International Journal of Research in Social Sciences
Vol. 13 Issue 02, february 2023,
ISSN: 2249-2496 Impact Factor: 7.081 UGC Approved
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

THE RESPONSES OF THE OVERWEIGHT INDIVIDUALS TO HIGH-INTENSITY INTERVAL TRAINING

DR PARVEEN KUMAR
ASSOCIATE PROFESSOR OF PHYSICAL EDUCATION
GURU NANAK KHALSA COLLEGE YAMUNANAGAR
DR RAJBIR
ASSISTANT PROFESSOR OF PHYSICAL EDUCATION
GOVERNMENT COLLEGE FOR GIRLS PALWAL, KURUKSHETRA

ABSTRACT

Starting with the realisation that the Indian National Congress's connection with the colonial British administration in India is seldom examined in either history or political science books, this dissertation investigates the Congress's publication archives and the subsequent usage of these materials. I've argued that an ongoing dialogue, first established through the Congress' textual culture and then re-enacted, expanded, and embedded within the colonial state through its intra-departmental correspondence and eventual inclusion in the colonial archive, was crucial to the formation of this relationship. Both fields benefit from a deeper understanding of this procedure since they depend not just on these embedded accounts but also on one another.

Keywords: *Obesity, Weight loss, Overweight, Metabolic adaptations*

INTRODUCTION

Obesity, a major contributor to the development of type 2 diabetes and other health problems, has skyrocketed in recent decades. Exercise is crucial to any successful weight loss plan because of its capacity to boost metabolic rate. The amount of substrates (i.e., fat and carbs) utilised during a workout is mostly dependent on the intensity of the exercise. Low to moderate intensity exercise is generally recommended for those who are overweight or obese in order to increase fat oxidation. Low to moderate intensity exercise has been proposed as a safe zone for minimising injuries and maximising gains in tolerance. This level of exercise intensity is utilised to ensure that formerly inactive individuals who are overweight or obese can complete their fitness programmes. Some researchers have proposed that high-intensity interval training (HIIT) is a good way to get the metabolic benefits from exercise that are more commonly associated with low-intensity workouts. Several alterations in the skeletal muscle cause an increase in fat oxidation and a decrease in glucose intolerance. High-intensity interval training (HIIT) has been proposed as a viable technique to elicit these adaptations, despite the fact that some overweight or obese people have difficulties continuing high-intensity exercise for extended periods of time. When it comes to improving cardiorespiratory fitness, HIIT is superior to continuous training at a moderate intensity. High-intensity interval training (HIIT) is not only beneficial, but also harmless and well-tolerated. High-intensity interval training is supposedly more enjoyable than steady-state moderate intensity exercise. Aerobic capacity improvements in young, healthy individuals may be achieved with either continuous moderate exercise or HIIT, according to a new systematic review and meta-analysis. A increasing body of evidence, however, suggests that high-intensity interval training (HIIT) may be an effective, time-efficient method for

improving functional ability and lowering the risk of death across the board in individuals who are overweight or obese and lead inactive lives. This article summarises the results of studies on HIIT conducted on overweight and obese individuals, with a focus on the effects of this type of training on fat burning and weight loss.

HIIT Protocols

During HIIT, you work out hard for a short length of time, over your lactate threshold, near your VO2max, and then rest for shorter amounts of time in between. People who are inactive, overweight, or obese can benefit from this format since it allows them time to rest in between intense workouts. The exercise consists of a three- to five-minute warm-up period, followed by thirty seconds of maximal cycling against a supra-maximal load. The Wingate test is the inspiration for HIIT, which requires a "all out" effort. The standard HIIT protocol consists of four to six Wingate tests, each followed by around four minutes of rest, for a total of two to three minutes of maximal exertion performed over the course of fifteen to thirty minutes. High intensity interval training (HIIT) is preferable for people who are already active and highly motivated than the Wingate protocol due to the Wingate protocol's strenuous physical demands and unpleasantness. Recent research suggests that high-intensity interval training (HIIT) can help those who are overweight or obese and have a sedentary lifestyle. Two weeks of very high intensity sprint interval training (six sessions of four to six repeats of a 30-second Wingate with a recovery period of four to five minutes) improved insulin sensitivity, increased resting fat oxidation, decreased waist circumference, and lowered systolic blood pressure in overweight and obese men who were sedentary, as found by Whyte et al. [18]. Furthermore, Trilk et al. demonstrated that four weeks of HIIT (consisting of four to seven rounds of thirty seconds each of "all out" sprints, followed by four minutes of recovery) improved the circulatory function of overweight and obese women who led a sedentary lifestyle by producing a 12% increase in VO2max, a 11.4% increase in stroke volume, and an 8.1% decrease in their resting heart rate. Obese males are less likely to develop diabetes after participating in as little as one high-intensity interval training session. Obese men saw an improvement in their glucose tolerance after just one session of high intensity interval training (HIIT), which consisted of four 30-second "all out" sprints followed by a four-minute rest period. Sedentary males who were overweight or obese saw improvements in insulin sensitivity and fat oxidation after just one session of high intensity interval training (HIIT) (4 x 30 seconds of "all out" sprints followed by 4.5 minutes of rest).

The Wingate test has its limitations owing to the need for a certain type of cycle ergometer and a great deal of drive on the part of the test taker. These studies show that "all out" HIIT may be an effective training technique for those who are overweight or obese, however the Wingate test cannot be administered to them. Therefore, some studies have used a modified low-volume HIIT protocol, which is expected to be more practical than repeated Wingate tests for sedentary and overweight or obese patients. Insulin sensitivity in inactive obese persons who performed six training sessions spaced out over two weeks was studied by Hood et al., who used a modified protocol (10 x 60 seconds at 80-95% of heart rate reserve, 60 seconds of rest). About 72 hours following the last training session, they saw a 35% increase in insulin sensitivity. A second, recent study found that after six weeks of a modified form of

high-intensity interval training, women who were overweight or obese experienced changes in body composition and skeletal muscle oxidative capacity (10 sets of 60 seconds at less than 90 percent of their maximum heart rate, followed by 60 seconds of recovery). High intensity interval training (HIIT) improved fat oxidation in sedentary, overweight women throughout the course of a 12-week modified HIIT programme (6-1060s at 75-95% HRmax, 75s rest). However, neither the women's weight nor their body composition were affected by HIIT. Consequently, these studies showed that sedentary people who are overweight or obese may benefit from high-intensity interval training (HIIT) based on the Wingate test.

Some studies have used a modified HIIT programme that includes treadmill jogging to help persons who are overweight or obese lose weight. Four sets of four minutes at 90% of HRmax are followed by three minutes at 70%, four sets of four minutes at 90% of VO2peak are followed by four minutes at 60%, and four sets of four minutes at 85-95% of HRmax are followed by three minutes at 50-60% of HRmax. High-intensity interval training (HIIT) may improve VO2max and decrease very low-density lipoprotein, blood pressure, and fasting glucose in individuals who are physically inactive and overweight or obese in a short amount of time.

OBJECTIVES

1. To study overweight individuals to high-intensity interval training
2. To study High-Intensity Interval Training (HIIT)

The Effect of HIIT on Fat Oxidation

It is crucial to exercise at an intensity that promotes the primary oxidation of fat during physical activity. One theory on what causes obesity and extra pounds to accumulate is that skeletal muscle has trouble processing free fatty acids. The ability of the skeletal muscle to use free fatty acid is reduced in obese people, according to studies. Endurance training is an effective method for avoiding obesity and losing weight because it increases lipolysis and fatty acid oxidation in skeletal muscle. Since the absolute rate of fat oxidation (g.min-1) increases from low to moderate intensity and then decreases as the intensity of the exercise increases, it is known that this boost is dependent on the intensity of the activity being done. Six sessions of high intensity interval training (HIIT) spread out over two weeks have been shown to increase endurance performance and metabolic regulation while also increasing oxidative capacity in skeletal muscle. Research was conducted on the effects of high intensity interval training (HIIT) on fat burning in untrained but recreationally active individuals over the course of six weeks (104 minutes at 90% of VO2peak, 2 minutes rest). Fat oxidation while cycling at 60% VO2peak was significantly increased after 6 weeks of high intensity interval training (HIIT). Results like this imply that high-intensity training sessions are useful for improving the ability of skeletal muscle to oxidise fat. Eight moderately active women participated in a study in which the impact of seven HIIT sessions spaced out over two weeks on their rate of fat oxidation during exercise was analysed. What they found was that lipid oxidation was 36% higher than before. Few studies have examined the effects of HIIT on fat oxidation in sedentary persons who are overweight or obese. Whyte et al. found that in males who were overweight or obese and sedentary, two weeks of HIIT (six sessions of four to six repeats of thirty seconds of Wingate with four to five minutes of recovery) increased the

amount of fat burnt at rest. New evidence suggests that the fat-burning potential of sedentary overweight women can be improved by participating in a 12-week high-intensity interval training (HIIT) programme (6-10 x 60s at 75-95% of HRmax, 75s rest).

Males who were overweight or obese took part in a 40-minute, three-times-weekly supervised high-intensity interval training (HIIT) programme. The programme consisted of intervals of 30 seconds at 90% of the participants' VO2max, followed by 30 seconds of recovery. After 30 minutes of continuous load exercise at 45% of VO2max, HIIT increased the amount of fat burnt by 31% relative to the baseline. It is evident that HIIT has the potential to be a helpful approach for enhancing the ability to burn fat in men who are overweight or obese. There were no reports of injuries or negative feedback about the exercise training sessions' intensity, and all participants showed up for every session.

There is some speculation that HIIT may increase fat oxidation, although the exact mechanism by which this occurs is unclear. Therefore, it is critical to assess muscle biopsies in order to comprehend the likely molecular pathways and modifications accountable for the improvement in fat oxidation subsequent to high-intensity interval training (HIIT). However, a thorough investigation of the molecular mechanisms that might account for the increased fat oxidation is outside the scope of this work. In a nutshell, it's interesting that researchers have found evidence linking fatty acid transport proteins to enhanced fat oxidation. Increases in the transfer rate of free fatty acids across the muscle membrane and the mitochondrial membrane may be responsible for the increased fat oxidation. These proteins, fatty acid translocase (FAT/CD36) and plasma membrane fatty acid-binding protein (FABPpm), are located in the sarcolemma, the mitochondrial membrane, and a cytoplasmic pool in skeletal muscle. Six weeks of high intensity interval training (ten 4-minute cycling sessions at 90% VO2peak separated by 2-min of rest) in ten untrained females increased the amount of fatty acid transport proteins in total muscle (FAT/CD36 and FABPpm), sarcolemmal (FABPpm), and mitochondrial (FAT/CD36) membranes. High-intensity exercise training has been hypothesised to cause increases in skeletal-muscle fatty-acid oxidation, and our study provides support for that theory. Further, studies have shown that enzymes have a role in improving skeletal muscle's fat-burning potential after high-intensity interval exercise. Eight moderately active women participated in a study by Talanian and coworkers, in which they completed high-intensity interval training seven times over a period of two weeks to determine its effect on the rate at which fat was burnt during exercise. A total of ten 4-minute intervals were done at 90% VO2peak, with 2-minute recoveries in between. Fat oxidation rose by 36% after only two weeks of high intensity interval training, and maximum activity of mitochondrial enzymes was reached.

The results of this study provide support for the hypothesis that high-intensity interval training (HIIT) increases skeletal muscle's ability to oxidise lipids and produces metabolic adaptation in adults who are overweight or obese. This might have major implications for avoiding and treating obesity-related health issues. However, there is a significant gap in our understanding of the effects of HIIT on fat oxidation in the obese as compared to steady state exercise training; further research is needed in this area. High intensity interval training is a popular kind of fitness training.

International Journal of Research in Social Sciences
Vol. 13 Issue 02, february 2023,
ISSN: 2249-2496 Impact Factor: 7.081 UGC Approved
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

The Effect of HIIT on Weight Loss

Exercise is a crucial intervention for weight loss since it may assist maintain or boost resting metabolic rate in addition to reducing body mass and increasing fat-free mass. High-intensity interval training (HIIT) has been found in a number of trials to help sedentary persons lose weight who are overweight or obese. For instance, sedentary men who were overweight or obese had a significant reduction in waist circumference and subcutaneous adipose tissue after just two weeks of high-intensity interval training (HIIT). Overweight young men had significant reductions in total abdominal, trunk, and visceral fat after participating in a high intensity interval training (HIIT) programme that lasted for 12 weeks. Another study found that sedentary individuals who were overweight and had metabolic syndrome lost 3% of their body weight and 5% of their waist circumference after 16 weeks of high-intensity interval training (HIIT; four sets of four minutes at a heart rate of at least 90% of its maximum, followed by three sets of three minutes at 70% of its maximum).

Tjonna et al. found that after three and twelve months of high-intensity interval training, participants lost 0.9 and 2.4 kg of total body fat, respectively. Recent research with overweight and obese women found that a 6-week low-volume HIIT programme (10 x 60s at 90% HRmax, 60s rest) led to significant changes in body composition. DEXA also showed an increase in lean body mass in the legs in addition to a decrease in abdominal and total body obesity.

On the other hand, individuals who were sedentary and overweight or obese in two recent trials using HIIT did not see a significant improvement in weight or body composition. In their short-term study of two weeks, Skleryk et al. used a high-intensity interval training (HIIT) strategy. Cycling at "all out" for 10 seconds may not have been adequate to alter body composition when compared to a longer 30-second routine in this programme. Astorino et al. used a more extensive HIIT routine (60 seconds at 75-95% of HRmax, 75 seconds of rest), but still saw no change in body weight after 12 weeks of training. As exercise has a stimulatory impact on hunger, this might be one reason why exercise regimens don't lead to weight reduction. To counteract the increase in exercise-induced energy expenditure, one alternative is a decrease in NEAT.

Due to a lack of research on the effects of high-intensity interval training (HIIT) on weight and body composition in sedentary individuals who are overweight or obese, this method of exercise has been shown to have only a modest impact on weight loss. Several of the studies reviewed here suggest that high-intensity interval training (HIIT) can aid in weight loss for this population, although further research of at least a year's duration is needed.

Although the exact process by which fat and weight are lost in response to high-intensity interval training (HIIT) is not yet known, an increase in post-exercise metabolism is one possible explanation. Catecholamines are released in greater quantities during acute HIIT and may have a role in increasing fat burning in the body after exercise (HIIT). Extra oxygen use after exercise is what scientists call a "post-exercise oxygen deficit" (EPOC). Researchers Bracken et al. discovered that the catechol-O-methyl transferase activity was elevated during HIIT, leading to a greater metabolism of catecholamines. The increase in plasma adrenaline and norepinephrine at the end of HIIT has been hypothesised to increase lipolysis and the

availability of free fatty acids, leading to a greater rate of fat burning both during and after exercise. High-intensity interval training also results in significant increases in muscle mitochondrial beta-hydroxyacyl-CoA dehydrogenase, an enzyme that may contribute to fat loss. High intensity interval training (HIIT) may lead to quick fat reduction since it increases post-exercise metabolism (also known as EPOC). During the resting phase, EPOC appears to be supplied predominantly by fat. Due to the need for the body to get rid of lactate and H+ and to resynthesize glycogen, HIIT increases fat oxidation both during and after the workout. An increase in lipolytic enzyme activity and a negative energy balance due to EPOC may both contribute to the weight loss that some ascribe to HIIT.

Reducing appetite after exercise is one possible mechanism behind the effects of high-intensity interval training on fat loss. Although one session of rigorous exercise has been found to reduce hunger immediately following its conclusion, the effect of high-intensity interval training (HIIT) on appetite suppression in overweight and obese people has not been studied. Recent studies have looked at the effects of high-intensity interval training (HIIT; six rounds of thirty seconds of the Wingate test) and endurance exercise (one hour of activity at 68.1% of VO2max) on hunger. Hours after an HIIT workout, the men reported feeling hungrier than they had following the endurance exercise.

Many people experience less hunger than normal after a session of vigorous exercise, although the reason for this is not well understood. However, reports of exercise-induced anorexia provide evidence that prolonged physical exertion can significantly alter one's experience of hunger. The considerable redistribution of blood away from the splanchnic circulation and towards the working muscles may account for this. More adaptations may be induced by chronic exercise training, which might lead to more stable levels of metabolic fuels and a reduction in appetite. Acute activity can deplete glycogen reserves in the liver and muscles, leading to a possible spike in appetite. It's possible that long-term exercise training leads to more changes than shorter bursts of activity.

Exercise is a crucial intervention for weight loss since it may reduce body mass, increase fat-free mass, and keep or increase resting metabolic rate. This is because physical activity has been shown to reduce overall body fat. Regular exercise has been shown to drastically reduce total fat, visceral fat, skeletal muscle lipid, and insulin resistance in obese individuals, regardless of weight loss. It doesn't matter if the person slims down or not, this is still the situation. A high level of postprandial blood triglycerides is related with an increased risk of cardiovascular disease, while regular physical activity is associated with a decreased risk of cardiovascular disease. High-intensity interval training (HIIT) has been shown to reduce postprandial triacylglycerol more effectively than moderate-intensity exercise, according to a growing body of studies. Despite the fact that exercise of moderate intensity has been shown to decrease postprandial levels of triacylglycerol, this is nonetheless the case. In order to reduce postprandial triglyceride rises, acute high-intensity endurance training has been shown to be more effective than moderate-intensity exercise. Evidence from studies supports this conclusion. High-intensity interval training (HIIT) has been shown to reduce postmeal lipid levels by producing an energy deficit. Freese et al. provide a comprehensive analysis of exercise's impact on postprandial lipemia. As a last note, it's important to emphasise that the

effect of HIIT on postprandial triacylglycerol is just transitory. Example: postprandial triacylglycerol might be lowered by a single session of high-intensity interval training (HIIT) 48 hours after exercise but the effect would be gone by day 3.

CONCLUSION

High intensity interval training (HIIT) was found to be an effective and well-tolerated exercise strategy for enhancing cardiorespiratory fitness, decreasing metabolic risk factors, and maximising fat burning and weight loss in sedentary overweight and obese individuals. Boosting fat oxidation is a promising avenue towards achieving the twin goals of a negative energy balance and reduced body fat that are foundational to any effective weight-management plan. An increase in fat oxidation has been shown to have potential for inducing a negative energy balance and reducing body fat, which has crucial implications for public health programmes aimed at reducing obesity.

REFERENCES

[1]. Steinberger J, Daniels SR (2003) Obesity, insulin resistance, diabetes, and cardiovascular risk in children: an American Heart Association Scientific Statement from the Atherosclerosis, Hypertension, and Obesity in the Young Committee (Council on Cardiovascular Disease in the Young) and the Diabetes Committee (Council on Nutrition, Physical Activity, and Metabolism). Circulation 107: 1448-1453.

[2]. Haslam DW, James WP (2005) Obesity. Lancet 366: 1197-1209.

[3]. Epstein LH, Goldfield GS (1999) Physical activity in the treatment of childhood overweight and obesity: current evidence and research issues. Med Sci Sports Exerc 31: S553-559.

[4]. Lazzer S, Lafortuna C, Busti C, Galli R, Tinozzi T, et al. (2010) Fat oxidation rate during and after a low- or high-intensity exercise in severely obese Caucasian adolescents. Eur J ApplPhysiol 108: 383-391.

[5]. Warburton DE, Nicol CW, Bredin SS (2006) Prescribing exercise as preventive therapy. CMAJ 174: 961-974.

[6]. Venables MC, Jeukendrup AE (2008) Endurance training and obesity: effect on substrate metabolism and insulin sensitivity. Med Sci Sports Exerc 40: 495-502.

[7]. Boutcher SH (2011) High-intensity intermittent exercise and fat loss. J Obes 2011: 868305.

[8]. Weston KS, Wisløff U, Coombes JS (2013) High-intensity interval training in patients with lifestyle-induced cardiometabolic disease: a systematic review and meta-analysis. Br J Sports Med.

[9]. Bartlett JD, Close GL, MacLaren DP, Gregson W, Drust B, et al. (2011) High-intensity interval running is perceived to be more enjoyable than moderate-intensity continuous exercise: implications for exercise adherence. J Sports Sci 29: 547-553.

[10]. Gist NH, Fedewa MV, Dishman RK, Cureton KJ (2014) Sprint interval training effects on aerobic capacity: a systematic review and meta-analysis. Sports Med 44: 269-279.

[11]. Trilk JL, Singhal A, Bigelman KA, Cureton KJ (2011) Effect of sprint interval training on circulatory function during exercise in sedentary, overweight/obese women. Eur J ApplPhysiol 111: 1591-1597.

[12]. Tjonna AE, Leinan IM, Bartnes AT, Jenssen BM, Gibala MJ, et al. (2013) Low- and high-volume of intensive endurance training significantly improves maximal oxygen uptake after 10-weeks of training in healthy men. PLoS One 8: e65382.