18]. Administration of Vitamin D escalates the expression of Vitamin D receptor (VDR) gene in the pancreas [19], with VDR activation inducing peptide YY transcription in pancreatic islets of Langerhans (alias an appetite repression hormone generated by the pancreas along with intestinal L cells [20], Sustenance of adequate amounts of Vitamin D (> 30g/ml) is feasible with adequate consumption of Vitamin D supplements, however the daily dosage is variable as per age, gender, geographical localization, skin pigmentation, physical activity along with seasonal variations. investigations have demonstrated that the least requirement of Vitamin D is 2000 IU/day for ensuring the least concentration of 30g/ml is sustained in the blood [21].

independent of each other, exercise besides Vitamin D supplementation directly or indirectly stimulate advantageous along with adjusting immune responses for regulating obesity, bodyfat.

In the absence of effect of simultaneous exercise besides Vitamin D supplementation, Sheikholeslami –Vatan and Rostamzadeh tried to evaluate the action of High intensity interval training (HIIT) along with supplementation of Vitamin D3 in case of sedentary men that were overweight. 48 enrolled men had a random allocation to one of these 4 groups; n = 12 ( HIIT + Vit D, HIIT + placebo (3sessions weekly. 10x1min interval cycling at 90-100% $VO_{2peak}$  segregated by 1min active recovery at 15%  $VO_{2peak}$  for 8 wks, Vit D along with control groups. The enrolled men were recipients of 2000 IU/day 25 (OH)D3 or placebo. Pre along with post training determination subsequent to 10h overnight fasting Insulin, weight, body mass index (BMI) along with body fat proportion were reduced significantly, however significant escalation of PYY was existent in the HIIT + Vit D, along with HIIT + placebo groups (p = 0.001 along with p = 0.001 respectively) following for 8 wks, of HIIT, Insulin (p = 0.009 along with p = 0.001) weight, BMI along with body fat proportion (p = 0.001 along with p = 0.001) were significantly lesser in the HIIT + Vit D, along with HIIT + placebo groups contrasted to the Vit D, along with control groups. (Figure 1) Nevertheless, PYY was significantly greater in the HIIT + Vit D, groups contrasted to Vit D (p = 0.025 along with control p = 0.007) along with further in the HIIT + placebo groups contrasted to the Vit D (p = 0.037 along with control groups (p = 0.032) following 8 wks of HIIT. Hence concluding that the combination comprising of regular HIIT with Vitamin D supplementation impacts appetite in addition to body constitution [22].

## Conclusion

Hence in total these observation demonstrated that with HIIT resulted in alterations in appetite based hormones, hormones reduction in appetite, body weight, body fat proportion BMI, along with, in case addition of Vitamin D supplementation of 2000 IU daily to HIIT is done then all these variables further get enhanced, thus emphasizing the significance of Vitamin D deficiency in these sedentary overweight men who benefit considerably with combining these if no contradiction exists for strenuous exercises. Furthermore these were observed to be of benefit regarding glucose along with lipid metabolism, thus could further aid in diabetics also.



**Figure 1:** Courtesy ref no22-Changes in acylated ghrelin (A), peptide YY (PYY) (B), insulin (C), glucose (D), body weight (E), BMI (F), body fat percentage (G) and vitamin D (H) during 8 weeks of HIIT protocol in overweight sedentary men. \*Significant difference compared to the pre-test; αSignificant difference compared to the Vitamin D group; βSignificant difference compared to the control group; €Significant difference compared to the HIIT + Placebo group.

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