

Diet and Obesity Among Adults on Guam



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Background

- Cancer is the 2nd leading cause of death on Guam
- Chamorros have highest overall age-adjusted cancer mortality rate on Guam
 - 247 per 100,000
 - >25% than US
- Top cancer site:
 - Lung in males
 - Breast in females

Background

- Body weight on Guam (BRFSS):
 - 37.6% overweight (BMI 25.0 - 29.9)
 - 23.8% obese (BMI \geq 30)
- Traditional Chamorro diet:
 - Taro, yams, cassava, breadfruit, coconut
 - Fish
- After WWII, diets of Chamorros shifted towards imported rice & canned foods

Background



Celebrations and food sharing VERY important part of Chamorro culture

U56 Pilot Project:

“Evaluation of Risk Factors for Chronic Disease Among Adults in Guam”

- Objectives:
 - To compare the dietary intakes of Chamorro and Filipino adults living in Guam.
 - To explore the relationship between weight status and dietary intake.

“Evaluation of Risk Factors for Chronic Disease Among Adults in Guam”

- Data Collected:
 - Demographic: age, gender, ethnicity, education, birth place, etc.
 - Personal & family medical history
 - Anthropometric: ht, wt, BMI, waist circumference, blood pressure
 - Diet intake (24-hr recall)
 - Physical activity (Baecke and NASA Par-Q)
 - BMI used to classify participants as obese ($BMI \geq 30$) or non-obese
 - Energy density calculated as energy(kcals)/gram food weight (all beverages excluded)

Table 1 — Body Size of Chamorros and Filipinos by Gender

	<i>Chamorros</i>		<i>Filipinos</i>	
	Females (n=34)	Males (n=32)	Females (n=33)	Males (n=28)
AGE [§]	43 ± 11	41 ± 12	41 ± 11	41 ± 11
BODY MASS INDEX [§]	30.58 ± 1.41 [†]	30.01 ± 1.21	24.41 ± 0.69	27.57 ± 0.65 [‡]
WEIGHT STATUS [†]				
Normal Wt (BMI<25.0)	20.6% (7)	21.9% (7)	60.6% (20)	32.1% (9)
Overweight (BMI 25.0-29.9)	38.2% (13)	21.9% (7)	30.3% (10)	35.8% (10)
Obese (BMI ≥ 30.0)	41.2% (14)	56.2% (18)	9.1% (3)	32.1% (9)

§ All values expressed as mean ± SE

† Frequency % (number)

‡ According to χ^2 analysis, distribution into categories of weight status among Chamorros significantly ($p < 0.05$) different from Filipinos

Table 2 — Diet of Chamorros and Filipinos by Gender

	<i>Chamorros</i>		<i>Filipinos</i>	
	Females (n=34)	Males (n=32)	Females (n=33)	Males (n=28)
TOTAL ENERGY (kcal/d)	1619 ± 108 ^a	2678 ± 245	1693 ± 147 ^a	2202 ± 171
Food energy (kcal/d)	1328 ± 102 ^a	2180 ± 225	1547 ± 147	1932 ± 156
Beverage energy (kcal/d)	217 ± 52 ^a	446 ± 81 [†]	136 ± 26	207 ± 50
Energy Density [‡] (kcal/gram)	1.70 ± 0.09	1.98 ± 0.16 [†]	1.59 ± 0.12	1.59 ± 0.10
Dietary Fiber (grams/day)	12.7 ± 1.9	14.6 ± 1.5	13.0 ± 1.4	13.3 ± 1.6
Vegetable group (cups/day)	0.89 ± 0.14 ^a	1.58 ± 0.14	1.00 ± 0.16	1.1 ± 0.15
Fruit group (cups/day)	0.57 ± 0.13	0.59 ± 0.18	1.11 ± 0.27	0.59 ± 0.17
Milk/dairy group (cups/day)	0.46 ± 0.11	0.56 ± 0.13	0.48 ± 0.12	0.50 ± 0.13
Grain product group (oz/day)	4.7 ± 0.5 ^a	8.4 ± 0.9	3.6 ± 0.5 ^a	7.7 ± 0.8
Meat/alternatives group (oz/day)	4.2 ± 0.4 ^a	8.4 ± 1.0	7.8 ± 2.1	8.6 ± 1.2

§ All values expressed as mean ± SE

[‡]Frequency % (number)

[‡]Based on food only; all beverages excluded.

[†]According to χ^2 analysis, distribution into categories of weight status among Chamorros significantly ($p < 0.05$) different from Filipinos

[†]Significantly ($p < 0.0001$) different from Filipinos of same gender

[‡]Significantly ($p < 0.05$) different from Females within same ethnic group

Table 3 — Dietary intake variables[†] for subjects consuming a low-, medium-, and high-energy-dense diet

	Energy Density ^a		
	Low (n=40)	Medium (n=41)	High (n=41)
Food Weight (g)	1744 ± 175 ^α	1024 ± 84 [‡]	802 ± 79 ^d
Intake of:			
Total Energy (kcalories)	2065 ± 195	1925 ± 195	2128 ± 193
Dietary Fiber (g)	18.8 ± 1.9 ^α	10.7 ± 0.9 [‡]	11.1 ± 1.2 ^d
Added Sugar (tsp)	11.9 ± 2.4 ^α	14.1 ± 2.0	17.9 ± 3.3 ^d
Discretionary Fat (g)	37.8 ± 4.1 ^α	45.3 ± 4.3 [‡]	69.7 ± 8.1 ^d
Meat and alternatives (oz)	7.1 ± 0.8	8.2 ± 1.6	6.6 ± 0.8
Processed	0.3 ± 0.1 ^α	0.5 ± 0.2 [‡]	1.5 ± 0.5 ^d
Meats/franks			
Vegetable (cups)	2.2 ± 0.5 ^α	1.1 ± 0.1 [‡]	0.8 ± 0.2 ^d
Fruit (cups)	1.4 ± 0.2 ^α	0.4 ± 0.1 [‡]	0.3 ± 0.1 ^d
%Energy from:			
Carbohydrate	53.9 ± 1.9 ^α	49.5 ± 1.6 [‡]	43.2 ± 1.8 [£]
Protein	18.9 ± 1.2	18.6 ± 1.1	16.6 ± 1.1
Fat	27.2 ± 1.2 ^α	30.7 ± 1.2 [‡]	40.1 ± 1.6 [£]

[†]All values expressed as mean ± SE.

[‡]Based on food only; all beverages excluded. Low/medium/high ED defined by sex-specific tertiles.

^{§,¶,£} Values with different superscripts are significantly different from each other (p<0.05).

Figure 1 — Energy density (kcal/gram) by obesity status and ethnicity

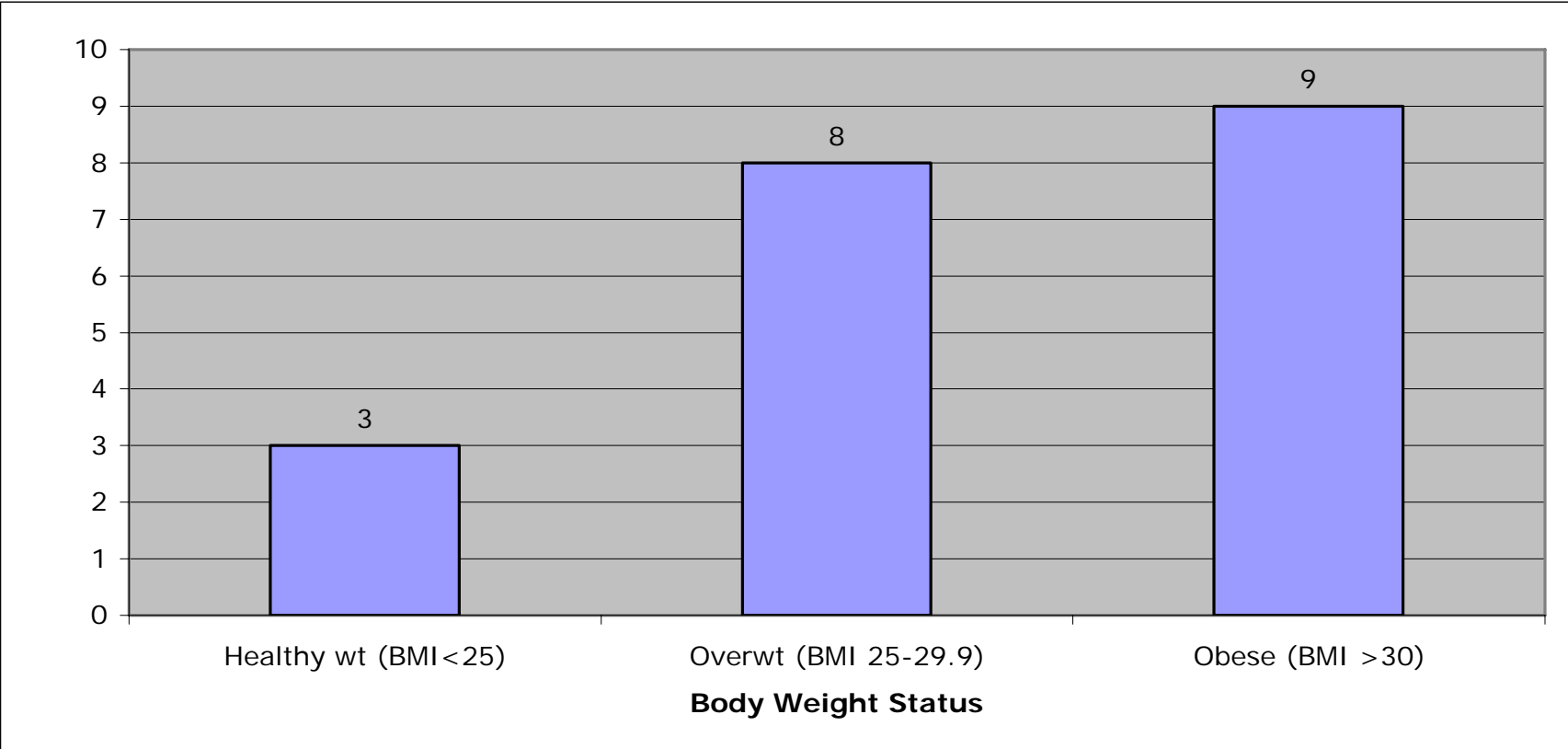
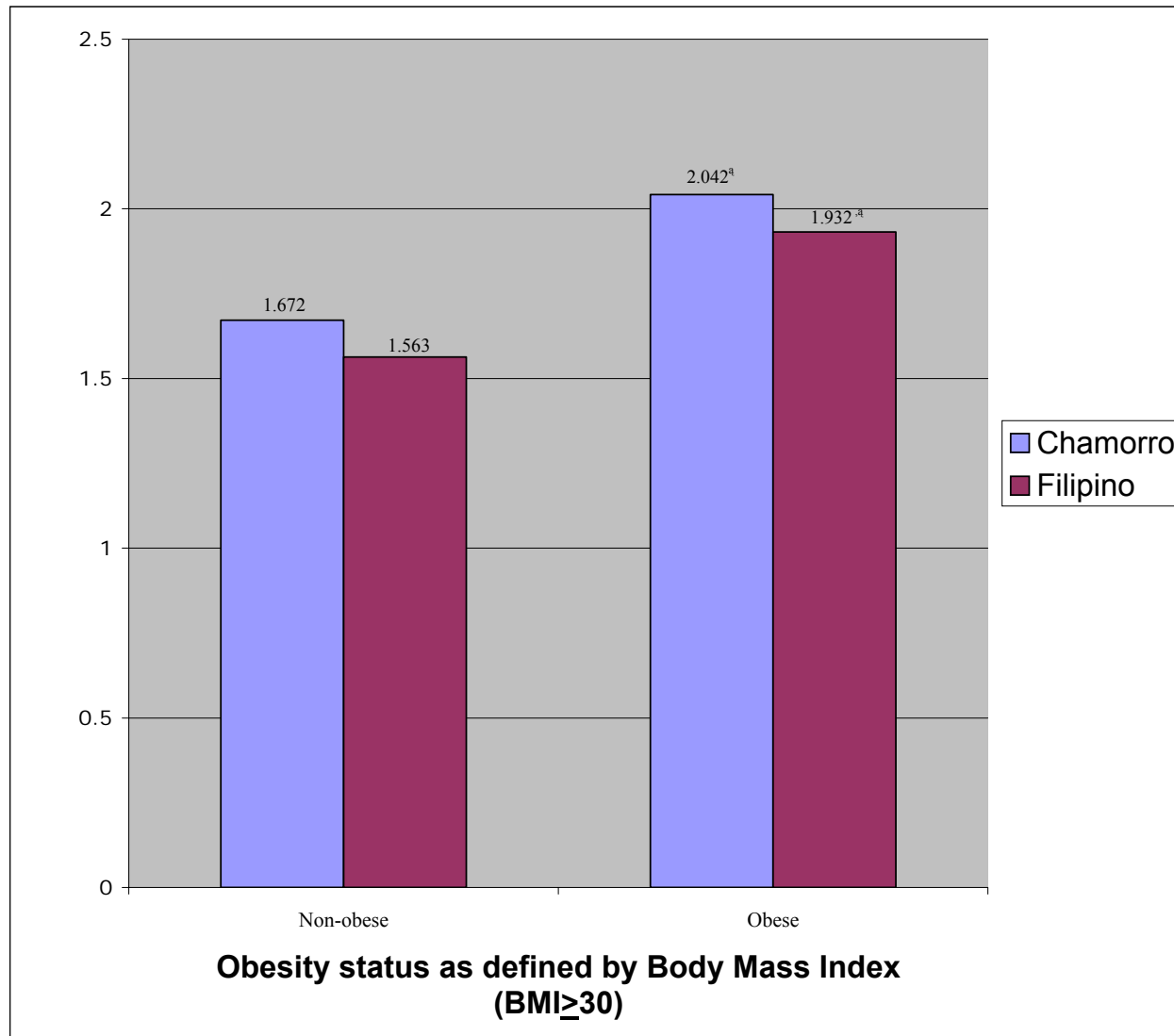


Figure 2 — Sweetened beverage intake by weight status



†: Bars with different symbols are significantly different, $p < 0.05$.

Table 4 — Top 10 foods sources of energy intake by ethnic group[†]:

Rank	Chamorros	Filipinos
1	White rice, unenriched (10.63%)	White rice, unenriched (14.25%)
2	Sweetened beverages (6.83%)	Fried chicken (3.55%)
3	Spaghetti w/tomato meat sauce (3.04%)	Sweetened beverages (3.07%)
4	French fries (2.74%)	Squid (2.65%)
5	Beer (2.64%)	Portuguese sausage (2.15%)
6	Chorizo (Spanish) sausage (2.63%)	Roasted chicken (2.18%)
7	Tacos, fast food (2.54%)	White bread (1.99%)
8	Red rice (1.89%)	Whole wheat bread (1.34%)
9	Kadun Manok (chicken stew) (1.70%)	Saimin-type noodle soup (1.33%)
10	Orange Juice (1.61%)	Bananas (1.28%)

Food item (% total energy)

Findings:

- Significantly more Chamorros were considered obese compared to Filipinos (49% versus 20%)
- Chamorros reported diets with a higher ED than Filipinos (1.9 kcals/g versus 1.6 kcals/g)
- Non-obese subjects had diets with lower ED than obese subjects (1.9 kcals/g versus 2.3 kcals/g).
- Overweight and obese subjects both reported a significantly higher % energy consumed as sugar-sweetened beverages than healthy weight subjects (8% and 9% versus 3%)

Conclusions:

- Differences in ED may contribute to differences in obesity rates between Chamorros and Filipinos on Guam.
- Dietary ED can be lowered by ↑ vegetables, fruits, and dietary fiber, and ↓ white rice, sugar-sweetened beverages, and fatty processed meats
- Could be accomplished if Chamorros and Filipinos consumed more of their traditional plant-based food dishes.

The University of Guam Unibetsedåt Guahan



Thank You!