

NIPDD Academic Project

Leandrita Ortega, MD

Title: Use of a standardized handout to improve patient compliance with High Intensity Interval Training (HIIT) in a Family Medicine Clinic

Purpose: To determine if a physician developed handout and scripted instructions will improve patient compliance with an exercise prescription.

Background: One of the main tasks of family physicians is to provide education in such a way that patients understand and are motivated to act in a manner that is beneficial to their health. With an estimated 1/3 of adults in the US now classified as obese by the CDC¹, many of the conditions family physicians manage in our practices are secondary to or comorbid with obesity. Given the staggering costs of obesity and related comorbidities to our health care system, currently estimated at nearly \$210 billion per year,² consistent and effective patient education is key to improving health outcomes.

A number of studies have shown that physicians are more likely to counsel patients regarding healthy behaviors if they engage in them personally.³⁴ In the Howe study, cardiologists who exercised at least 150 minutes per week were more likely to recommend this to patients, and providers who disclosed their own health behaviors were seen as more credible to patients (Frank, et al). Although physicians overall have healthier lifestyles than the general population, other barriers such as lack of time and effective resources can further hamper the ability to provide effective patient education. Training in patient education is not often emphasized in Graduate Medical Education and strategies to incorporate this are important to well-rounded training.

A form of exercise that has recently been discussed prominently in the literature is High Intensity Interval Training (HIIT). HIIT is characterized by bouts of high intensity (measured by VO₂ max or perceived exertion) exercise interspersed with periods of recovery at lower intensity (but not cessation) of exercise. A meta-analysis by Batacan, et al, showed a significant improvement in cardio metabolic markers in overweight and obese patients who performed HIIT even for a short period (less than 12 weeks) with further gains with greater than 12 weeks of participation.⁵ Some parameters that were found to improve from baseline included maximal oxygen uptake, diastolic blood pressure, and fasting glucose. With long term participation, there were additional improvements in waist circumference, resting heart rate, body fat percentage, and systolic blood pressure. In normal weight female subjects, Trapp et al found a significant reduction in total body fat, central abdominal fat, and fasting insulin levels with 15 weeks of HIIT compared to steady state exercise or control.⁶

One possible concern is the safety of high intensity exercise in patients with particular comorbidities such as diabetes or heart disease. In a study of stable, medically controlled post-infarction heart failure patients

¹ Ogden C; Carroll M; Fryer C; Flegal K. *NCHS Data Brief*, 219, November 2015

² Cawley J; Meyerhoefer C *Journal of Health Economics*, 31(1): 219-30, 2012

³ Frank E; Breyan J; Elon L *Arch Fam Med*, 2000;9:287-90

⁴ Howe M; Leidel A; Krishnan SM; Weber A; Rubenfire M; Jackson EA *Prev Cardiol* 2010;13(4):180-5

⁵ Batacan R; Duncan M; Dalbo V; Tucker P; Fanning A *Br J Sports Med* 2017;51:494-503

⁶ Trapp EG; Chisolm DJ; Freund J; Boutcher SH *International Journal of Obesity* 2008;32:684-91

with an average age of 75, Wisloff and colleagues demonstrated a significant improvement in left ventricular remodeling, aerobic capacity, endothelial function, and quality of life in patients performing aerobic intervals at up to 90% of their predicted maximum heart rate compared to routine activity education (control) or moderate continuous training.⁷ Phillips et al were able to demonstrate a significant improvement in mean arterial pressure and peripheral insulin resistance as well as aerobic capacity in people with risk factors for type 2 diabetes.⁸ In a group of chronic stroke patients who were appropriately screened, HIIT was found to be a safe and effective way to exercise.⁹ These examples in the literature provide ample evidence that HIIT can be safely recommended to patients as a way to engage them in exercise that is safe, enjoyable, can be done in a short amount of time, and is effective in improving overall health.

Materials and Methods: After reading several books¹⁰ and articles about HIIT training, a handout summarizing how to perform HIIT was developed by the author. Staff members of the author's clinic including receptionists, medical assistants, and a nurse practitioner were asked to review the handout for readability and ease of understanding. Microsoft Word estimates the average reading level at just above the 5th grade level which is the Joint Commission recommended standard for patient education material.¹¹

Patients with a BMI of 25 or greater were identified during routine clinical intake. The research project was explained briefly by the provider and patients were asked if they would like to participate. Patients who expressed interest were asked routine screening questions including the presence of chest pain, especially with exertion, shortness of breath, palpitations, or ankle edema. In addition, any limitations imposed by orthopedic conditions (low back pain, knee pain, hip pain) were assessed. Patients that did not feel they could comfortably exercise vigorously or had symptoms that were concerning for underlying active cardiovascular disease were excluded.

One of the clinic's medical assistants was trained in the use of a standardized script regarding the research project (Appendix A). After a patient was identified as being a candidate for the research project and indicated interest in participation, she reviewed a standardized consent form (Appendix B), the research protocol, and the handout that was designed by the provider as the intervention for the purposes of this project (Appendix C). Patients were asked to complete the outlined exercise 3 times per week for 3 weeks and then return for reevaluation with the medical assistant.

At the return visit, the same measurements taken at intake were repeated and recorded on the same intake form. The data were then entered into an Excel spreadsheet for analysis.

⁷ Wisloff U; Stoylen A; Loennechen J; Brovold M; Rognum O; Haram P; Tjonna A; Helgerud J; Slordahl S; Lee S; Videm V; Bye A; Smith G; Najjar S; Ellingsen O; Skjaerpe T. *Circulation*, 2007;115:3086-94.

⁸ Phillips B; Kelly B; Lilja M; Ponce-Gonzalez J; Brogan R; Morris D; Gustafsson T; Kraus W; Atherton P; Vollaard N; Royakkers O; Timmons J. *Frontiers in Endocrinology*, 2017;8:1-11.

⁹ Carl DL; Boyne P; Rockwell B; Gerson M; Khoury J; Kissela B; Dunning K. *Appl Physiol Nutr Metab*, 2017;42(3):311-8.

¹⁰ Driver, James. (2013). *HIIT—High Intensity Interval Training Explained* [Kindle e-Book], accessed from www.amazon.com.

¹¹ Advancing Effective Communication, Cultural Competence, and Patient- and Family-Centered Care: A Roadmap for Hospitals. The Joint Commission. Oakbrook Terrace, IL; 2010. Accessed online February 25, 2018.

Results: In the initial phase of data collection, 10 patients agreed to participate. Follow up visits with the medical assistant were scheduled approximately 3 weeks from the date of intake. Of those that agreed to participate, 5 patients returned for reevaluation at the scheduled time. The same medical assistant obtained both the baseline and follow up measurements.

Based on the patients that returned for follow up, 4 out of 5 were women (80%). The average age of participants was 59.4 years with a range of 42-68. Four of the patients had a BMI in the overweight range (25-29.9) while one patient had stage 3 obesity with a BMI >40. All patients had a waist circumference of 35 inches or greater at intake. None of the patients were engaged in regular exercise at intake.

After an average interval of 23.4 days, the patients returned for reevaluation. All patients demonstrated some degree of weight loss with an average of 1.54 kg of weight lost with a range of 0.4-3.3 kg lost over the course of the intervention. Similarly, waist circumference decreased by an average 1.9 inches with a range of 0-5 inches lost. Three patients indicated they followed the protocol as written and were exercising 3 times per week. One patient only exercised once during the intervention and another reported that she was performing the protocol twice daily every day for a total of 14 exercise sessions per week.

Given the low rate of participation during the initial phase of the study, clinical significance of the findings could not be calculated with any degree of accuracy. However, there were notable trends in favor of weight loss, reduction in waist circumference, and increased exercise frequency among the study participants. In addition, the majority of the participants agreed to continue participating an additional 3 weeks due to the positive results they experienced during the first 3 weeks of the intervention.

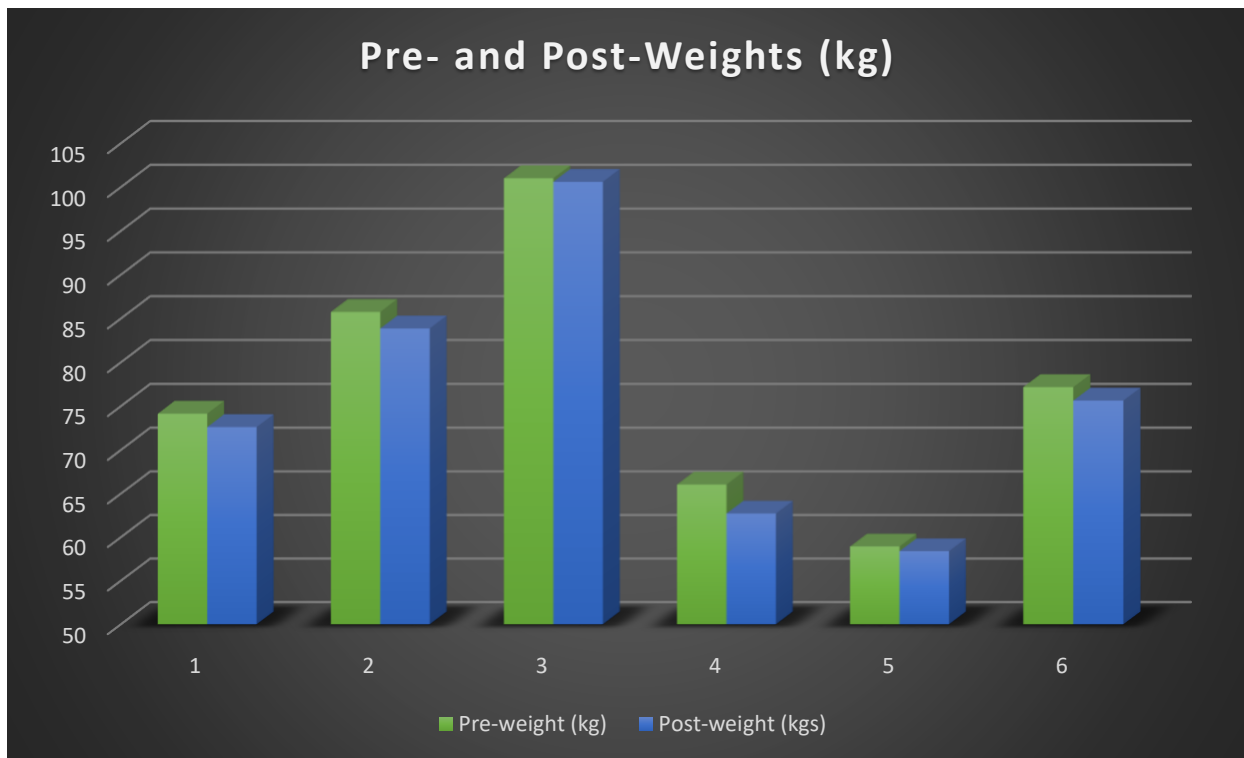


Table 1. Pre- and Post-intervention weights. 1-5 represent patients and 6 represents the average for the group.

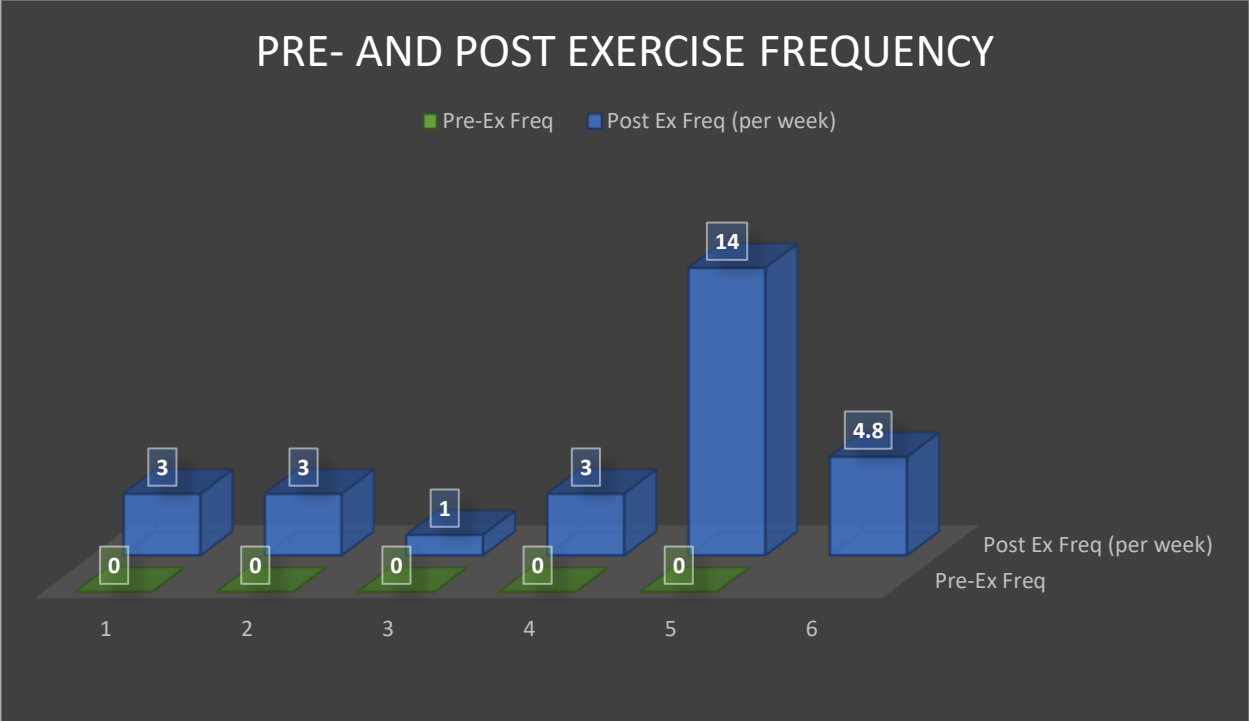


Table 2. Pre- and Post-intervention exercise frequency.

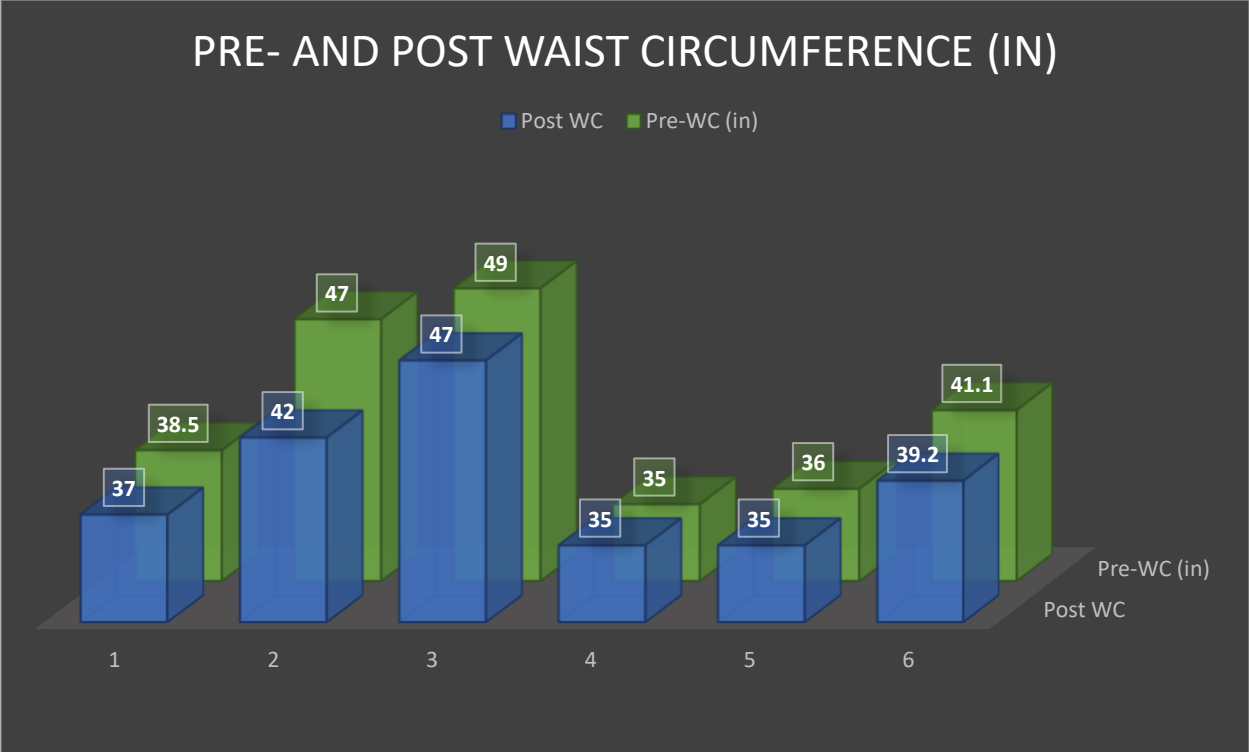


Table 3. Pre- and Post-intervention waist circumference.

Discussion: Based on a brief intervention period and low patient participation, our data in this descriptive study show a trend toward weight loss and decreased waist circumference among of group of overweight and obese non-exercisers who participated in HIIT 3 times per week for 3 weeks. Unfortunately, because of the small sample size and the lack of a control group, it was not possible to accurately calculate p-values to determine statistical significance despite the promising trends that were observed.

A number of factors hampered our efforts to recruit patients into our study. The author made a calculation that more patients would be likely to participate in an exercise study in the month of January since this a time of year when people often make New Year's resolutions and are actively seeking assistance with their weight loss efforts. What was not taken into account was the effect a very busy influenza season would have on our practice including patients who felt too ill to begin an exercise program as well as staff absenteeism that hindered our efforts at recruitment greatly. In order to reduce variability in the measurements of patients and the explanation of the protocol, I had only one medical assistant perform these tasks but she was out for almost an entire week in the middle of our recruitment period.

In addition, there is some level of inherent bias in our sample based on the patients' self-selection to exercise. This is a more difficult problem to overcome since participation in this type of study is completely voluntary. While exercise and some strategies to incorporate regular exercise are discussed by the author on a regular basis during routine clinical encounters, this is the first time patients were asked to be accountable through a return visit. Consequently, although patients often assure me they will exercise when advised to do so, I found that most of my obese patients declined to participate in the research study. Some cited lack of time, others felt they had too much joint or back pain to perform exercise, and others said very bluntly that they simply did not want to do it or knew they would not comply.

Despite these limitations, we have decided to continue our data collection efforts in order to have a more robust data set that can potentially be presented in a paper or at a regional or national conference. While I did not recruit a true control group, our plan is to identify patients who were seen on the same day as successfully recruited patients who were advised about their exercise habits (as documented in their clinical encounter) and ask them to come in to be weighed and give their current exercise frequency. We will use patients for whom this information was gathered at the initial clinic visit to minimize recall bias. Although we will be unable to use waist circumference since this is not routinely measured outside of the study, we can make some comparisons on these other two parameters. We will also extend the intervention period to 6 weeks in our effort to glean useful information from the data about the utility of the HIIT handout that was used in this intervention.

Based on the final results of this longer study with a larger intervention and control group, this type of project may be incorporated into our residency curriculum with each resident assigned the task of developing a patient education handout that can then be validated using similar methodology. One of the clear challenges is helping our patients recognize the need for change and then be willing to be active participants in behavioral modification that will have a positive impact on their health.

I would like to thank Renee DesPres, my research mentor from Silver City, NM, who has been an invaluable asset to me during this endeavor. I would also like to thank Shannon Pittman, MD for her advice and guidance on my project. I look forward to continuing in this endeavor and seeing the fruit of healthier patients with better health outcomes.

APPENDIX A

High Intensity Interval Training Study Script

Patient Name: _____

- (1) Thank you for agreeing to participate in this research study. Dr. Ortega is preparing to be the director of our new residency program and will be performing research studies periodically so that she can teach the residents to do studies as well.**

- (2) For the next 6 weeks, you will follow this handout regarding a specific type of exercise called High Intensity Interval Training or HIIT. Research has shown that people that regularly perform HIIT have greater weight loss and greater improvement in heart health. It is also safe for people of all ages and fitness levels which makes it an ideal way to begin or add to your current exercise routine.**

- (3) Are you willing to perform the workout 3 times per week for the next 6 weeks?**

- (4) Are you willing to return in approximately 6 weeks for a free re-evaluation?**

- (5) Great! Let's go through this handout step by step. (Read through each of the steps as written.)**

- (6) Let's cover a few tips that are listed on the handout. (Read through text boxes that are not part of steps as written.)**

- (7) Do you have any questions? I will write these down for the doctor.**

- (8) I am going to write down some information today including your weight, height, BMI, and waist circumference. (Record information on form.)**

Date:

Height:

Weight:

BMI:

Waist Circumference:

- (9) Please tell me how many times per week you currently exercise. (Record this on the form.)**

- (10) Thanks for participating! When you come back, we will give you a small token of our appreciation. If you are not sure if you can come back on your scheduled day, please let us know right away, but we are really counting on you to return.**

APPENDIX B



INFORMED CONSENT
FOR
EXERCISE THERAPY

I desire to participate in the HIIT research project to improve my knowledge of a particular type of exercise. This program is recommended by my physician, Dr. Ortega and is part of a research study.

I will have a clinical evaluation before I enter this exercise program. This evaluation will include a Medical history and exercise evaluation consisting of, but not limited to, measurements of heart rate and blood pressure. The purpose of this evaluation is to determine whether any conditions may exist that indicate I should not engage in this exercise program.

I realize that it is necessary for me to promptly report signs or symptoms indicating any abnormality or distress to Dr. Ortega or her staff. I agree to follow any recommendations they make should I report abnormal symptoms.

I understand that I will be instructed on prescribed exercise. I also understand that I will be instructed fully on all stretching and strength training before starting. I understand that any questions will be answered to my satisfaction before beginning any exercise.

I certify that I have read the contents of this form or its contents have been read to me. An explanation of the contents of this form has been provided to me, and I understand its contents. My questions have been answered to my satisfaction. All blanks or statements requiring insertion or completion were filled in; and any items, which were not applicable, were stricken before I signed.

Participant Signature

Name Printed

Witness Signature

Name Printed

Date

APPENDIX C

HIGH INTENSITY INTERVAL TRAINING



Step 1: Start with a 5-minute warm up (for example, a slow walk)

Step 2: Time to pick up the pace! Increase speed or incline and work at an effort of 8-10 (working hard, breathless, but not light headed or dizzy). Continue this pace for 10-20 seconds.

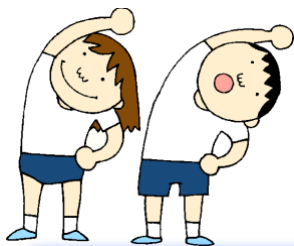


Step 3: Slow your pace but do not stop moving for AT LEAST 60 seconds or until you feel you have recovered enough to work hard again. Go back to step 2. You have completed 1 interval!



BEGINNERS: PERFORM 4-6 INTERVALS PER 30 MINUTE SESSION (NOT INCLUDING WARM UP/COOL DOWN)

EXPERIENCED EXERCISERS: PERFORM 10-12 INTERVALS PER 30 MINUTE SESSION (NOT INCLUDING WARM UP/COOL DOWN)



Step 4: Cool down and stretch for 5 minutes.

What can I use do to my intervals?

At the Gym: Elliptical Machine-Treadmill-Stationary Bike-Battle Ropes-Jump Rope-Rowing Machine

At home/outdoors: Jumping Jacks-Speed Squats-Jog/Run in Place-High School Track-Hill Climbing-Burpees-Mountain Climbers

IF YOU ARE NOT TIRED BY THE END OF YOUR WORKOUT, INCREASE INTENSITY OR DECREASE REST PERIOD BETWEEN INTERVALS.

DO NO MORE THAN 12 INTERVALS PER SESSION!

STAY HYDRATED! DRINK AT LEAST 16 OUNCES OF WATER DURING/AFTER WORKOUT.

STOP IMMEDIATELY IF YOU EXPERIENCE CHEST PAIN, SEVERE SHORTNESS OF BREATH, OR DIZZINESS