

## INTRODUCTION

- Women with obesity have decreased fertility and an increase in rates of miscarriage, pregnancy complications and adverse outcomes.
- Obesity is characterized by elevated lipids, insulin resistance and relative hypogonadotropic hypogonadism; decreased LH, FSH, ovarian steroids and reduced pituitary response to GnRH, which we define as Reprometabolic syndrome.
- Reprometabolic phenotype can be induced in healthy normal weight women (NWW) by acute (6h) infusion of free fatty acids and insulin which mimics metabolic syndrome.

## SPECIFIC AIMS

- Create a physiologic dietary model of hyperinsulinemia and elevated free fatty acids in normal weight women to induce a temporary Reprometabolic syndrome.
- Examine the effects of one-month exposure to a eucaloric high fat diet (HFD) on body composition, physical activity, and sleeping patterns.
- Investigate the association of alterations in these parameters with Reprometabolic syndrome.

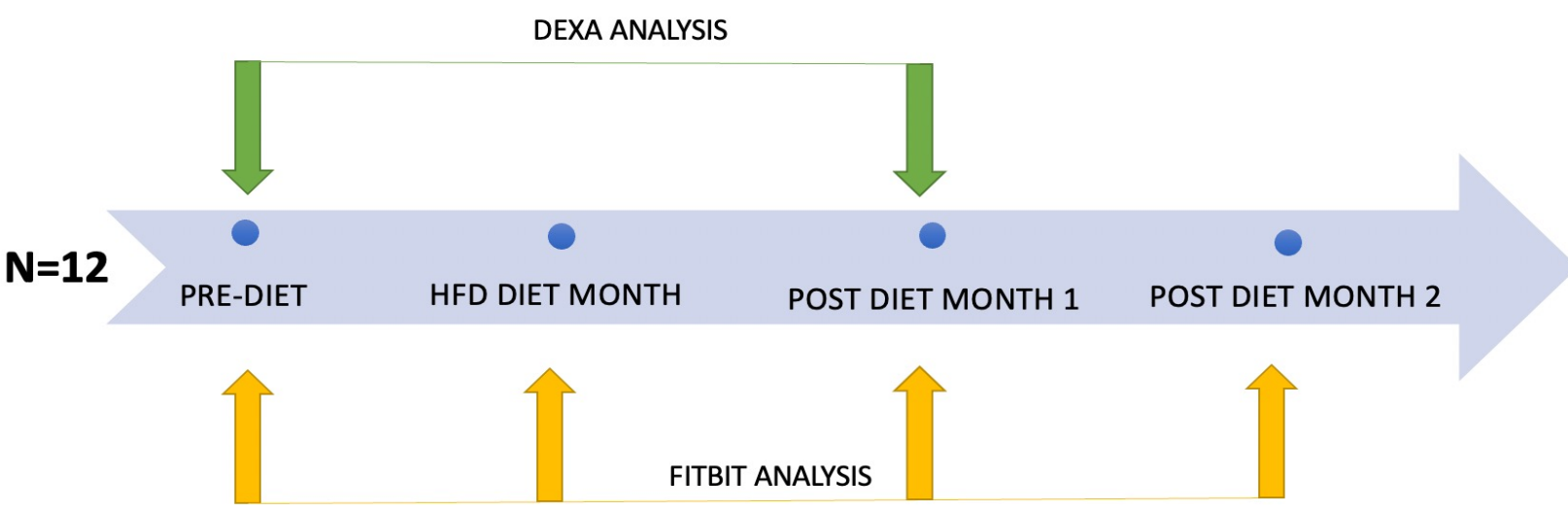
## HYPOTHESIS

If we induce a reprometabolic syndrome in NWW women through a one-month eucaloric HFD there will be no significant change observed in body composition, sleep duration and activity parameters.

## MATERIALS AND METHODS

- 18 female participants of reproductive age were given a one-month eucaloric HFD, from the onset of menses.
- HFD will contain 48% of calories from fat and was administered through the Colorado Clinical and Translational Sciences Institute Nutrition Services
- Fitbit HR was used to monitor movement and sleep.
- Total body and visceral fat composition was estimated by DEXA
- Measurements were obtained at baseline and post HFD
- Fitbit measurements were obtained for a total of 4 menstrual cycles
- Results were analyzed by linear mixed model testing and reported as means  $\pm$  sem.

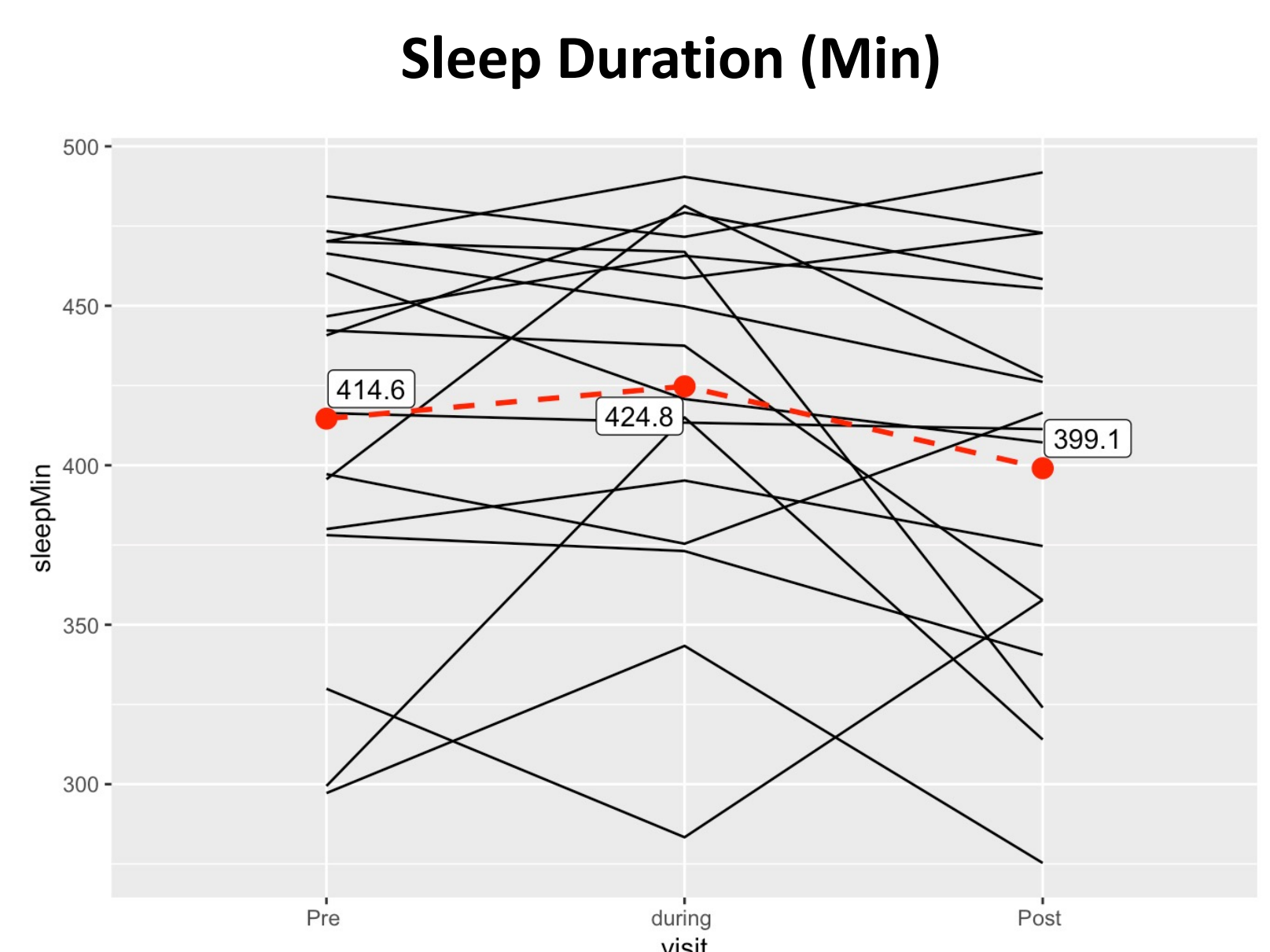
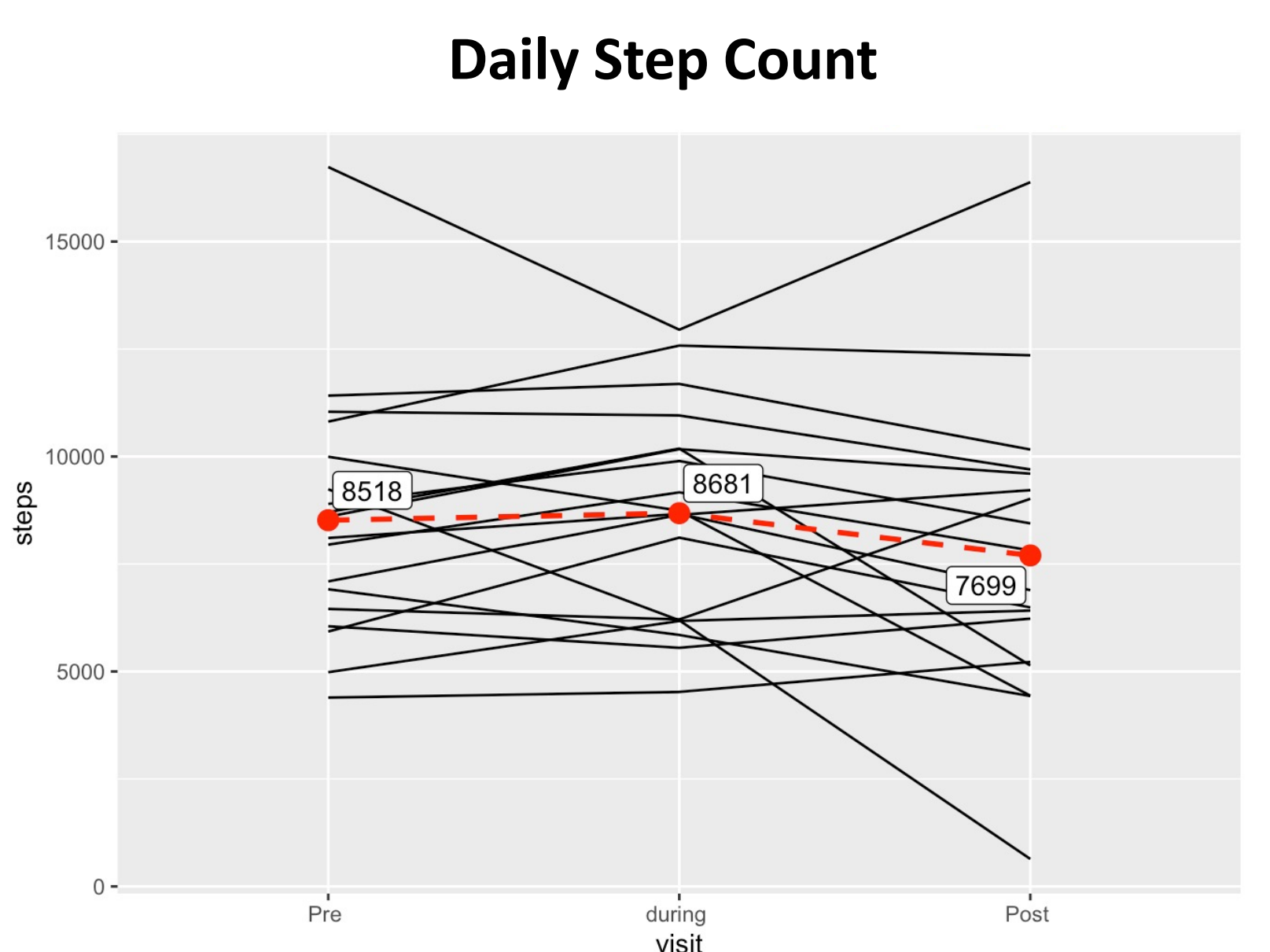
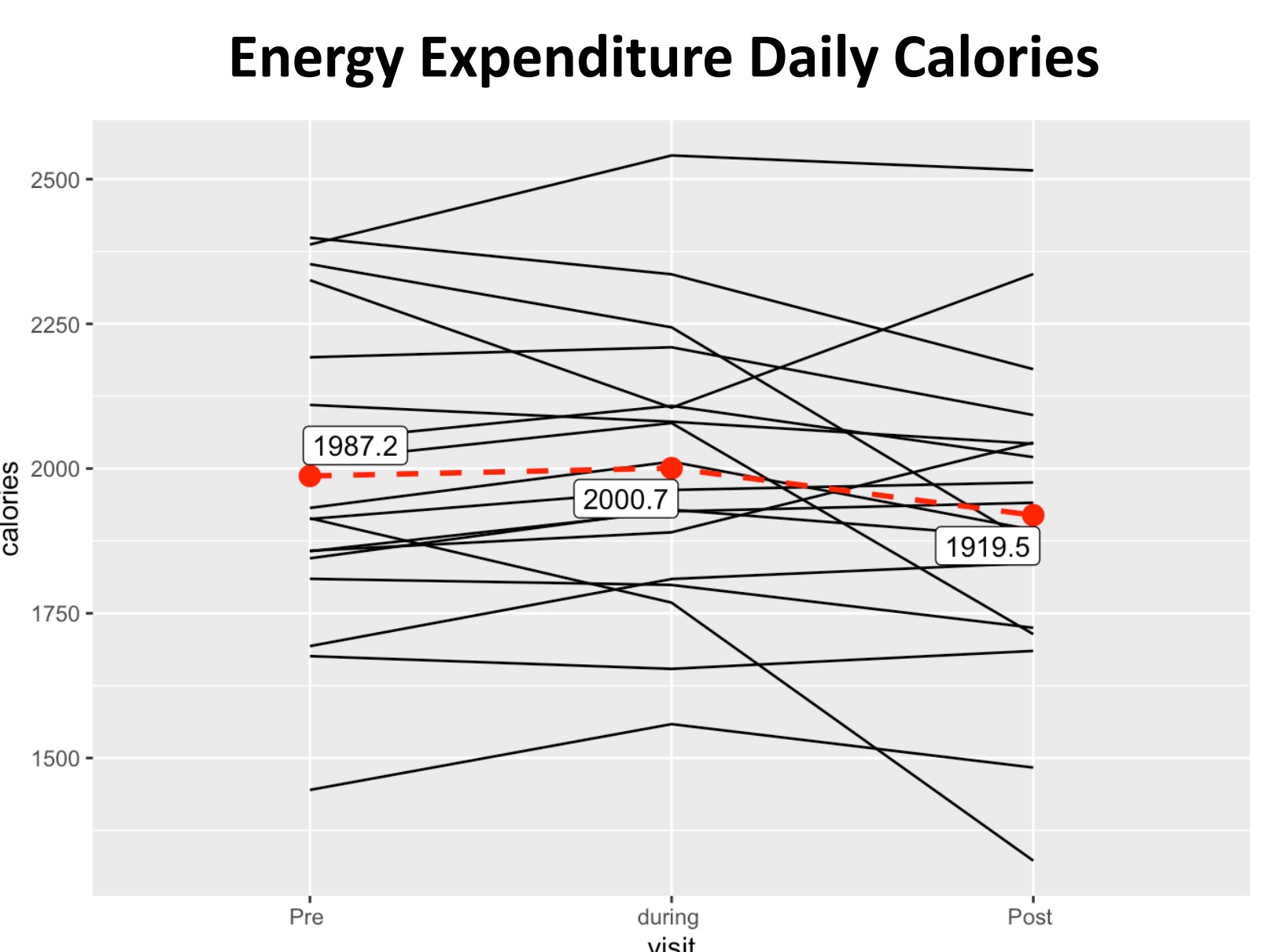
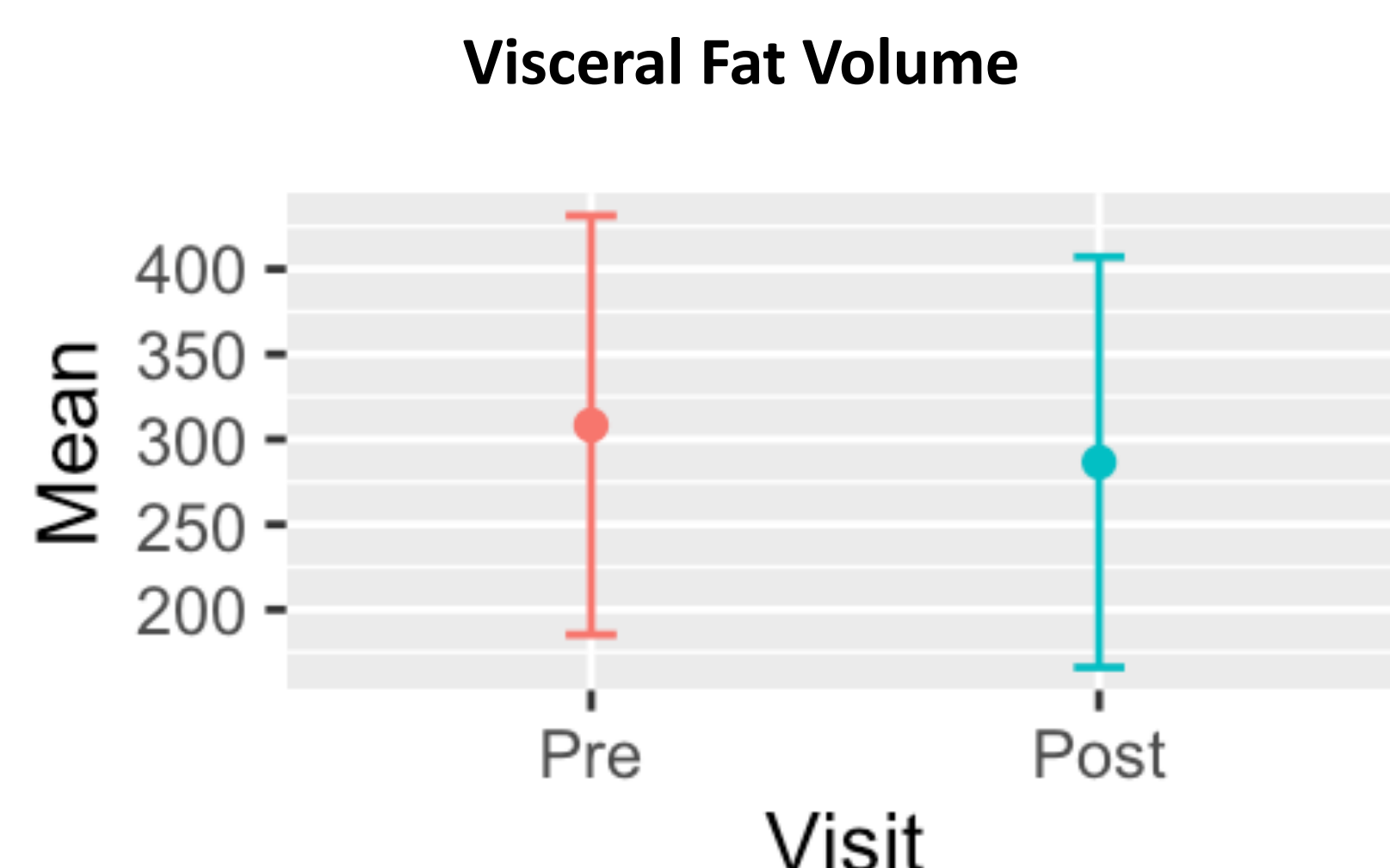
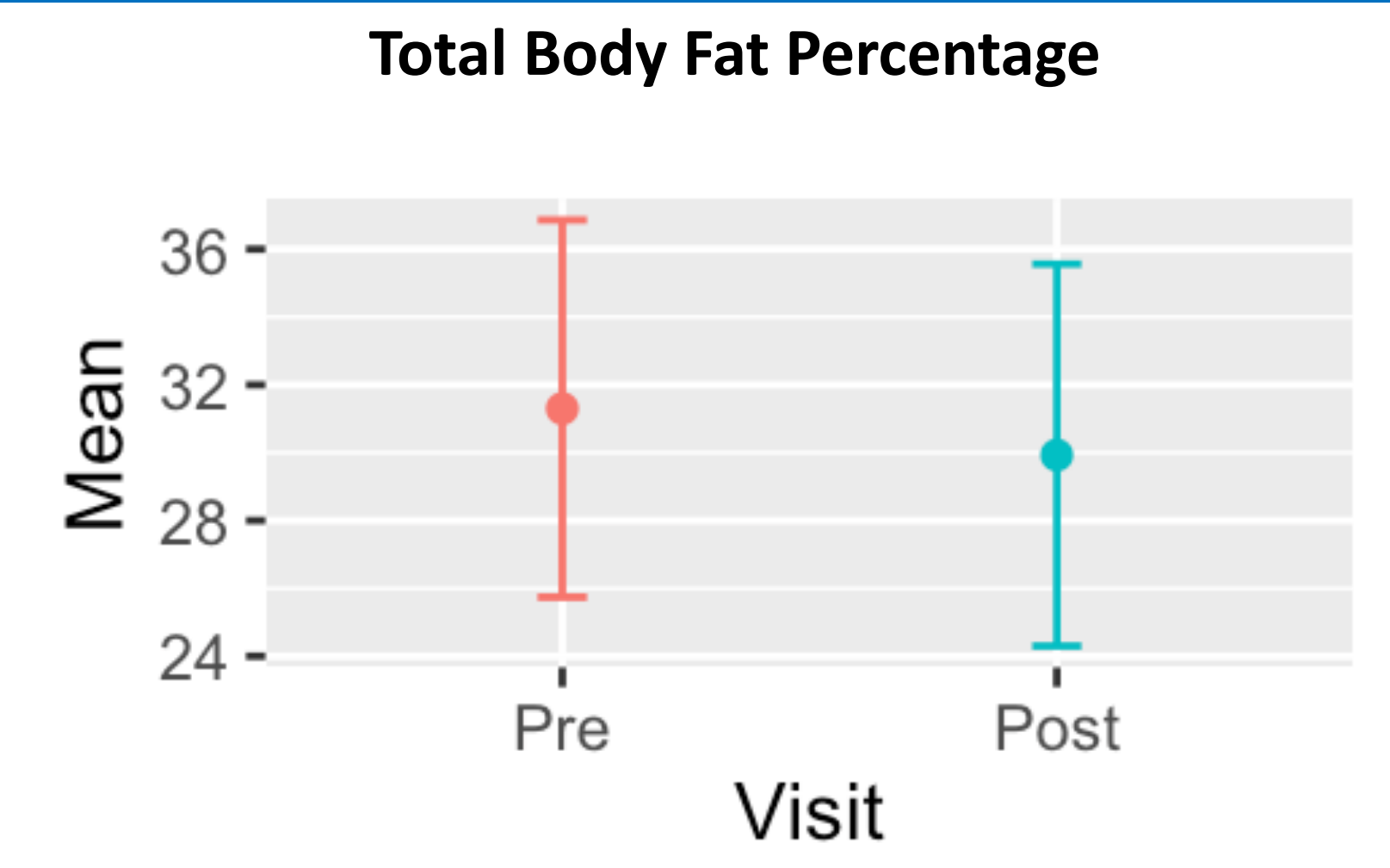
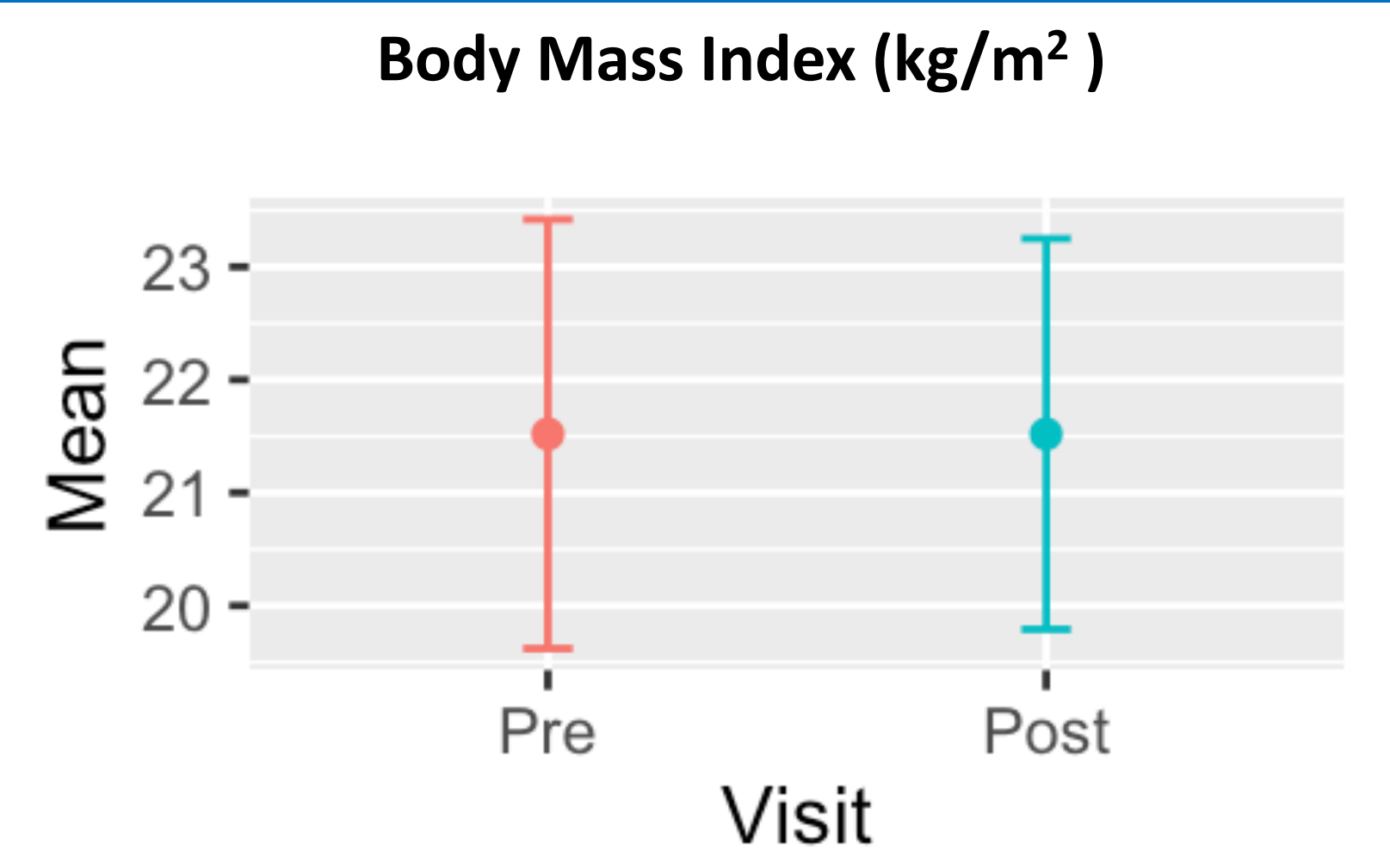
### STUDY DESIGN



## DISCLOSURES/FUNDING

No Disclosures  
 NIH R01 HD087314-01A1  
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## RESULTS



## INCLUSION CRITERIA

- BMI at least 18 but less than 25 kg/m<sup>2</sup>
- No history of chronic disease affecting hormone production, metabolism or clearance
- No use of medications known to alter or interact with reproductive hormones or insulin metabolism (e.g., thiazolidinediones, metformin)
- No use of reproductive hormones within 3 months of enrollment
- Normal prolactin and thyroid stimulating hormone levels at screening
- History of regular menstrual cycles every 25-35 days
- Use of a reliable method of contraception (female or male partner sterilization; IUD; abstinence; diaphragm)
- Normal hemoglobin A1c
- Screening hemoglobin >11gm/dl

## MEAN CHANGE IN VARIABLES PRE & POST DIET.

Variable	Mean Pre-Diet	Mean During Diet	Mean Post-Diet	P- value
BMI	21.52 $\pm$ 1.90	-	21.52 $\pm$ 1.73	0.97
Total Body Fat %	31.30 $\pm$ 5.56	-	29.93 $\pm$ 5.63	<0.01
Visceral Fat Volume	308.30 $\pm$ 123.04	-	286.58 $\pm$ 120.54	0.03
Daily Step Count	8,517.83 $\pm$ 704.09	8,681.48 $\pm$ 546.68	7,699.33 $\pm$ 546.68	0.16
Energy Expenditure Daily Calories	1,987.20 $\pm$ 62.53	2,000.72 $\pm$ 39.44	1,919.46 $\pm$ 39.44	0.09
Sleep Duration	414.61 $\pm$ 14.60	424.75 $\pm$ 11.41	399.06 $\pm$ 11.41	0.08

## CONCLUSIONS

- A one month HFD intervention does not significantly change daily steps, calories burned or sleeping minutes in healthy normal weight women of childbearing age.
- Our study does show a change in wake after sleep onset incidences although more data collection is needed with higher specificity of detection in better sleep tracking models.
- If accurate, this significance is thought to be attributed to the timing of food ingestion as well as the types of fat consumed (mono vs polyunsaturated fats) although further studies are needed to draw an association.
- Our study showed an interesting significant decrease in in total percent fat, total fat mass, visceral fat volume as we as trunk fat with no changes in BMI.
- Our study shows that a one month HFD intervention might have an effect on sleep/wake cycles with a decrease in body fat composition
- Longer intervention time is needed to make a correlation between these fat intake and body fat percentage and long term consequences on reproductive hormones is to be elucidated in future studies.