

***High-protein diet  
promotes **a moderate**  
postpartum weight  
loss in a prospective  
cohort of Brazilian  
women***

Castro MBT

Kac G

Leon ACP

Sichieri R

# Introduction

**Postpartum recommendations:** *energy intake/breastfeeding  
(no orientation about diet composition)*

## **Studies concerning protein consumption**

- *non-pregnant women: more effective weight loss diet (Layman & Baum, 2004; Hu, 2005)*
- *Postpartum women: exclusion criterias (Westman et al., 2002; Foster et al., 2003)*

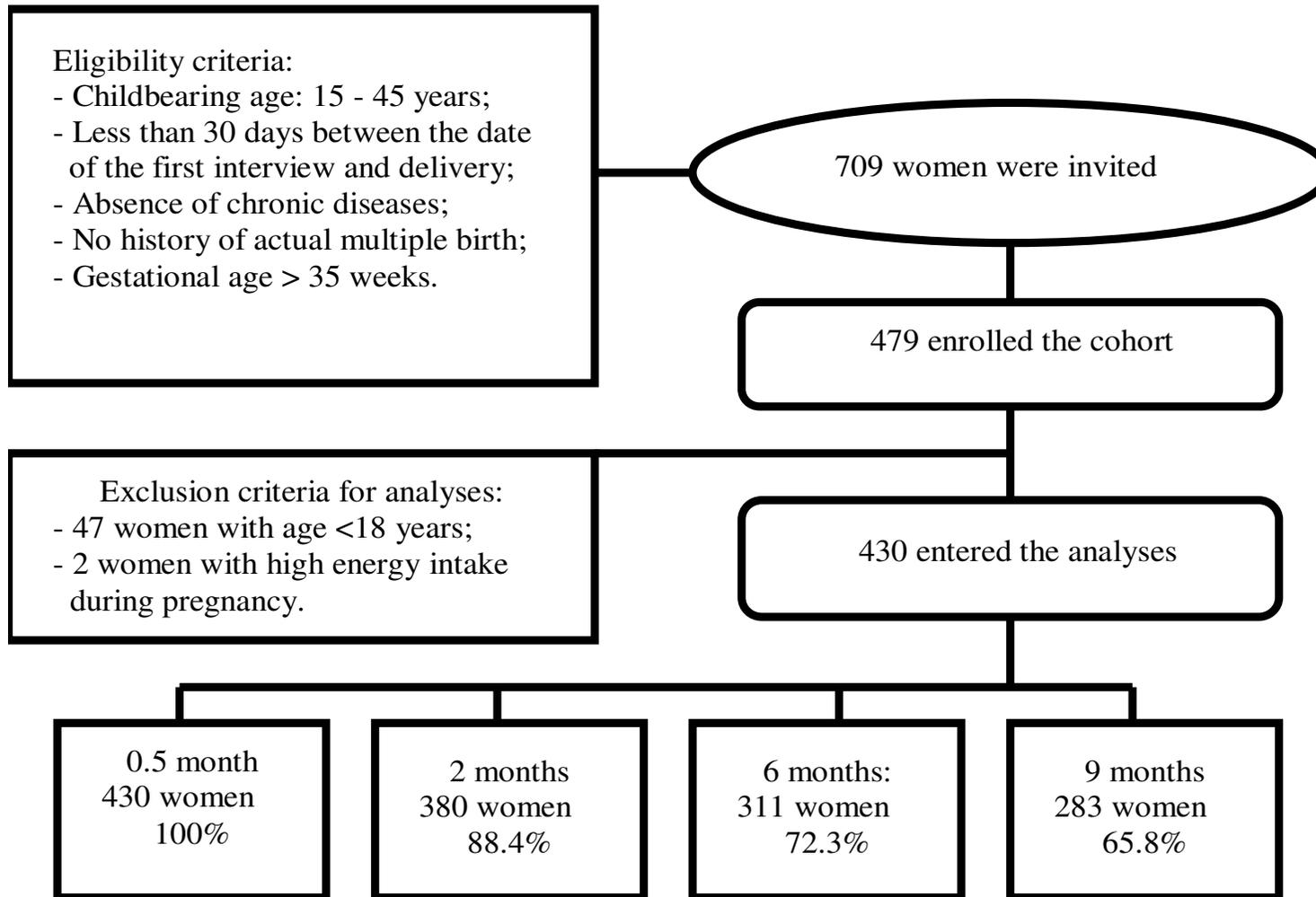
**High-protein diets (HP  $\geq$  1.2 g/kg):** *occidental standard*

- *Coronarian disease (Tucker et al., 2005; Dauchet et al., 2006)*
- *Cancer incidence (Key et al., 2004; Uauy & Solomons, 2005)*

**Prospective study:** *diet composition (HP/LP)  $\Leftrightarrow$  postpartum weight variation*

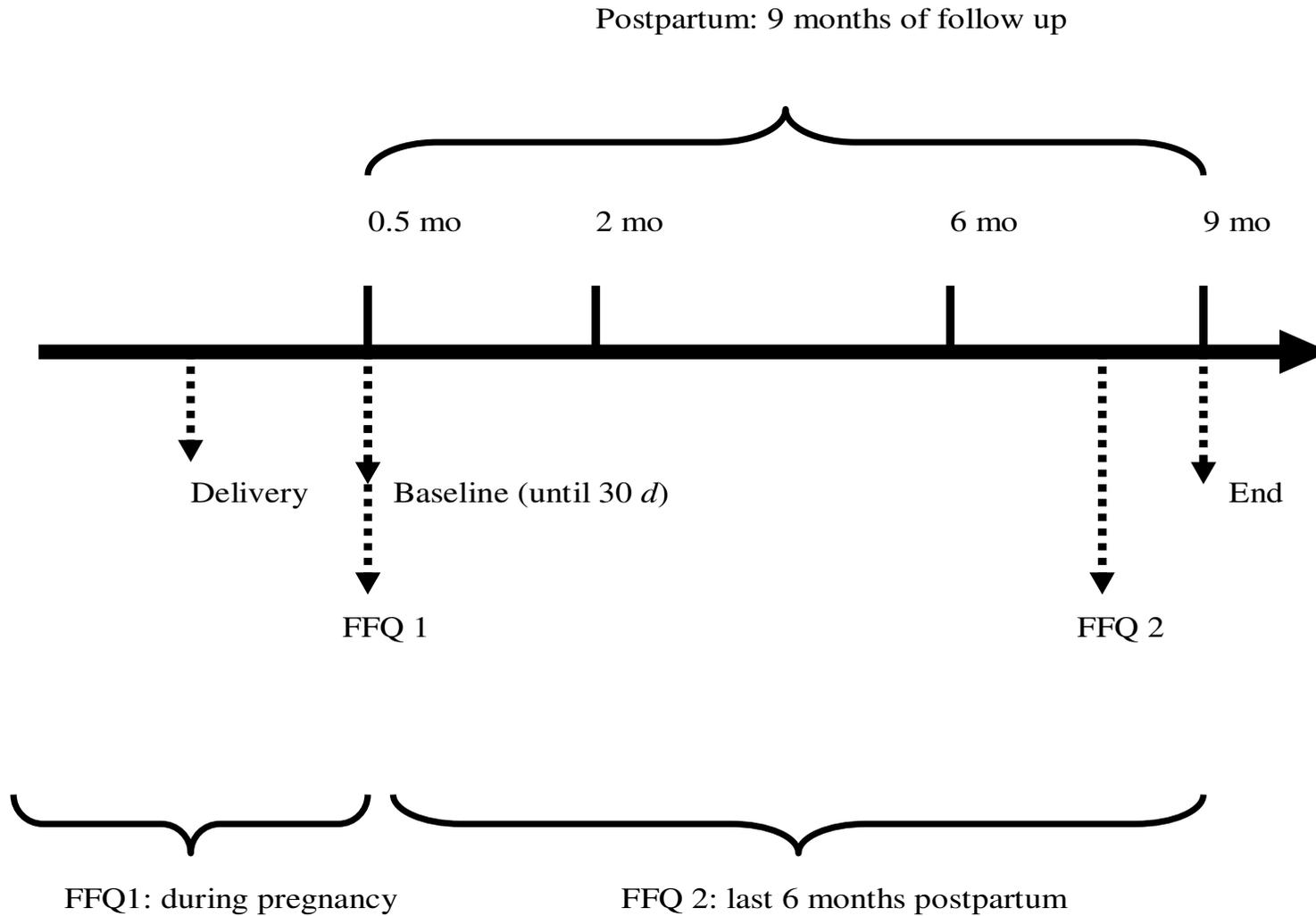
# Methods

Figure 1a.



# Methods

Figure 1b.



# Methods

Models were fitted in five steps as follows:

**Model A:** unconditional mean model describing partition of the outcome variation

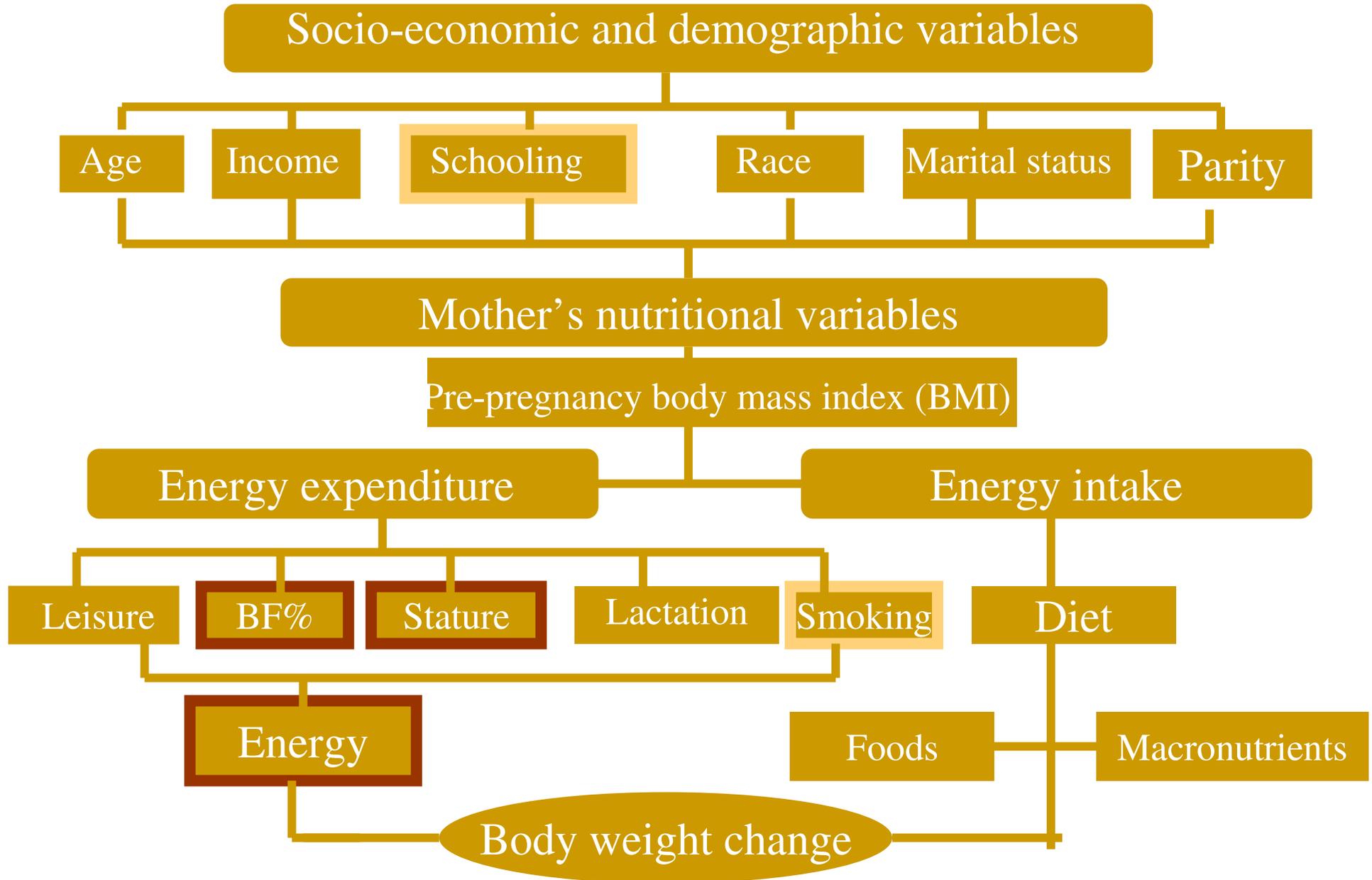
**Model B:** unconditional growth model which includes time variable

**Model C:** conditional model that includes the effect of the HP diet

**Model D:** conditional model adjusted for time-invariant variables: energy intake, percent body fat, stature, age, race, schooling and smoking during postpartum and their interaction with time.

**Model E:** final model with interactions between stature, age and race with time

# Methods



# Results

## HP/LP at baseline (Table 1)

**Weight:** *Thinner* ( $p < 0.0001$ )

**Stature:** *Lower stature* ( $p = 0.0012$ )

**Body fat:** *lower BF% e BMI* ( $p < 0.0001$ )

**Age:** *younger* ( $p = 0.05$ )

**Race:** *lower proportion of whites* ( $p = 0.04$ )

# Results

## **HP/ LP intake at baseline (Table 2)**

**Energy intake:** *2623 kcal versus 1791 kcal,  $p < 0.01$*

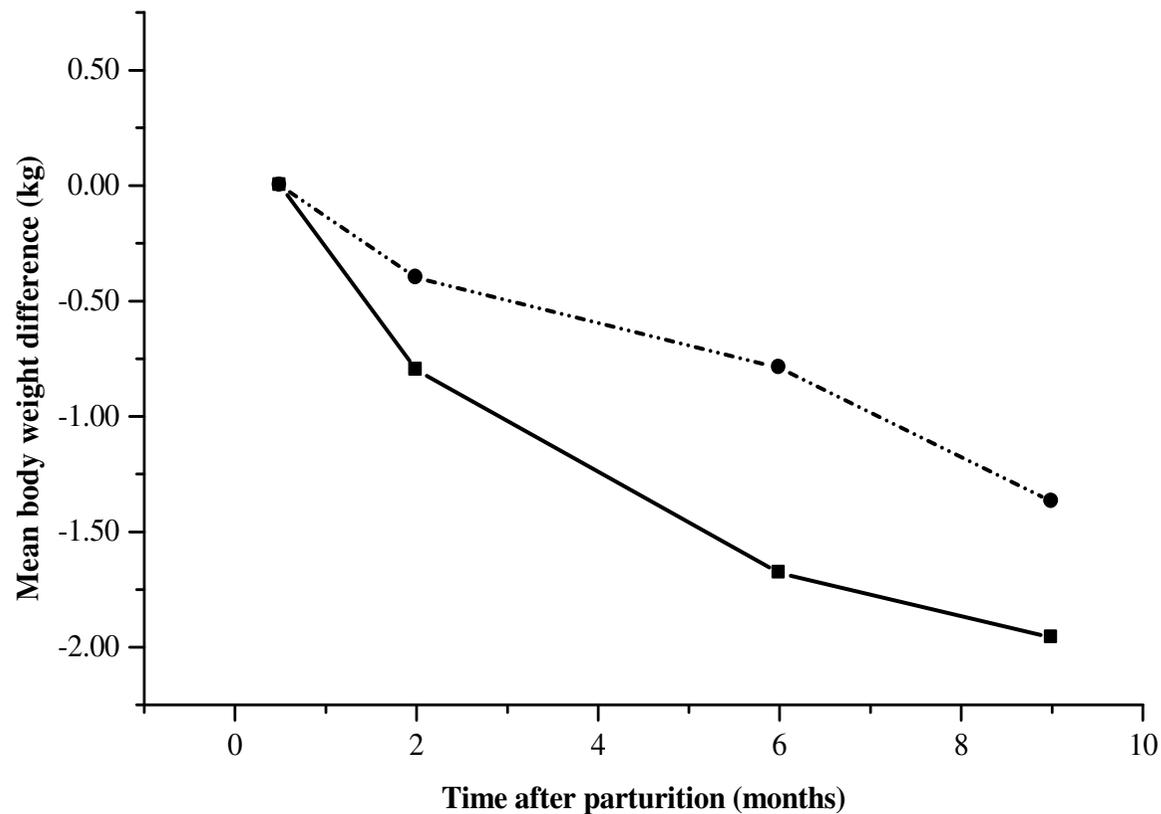
**Protein intake:** *higher*

**Protein intake per kg of body weight (g/kg/d):**

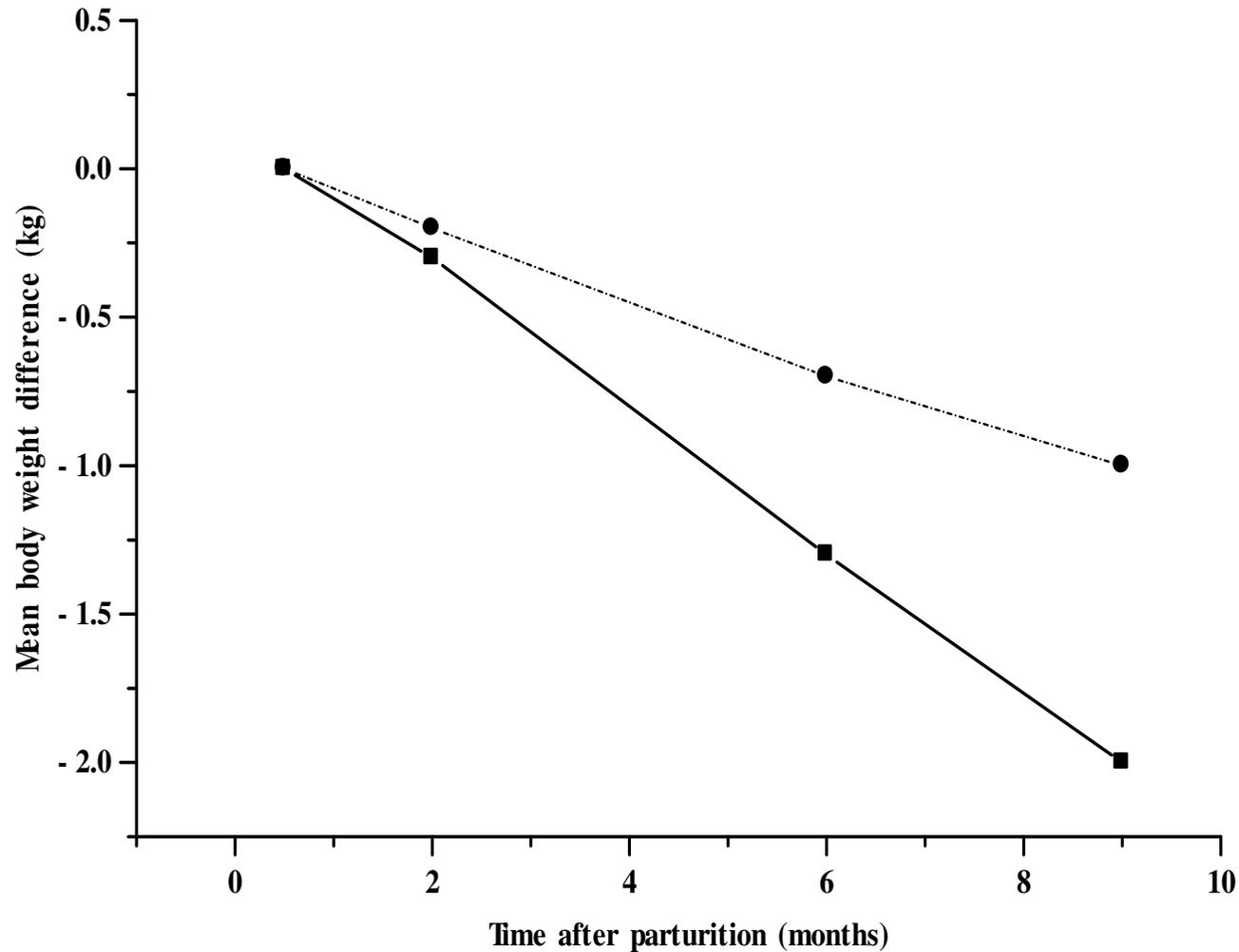
*1.54 g/kg/d ( $\pm 0.32$  g/ kg/d) versus 0.83 g/kg/d ( $\pm 0.20$  g/ kg/d)*

**Density of the protein:** *was higher at HP diet except for chicken and bean*

**Figure 2.a** - Mean body weight difference in women with high-protein diet (HP): ■ High protein intake during postpartum ( $\geq 1.2$  g/kg/d; n = 97, 97, 97, 87); ● Low protein intake during postpartum ( $< 1.2$  g/kg/d; n = 181, 181, 181, 164); \* significant time by group interaction.



**Figure 2.b** – Adjusted mean body weight loss by energy intake, energy intake\*time, stature, BF%, BF%\*time, age, race, smoking, smoking\*time, schooling and schooling\*time in women with high-protein diet (HP) ■ High protein intake during postpartum ( $\geq 1.2$  g/kg/d; n = 97, 97, 97, 87); ● Low protein intake during postpartum ( $< 1.2$  g/kg/d; n = 181, 181, 181, 164); \* significant time by group interaction.



**Table 3.** Regression coefficients and (standard error) of multilevel models for body weight (n=278) for high (HP)<sup>†</sup> and low (LP)<sup>††</sup> protein intake during postpartum.

Parameter		Model A	Model B	Protein intake	
				Model C <sup>‡</sup>	Model D <sup>‡‡</sup>
<i>Fixed Effects</i>					
Intercept	Weight	62.246** (0.590)	62.757** (0.594)	66.678** (0.865)	63.612** (0.753)
	HP/LP			-10.153** (1.465)	-4.975** (1.023)
Rate of change	Time		-0.153** (0.021)	-0.123** (0.027)	-0.123** (0.027)
	HP/LP			-0.104** (0.047)	-0.103* (0.046)
<i>Variance Components</i>					
Level 1	within-person	5.905** (0.267)	5.591** (0.253)	5.713** (0.285)	5.713** (0.285)
Level 2	between-person	147.53** (10.208)	147.76** (10.216)	131.62** (11.329)	30.538** (2.751)
<u>Goodness-of-fit:</u>					
-2 Res Log Likelihood		8337.8	8289.8	6225.3	5852.6
Akayke Information Criterion		8341.8	8293.8	6229.3	5856.6

<sup>†</sup> HP = Protein intake  $\geq$  1.2 g/kg. <sup>††</sup> LP = Protein intake  $<$  1.2 g/kg.

<sup>‡</sup> Unadjusted model. <sup>‡‡</sup> Adjusted model. \* $p \leq 0.05$ ; \*\* $p \leq 0.01$ .

# Discussion

- **HP:** *higher body weight loss/strategy (lose and maintain)*

**Body weight loss** ⇔ **Dietary change**  
↑ energy restriction/↑ protein

- **Sustantable weight loss:** *small X over time*
- **Nutritional requirements/Lactation**
  - OMS: 0.91 g /kg + 16.0 g
  - IOM: 1.3 g/kg
  - Study: 1.54g/kg

# Discussion

## Advantages of HP diet

- Promotes body weight loss (*Westman et al., 2002 and others*)
- Preserves body lean mass (*Motil et al., 1998*)
- Satiety (*Mikkelsen et al., 2000; Layman et al., 2003; )*
- Blood lipid profiles (*Westman et al., 2002; Hu, 2005*)
- Energy expenditure (*Mikkelsen et al., 2000*)
- Thermogenesis (*Johnston et al., 2004*)

## Losses of follow-up

- *Random* (Kac *et al.*, 2003; Castro *et al.*, 2006 )
- *6 months: 72% of participants*

## FFQ: *Fatter (underestimate)*

Obese ↓ CH e ↑ protein (Sichieri & Everhart, 1998).



↑ alternative hypothesis

- *Usual consumption, validity and reproducibility* (Erkola *et al.*, 2001)
- *Postpartum* (Rodrigues & Costa, 2001 and others).
- HP: *high proportion of participants*
- Confounding: *adjusted analysis*

- Positive relation: HP/weight loss
- Strategy: loss/maintenance during postpartum
- Clinical trials/prospective studies: risks and benefits