Four Weeks of 16:8 Time-Restricted Feeding on Stress, Sleep, Quality of Life, Hunger Level, and Body Composition in Healthy Adults: A Pilot Study on Wellness Optimization

Gurinder Bains, Everett Lohman, Noha Daher, Lee Berk

Contact: Gurinder Bains gbains@llu.edu

SCHOOL OF ALLIED HEALTH, LOMA LINDA UNIVERSITY

Introduction

According to the World Health Organization, obesity rates worldwide have practically tripled since 1975. According to the Center for Disease Control National Center for Health Statistics, the age-adjusted prevalence of obesity was approximately 42% in adults in the United States during 2017-2018. Weight loss and improvement in body composition through physical activity and/or dietary modifications may help decrease the risk for obesity-related disease. The International Food Information Council (IFIC) Foundation's Annual Survey (2018) indicated that 36% of Americans followed a particular eating plan or diet. The eating design revealed to be most utilized was Intermittent Fasting (IF). Weight management strategies are numerous and focus primarily on physical activity and/or diet regimens in lieu of lifestyle changes. There are many distinct diet paradigms: such as those emphasizing consumption or an increase/decrease in protein, carbohydrates, or fat, tracking daily caloric intake, and caloric restriction. Sustainable methods of dietary lifestyle changes are essential to long term weight loss maintenance and enhancement in overall health and wellness. One such promising approach is IF.

Purpose

The purpose of this pilot study was to determine the effect of four weeks of Intermittent Fasting (without caloric deficit) on body composition, stress levels, sleep quality, hunger level, and quality of life.

Methods

- Sixteen subjects with mean age of 34.0 ± 11.7 years and body mass index (BMI) 27.4±1.3 kg/m2 were recruited. (Table 1)
- Participants were healthy individuals who never attempted a 16:8 Intermittent Fasting protocol. They were excluded if they were diagnosed with Diabetes or had the risk factors associated with Metabolic Syndrome.
- The self-reported compliance mean was 24.2 ± 4.0 days out of a possible 28 days.
- Baseline assessments of height, body composition (InBody 770), and questionnaire on sleep (Pittsburgh Sleep Quality Index), Quality of Life (SF-36), and stress (Perceived Stress Scale) were completed. All measurements were re-evaluated at week four.
- A Visual Analog Scale (VAS) was administered to measure the level of subjective hunger over four weeks.
- The participants were required to fast 16 hours from the time of their last meal in the evening until to the start of their first meal the following day.
- During the fasting period, the participants were permitted to drink water, black coffee/tea, or zero calorie drinks.
- Once the fast was broken, the participant was instructed to "eat the same amount of food they normally would in a day" within an 8-hour period.
- No official tracking of daily calories using an app or log sheet. No requirement on the number of separate meals consumed during the eight hours.

Results

Table 1. Frequency (Percentage) of Participant Demographics (n=16)

Gender	
Male	9 (56.3)
Activity Level	
Moderate	15 (93.8)
Light	1 (6.2)
Work Shift	
Day	15 (93.8)
Night	1 (6.2)
Occupation	
Graduate Student	11 (68.8)
Healthcare	4 (25.0)
Mechanic	1 (6.2)

Table 2. Mean (SE) of the outcome variables over time.

	Baseline	4 weeks	Mean Difference* (95% CI)	p-value**(d)
Stress	14.1 (1.9)	11.0 (1.4)	3.1 (-0.2,6.4)	**0.03**** (0.50)
Sleep	5.5 (0.8)	4.6 (0.5)	0.9 (-0.2,1.9)	0.30 (0.27)
Weight (kg)	80.0 (4.4)	79.1(4.6)	0.9 (-0.2,1.9)	0.10 (0.44)
BMI (kg/m^2)	27.4 (1.3)	27.0 (1.3)	0.4 (0.0,0.7)	0.06 (0.50)
Body Fat (%)	26.2 (2.4)	25.5 (2.6)	0.7 (0.2,1.2)	**0.01** (0.68)
Body Fat Mass (kg)	21.6 (3.0)	21.0 (3.2)	0.6 (0.1,1.1)	**0.02** (0.58)
Visceral Fat (cm^2)	98.2 (15.3)	94.1 (15.7)	4.1 (1.6,6.6)	**0.003** (0.81)
SMM (kg)	33.0 (1.8)	32.8 (1.8)	0.2 (-0.3,0.6)	0.52 (0.22)
Lean body mass (kg)	15.7 (0.8)	15.6 (0.8)	0.1 (-0.1,0.3)	0.59 (0.21)
Trunk Fat (kg)	11.5 (1.6)	11.0 (1.6)	0.5 (0.2,0.7)	**0.001** (1.10)

Abbreviations: SE, Standard Error; CI, Confidence Interval; BMI, Body Mass Index; SMM, Skeletal Muscle Mass; d= difference in means/standard deviation (Cohen's d)

Table 3. Median (min, max) of SF-36 subscale scores over time.

	Baseline	4 weeks	p-value (r)
Physical Functioning	3.0 (2.8, 3.0)	3.0 (2.8, 3.0)	0.16 (0.35)
Role limitations-physical health	2.0 (1.0, 2.0)	2.0 (2.0, 2.0)	0.07 (0.46)
Role limitations-emotional	2.0 (1.0, 2.0)	2.0 (1.0, 2.0)	0.67 (0.11)
Energy/fatigue	3.5 (2.5, 4.8)	3.8 (2.5, 4.8)	0.53 (0.16)
Emotional well-being	4.2 (3.8, 5.2)	4.1 (3.8, 4.8)	1.0 (0.00)
Social Functioning	3.0 (2.5, 3.5)	3.0 (2.0, 3.5)	0.21 (0.32)
Pain	1.5 (1.0, 3.0)	1.3 (1.0, 2.5)	0.23 (0.30)
General Health	3.0 (2.4, 3.4)	2.7 (2.0, 3.2)	0.14 (0.37)

Abbreviation: r= Z/√N

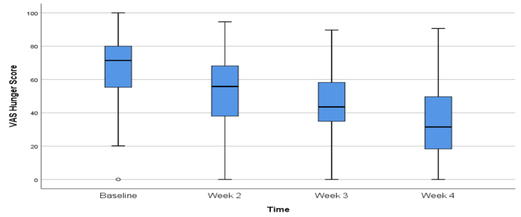

Figure 1. Changes in median (min, max) of VAS hunger scores over time

- There was a significant reduction in stress (mean ± standard error) (14.1±1.9 vs. 11.0±1.4, p=0.03), body fat % (26.2±2.4 vs. 25.5±2.6, p=0.01), body fat mass (kg) (21.6±3.0 vs. 21.0±3.2, p=0.02), visceral fat (kg) (98.2±15.3 vs. 94.1±15.7, p=0.003), and trunk fat mass (kg) (11.5±1.6 vs. 11.0±1.6, p=0.001) (Table 2)
- There was no significant change in sleep quality, weight, BMI, skeletal muscle mass, and lean body mass (p>0.05) (Table 2)
- There were no significant changes over time in any of the subscale scores SF-36 quality of life measurements (p>0.05) (Table 3)
- There was a significant drop in hunger scores over time ($\chi 2$ = 16.4, p=0.001). (Figure 1)

Conclusion

- Intermittent Fasting in the form of a 16:8 daily Time-Restricted Feeding (TRF) protocol can potentially be an effective weight management option to help decrease acute stress levels, lower body fat (more importantly visceral fat), decrease hunger (thus increasing satiety), while also not disrupting sleep quality and Quality of Life.
- This in turn, could potentially aid in decreasing obesity-related diseases.
- Our pilot study demonstrated many health-related benefits from a TRF program with no prescribed caloric deficit that could easily be incorporated by healthcare workers into personal and patient whole-person wellness programs.
- Such a program could bolster resilience of healthcare workers and could improve a multitude of health-related patient outcomes.
- Further research is needed to expand these positive findings with a larger sample size (of varying ages, gender groups, body habitus, and health conditions), a control group, over different time periods, and with repeat assessments after study completion.

References available upon request