

The metabolic effects of capsaicin on college-aged men: a randomized, double-blind, placebo-controlled, crossover pilot study



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ABSTRACT

Background. Capsaicin is the biologically active, spicy flavor profile component of chili peppers that has been recently touted as an anti-obesity agent. However, studies examining the effects of capsaicin on these markers have mixed results.
Objective. The purpose of this pilot study was to examine the effects of consuming a 14-d supply of 500mg/day or either capsaicin supplement versus placebo on: 1) basal metabolic rate (BMR); 2) blood glucose (BG); and 3) anthropometrics in college-aged men with BMI >25kg/m².
Design. This study utilized a randomized, double-blind, placebo-controlled crossover design.
Methods. Six overweight/obese, sedentary men completed four visits (~45min/visit) over a 45-day intervention period. On visit 1, participants completed anthropometric and BMR measurements and were randomly assigned to either capsaicin or placebo. Participants were provided with a 14d supply of pills, a pill log, and dietary logs to take and complete daily for 14d. On day 15 (V#2), the same testing and measurements occurred. Participants then completed a 14-day washout period. Following the washout period, participants crossed-over and underwent the V#3 (days 30) and V#4 (days 45) where the same procedures as before were followed.
Results. From pre- to post-capsaicin supplementation, there were no significant changes in BMR (1.61±0.49 to 1.80±0.54 kcal/min, ns), BG (102.5±5.9 to 104.0±8.4mg/dL, ns), body weight (96.1±20.1 to 96.4±20.94kgs, ns), or BF% (22.2±9.2 to 22.7±8.6%, ns). Placebos showed no change in these markers (ns).
Conclusions. In overweight/obese college-aged men, supplementation with 500 mg of capsaicin or placebo did not differentially affect BMR, BG, or body fat composition. Overall, more research should ensue with a larger sample.

BACKGROUND

- Clinical studies show capsaicin is an effective anti-obesity agent due to its critical role in adipogenesis.
- Capsaicin's role in decreased preadipocytes is a critical key to demonstrating its effectiveness in weight loss and it has been shown to potentially affect leptin levels in the human body, which contributes to a person appetite and satiety.
- It is also seen in increasing basal metabolic rate and elevating resting energy expenditure and may have the potential to reduce blood glucose by increasing insulin levels and glycogen content.
- Capsaicin is the pungent, biologically active component of chili peppers and is responsible for the spicy flavor profile of peppers.

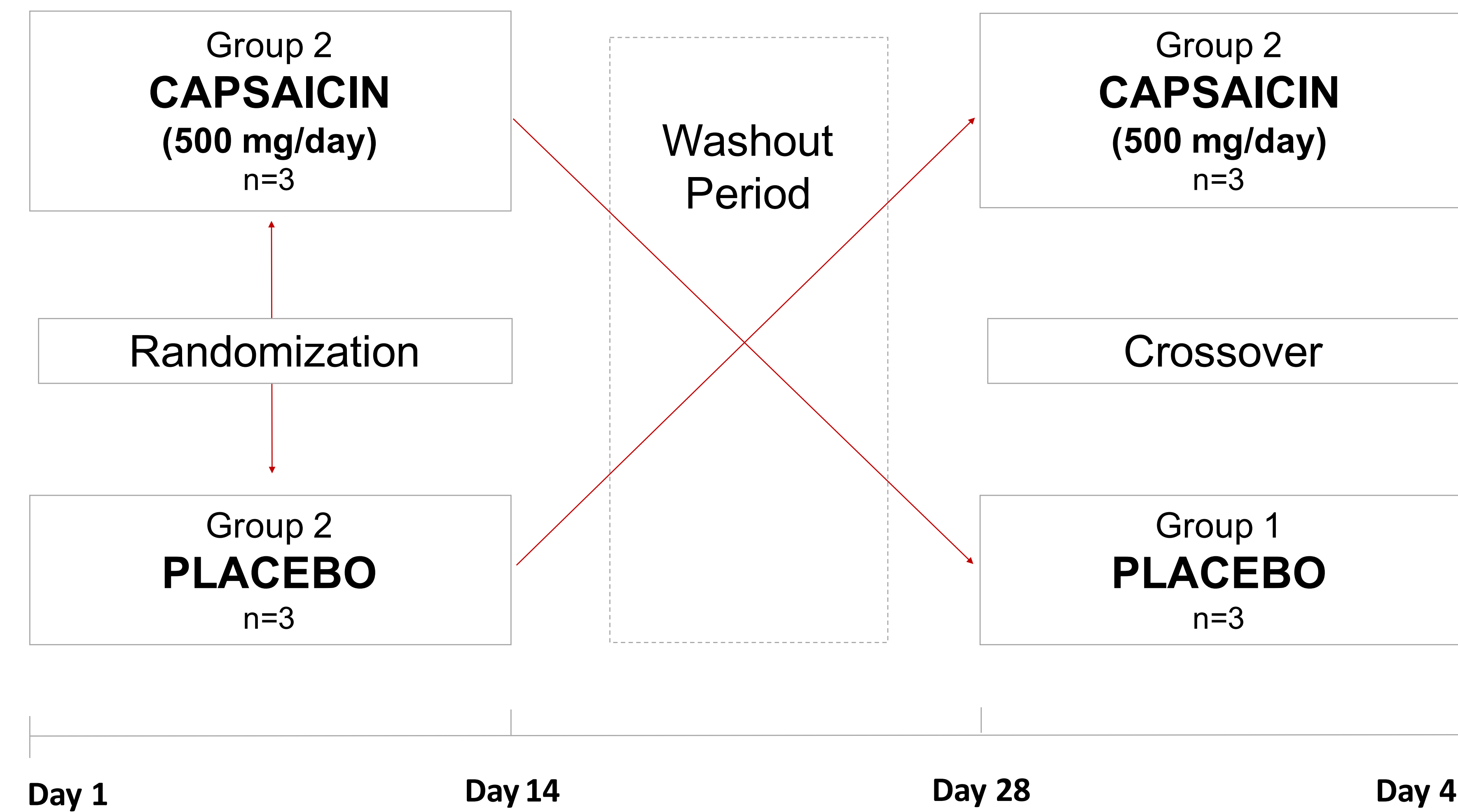
PURPOSE

The purpose of this study is to examine the effect of capsaicin on 1) basal metabolic rate; 2) blood glucose; 3) body weight; 4) body fat; and 5) waist-to-hip ratio. Undergraduate researchers expect to gain knowledge and understanding in the overall research process, collection of data and measurements, handling blood samples, reading blood results, and communication skills. The researcher's goal is to determine the relationship between capsaicin and resting basal metabolic rate.

HYPOTHESES

We hypothesize that the intake of supplemental capsaicin for weight stable, college-aged men with a BMI >25kg/m² will increase basal metabolic rate (how many calories you burn at rest), decrease blood glucose, have no change in body weight, slightly decrease body fat, and have no change in waist-to-hip ratio.

STUDY DESIGN



METHODS

Participant Characteristics

- Male participants
- 18-25 years of age
- BMI >25 kg/m²

Study Protocol

- All testing occurred at the Obesity Prevention Lab at Texas Christian University
- Study was composed of a phone screening and four 45-minute visits per participant
- Participants were instructed to fast overnight (10-12h) and refrain from vigorous exercise 24h prior to testing

Phone Screening

- Participants that fit the inclusion criteria were scheduled for their first visit.

Visit 1, 3

- Day 1 and 28, informed consent obtained, measurements taken, 14-d supply of pills and food log were provided.

Washout period

- Days 14-28, participants will be provided with a food log.

Visit 2, 4

- Days 14 and 42, measurements taken, food log reviewed, 14-d supply of pills provided.

*Measurements taken included basal metabolic rate (BMR), blood glucose (BG), body weight, body fat, and waist-to-hip ratio (WHR).



RESULTS

Table 1. Participant Characteristics (Screening) Figures 1 & 2. RMR and RER data

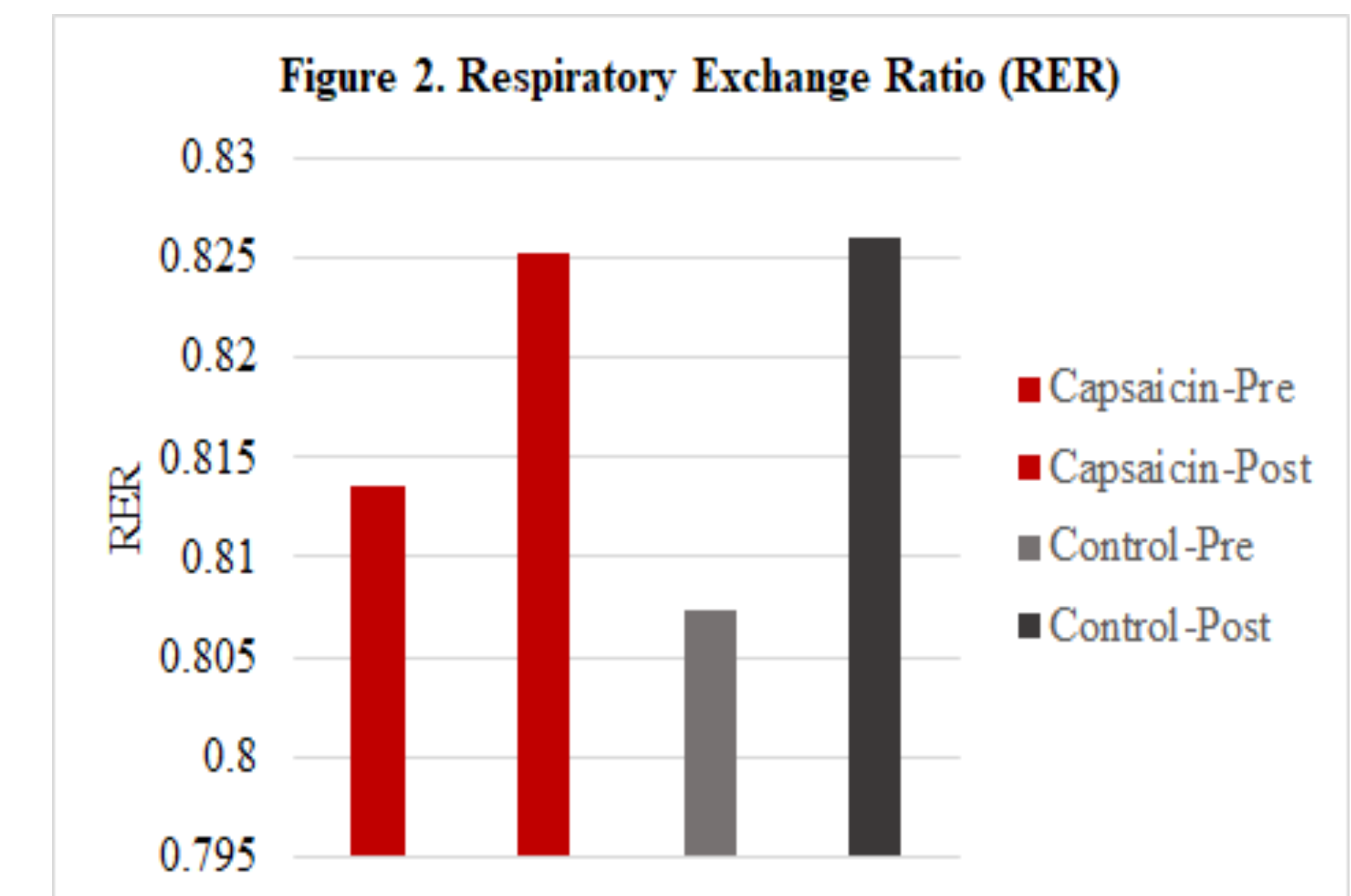
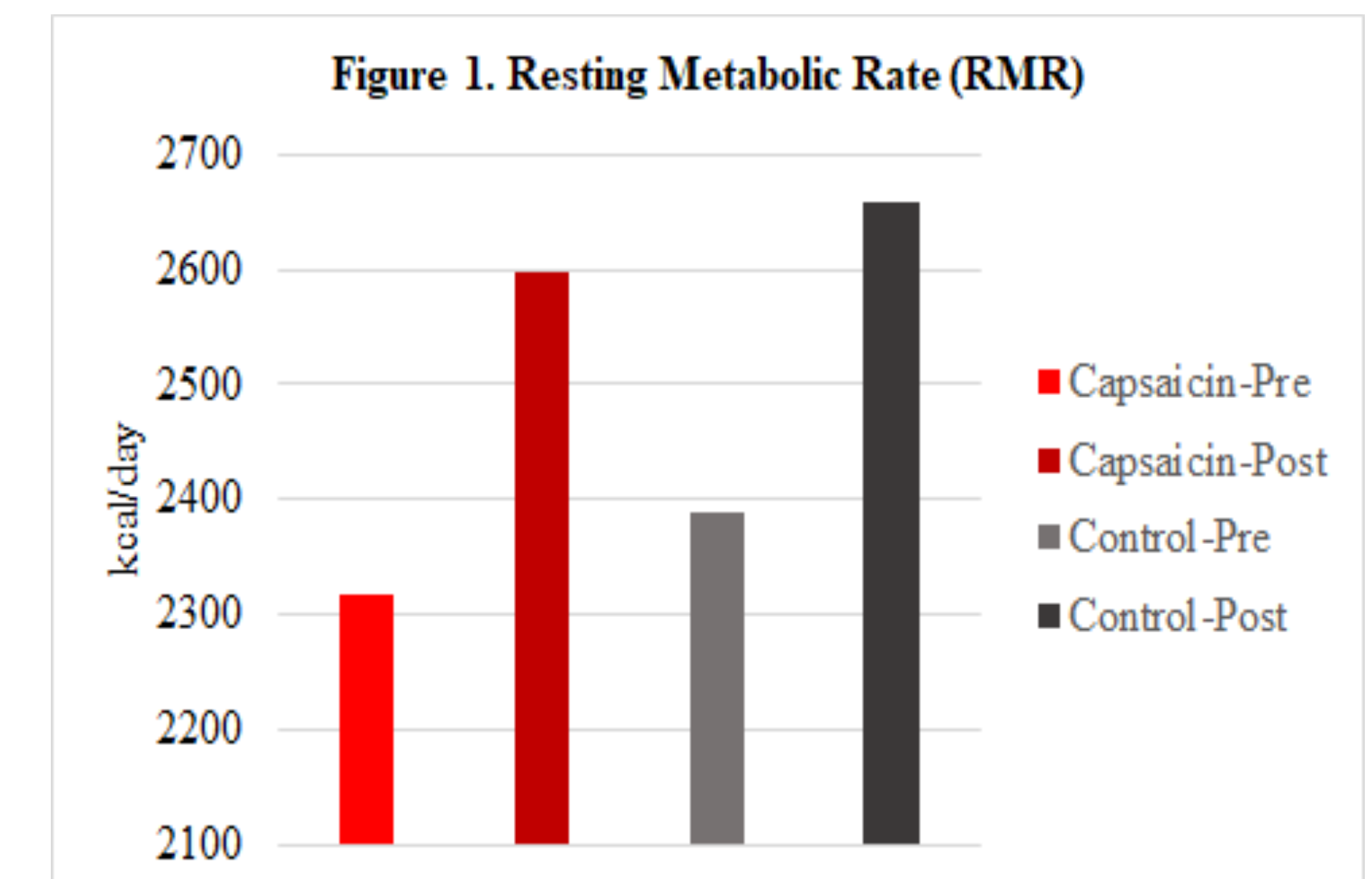
	Mean	SD
Age	21.17	1.17
Height (m)	1.84	0.08
Weight (kg)	96.77	17.91
BMI (kg/m ²)	28.4	3.2

Note: subject characteristics are represented as mean ± standard deviation

Table 2. Data

	Day 1		Day 14	
	Mean	SD	Mean	SD
Control				
Weight (kg)	96.62	19.83	96.87	20.69
BMI (kg/m ²)	28.69	3.75	28.75	4.00
Body Fat (%)	23.56	7.18	23.1	8.00
Blood Glucose (mg/dl)	101.58	6.11	101.58	10.28
Waist (cm)	84.86	10.01	84.08	10.91
Hip (cm)	89.38	11.01	88.58	9.58
Waist:Hip	0.95	0.04	0.95	0.05
Capsaicin				
Weight (kg)	96.05	20.12	96.37	20.94
BMI (kg/m ²)	28.50	3.86	28.58	4.08
Body Fat (%)	22.23	9.18	22.65	8.60
Blood Glucose (mg/dl)	102.5	5.89	104	8.39
Waist (cm)	84.14	10.89	84.40	11.44
Hip (cm)	89.28	11.28	89.10	11.93
Waist:Hip	0.94	0.03	0.95	0.04

Note: Subject Characteristics are represented as mean ± standard deviation



CONCLUSIONS

In overweight/obese college-aged men, supplementation with 500mg of capsaicin or placebo did not differentially affect BMR, BG or body composition. Overall, more research should ensue with a larger sample.

FUTURE DIRECTIONS

- Examine the effects of capsaicin supplementation on a larger sample size for more reliable results.
- Extend intervention phases to >2 weeks to determine if longer interventions have a positive effect on metabolic markers and anthropometric measurements.

CLINICAL IMPLICATIONS

In the field of Nutrition and Dietetics, the use of supplemental capsaicin and capsaicin-rich foods could be a promising intervention for the current overweight and obesity epidemic and could potentially mean a reduction in obesity-related diseases and conditions.