

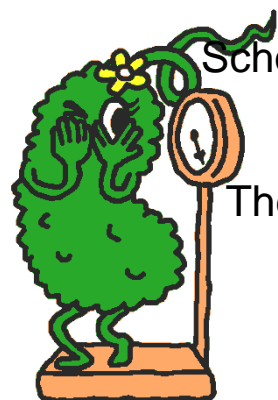
A Clinical Trial of the Effects of the Traditional Okinawa Diet on Blood Pressure and other Health Indicators: Can DASH-like Results be Achieved?

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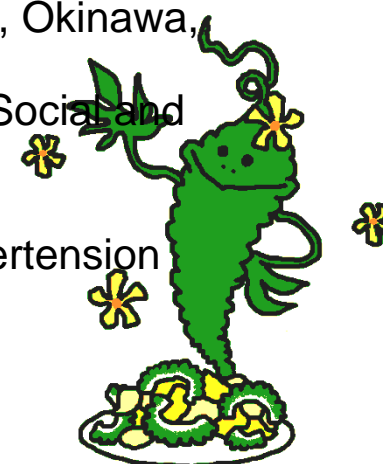
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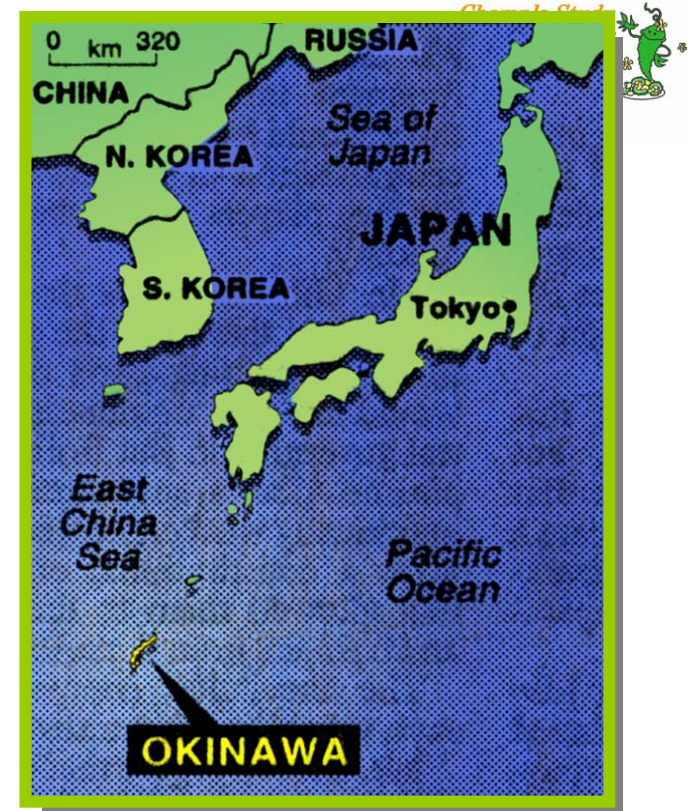
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Okinawa, an isolated island prefecture of Japan, has among the world's longest average life expectancy and the highest prevalence of exceptionally long-lived individuals.



Geographic Location of Okinawa

The Okinawans centenarians have the highest prevalence in Japan.

Objectives

- The Okinawa Diet, a naturally occurring dietary pattern similar to the DASH diet in food groups and nutrient composition, is often cited as the main reason.
- Unlike the DASH diet, a few dietary intervention studies have been carried out. Therefore we explored the effects of the traditional Okinawa diet on blood pressure and other health indicators through a clinical trial.

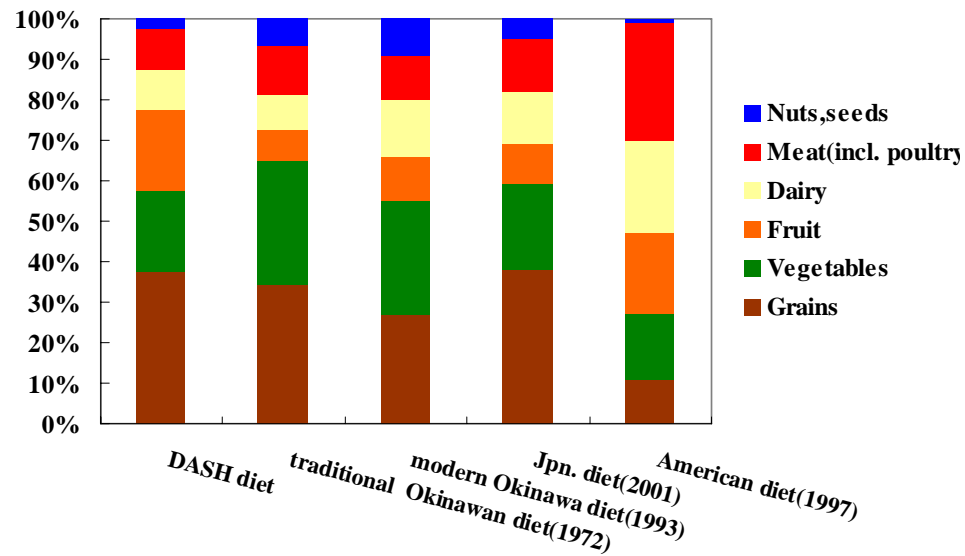
Traditional Okinawan Diet

- High rich intake of
Green-Yellow Vegetables,
Sweet potatoes,
Soy beans products(ex. Tofu)
Bonito-flakes and kelp
- Low intake of Salty products , Dairy products
- High-fiber diet, low caloric diet.

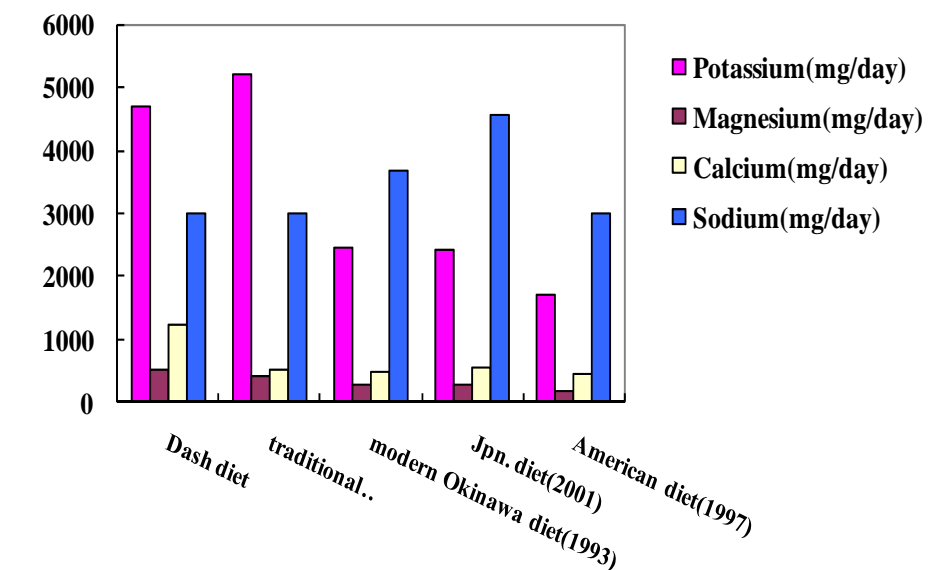
Todoirki H, Okinawan J.Amer Studies 1, 52-61, 2004

- The Okinawa Diet, a naturally occurring dietary pattern similar to the DASH diet in food groups and nutrient composition.
- The Okinawa diet offers a new, Asian dietary approach to preventing and treating hypertension.

The ratio of food groups by several diets



Mineral amounts in several diets

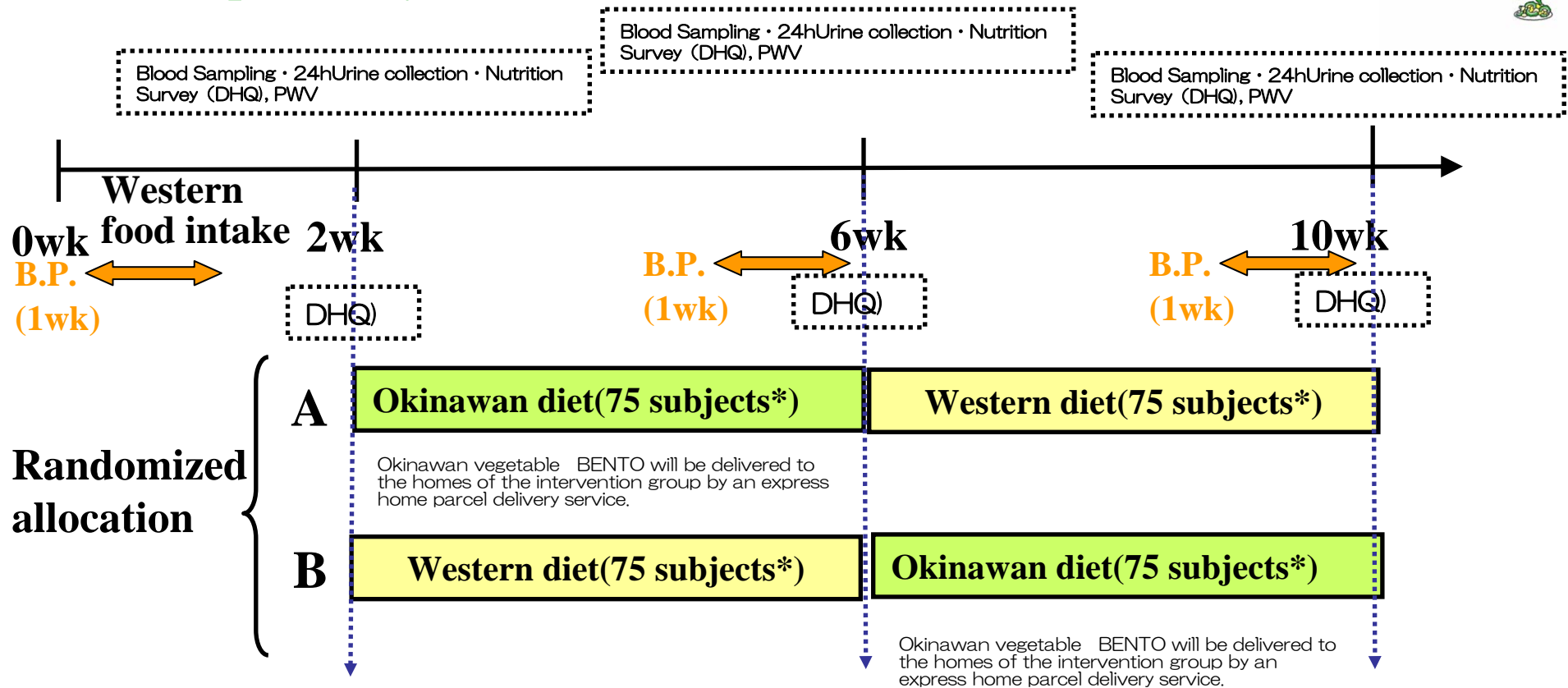


Appel, L. J. et al.; DASH Collaborative Research Group: A Clinical trial of the Effects of Dietary Patterns on Blood Pressure. N Engl J Med, 336: 1117-1124, 1997

Methods of the Chample Study

- **Subjects** : American residents in Okinawa aged 40 to 69 years (n=138; 50.0 ± 7.2 years old, 51 men and 87 women). White: 85%, African American: 10%, Others: 5%.
90% of subjects completed in the trial.
- **Study design**: Randomized cross-over design.
- **Diets**: Single-portion takeout meals common in Japanese cuisine (bento) were provided. A four-day supply of lunch and dinner bento was delivered once a week. For two weeks, the subjects were fed a typical Western style diet then randomly assigned to receive four weeks of traditional Okinawa diet, which is rich in green leafy and yellow root vegetables, and low in sodium, saturated, trans, and total fat.

Chample Study 3 Method: Randomized Controlled Clinical Trial



The members of the control group will be asked to avoid Okinawan vegetables as much as possible. **

* The study will employ 150 healthy Americans aged 40 to 69 years living in Okinawa.

** The dietary intervention group will be provided with instructions on how to cook the Okinawan diet (“The Okinawan Diet Plan” by Drs. Willcox).

Nutrients design of the Chample Study 3

Each meal contains (on average):

- Energy 700kcal(this includes rice)
- Salt 2.5-2.7 g
- Vegetables 250g (Okinawa:Others=2:1)
- Potassium 1500mg
- Vitamin C 100mg
- Bonito flakes 1.5 g

*Nutrient component based on traditional Okinawan diet in the nutritional survey in 1949.

Examples of Okinawan Vegetables in BENTO

Goya
(*Momordica
charantia*)



Green
papaya
(*Carica
papaya*)



Handama
(*Gynura
bicolor*)



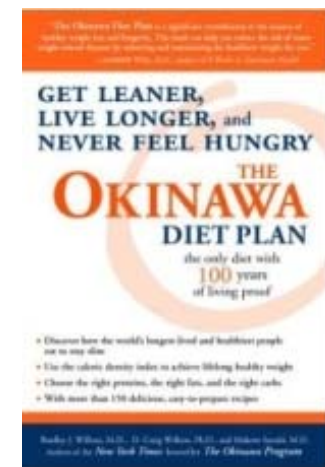
Sakuna



Bento for Americans (Chample Study 3)



- A four-day supply of lunch and dinner bento once a week. traditional Okinawa diet, which is rich in green leafy and yellow root vegetables, and low in sodium, saturated, trans, and total fat.
- A two-day supply of Goya juice(480ml per day) once a week .
- Subjects intake the average of 80% amount of the delivered meals .

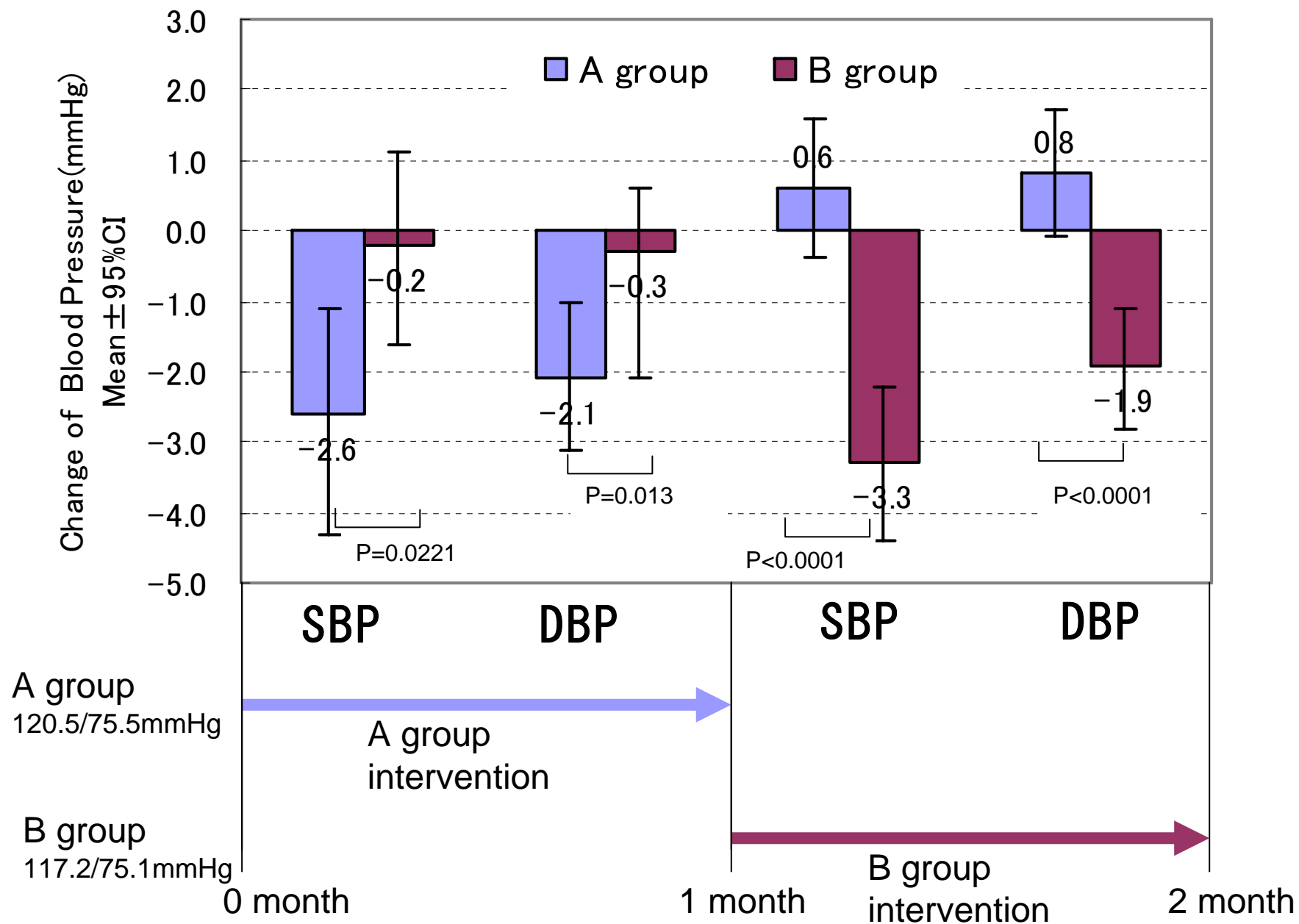


(Willcox 'The Okinawa Diet Plan')

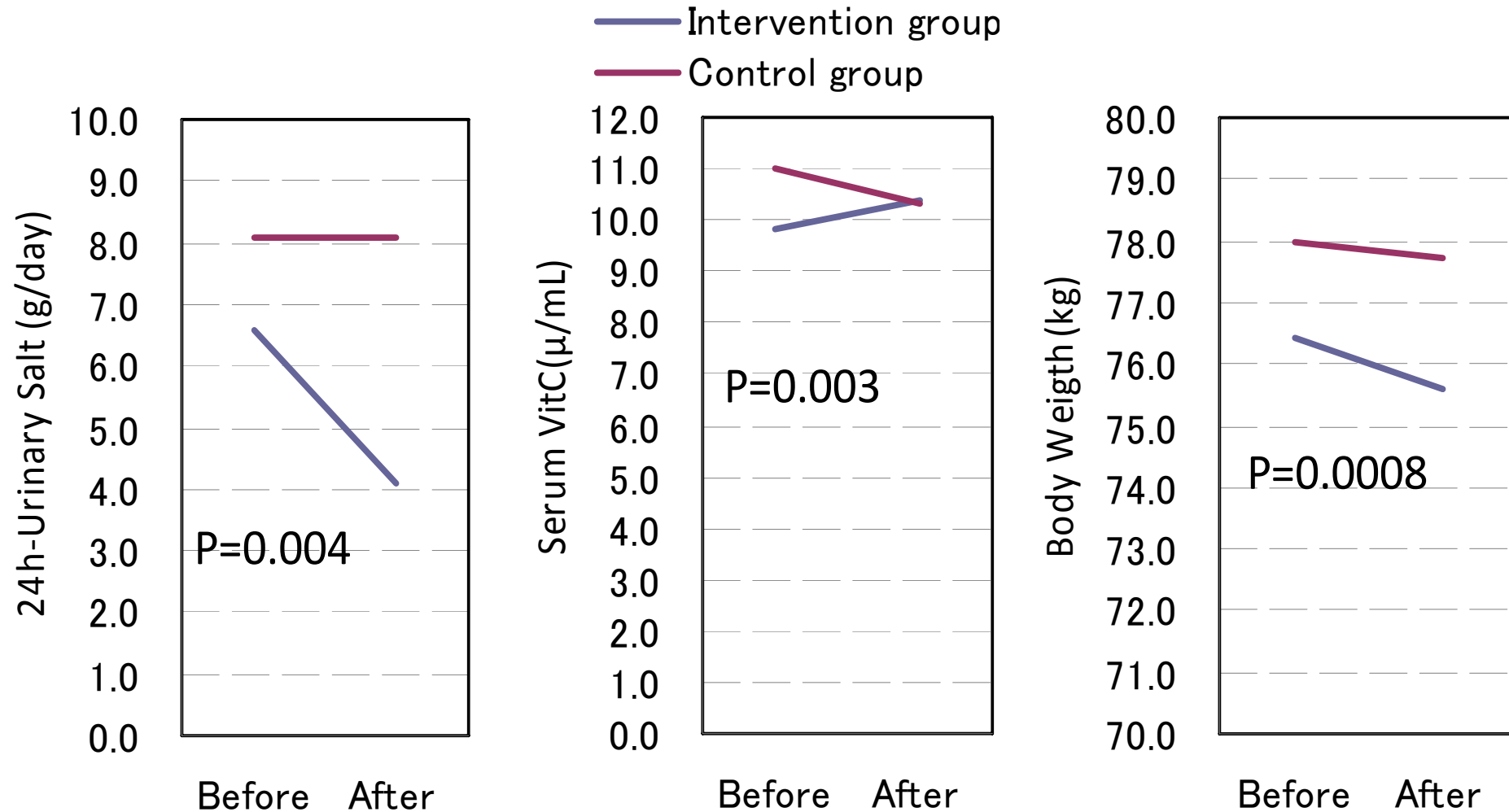
Results

- Among Okinawa diet subjects, systolic and diastolic BP decreased 2.6 mmHg (95% CI -4.3,-1.1), and 2.1mmHg (95%CI -3.1 -1.0), respectively. Among control group, systolic and diastolic BP decreased 0.2 mmHg (95% CI -1.6, 1.1), and 0.3mmHg (95%CI -2.1 0.6), respectively. All BP values were measured at home.
- 24h-urinary of sodium and body weight decreased more in the intervention group than in controls (significance of between-group differences ranged from $p=0.004$ to 0.0008). Serum vitamin C level increased in the intervention group than in controls (significance of between-group differences $p=0.003$).
- Post-intervention group indicated the similar results.

Intervention changes in blood pressure



Pre-intervention changes in variables



Chample Study Scheme (RCT design)



Project Location Year	Intervention Term	Character of Subjects	Number of Subjects	Intervention Method	Outcome
Part1 Okinawa 2005	2 weeks	Female(18-38 yrs)	39	Home-percel delivery of Okinawan vegetables	Blood/Urinary Nutrients
Part2 Okinawa 2006	1 month	Middle-aged Okinawan couples(40-69 yrs)	229	Delivery of Okinawan vegetables +GOYA Juice	B.P. , Blood/Urinary Nutrients Arteriosclerosis Index(PWV/AI)
Part3 Okinawa Cross-over 2007	1 month	Americans Volunteers(40-69 yrs)	138	Delivery of Okinawan Bento +GOYA Juice	B.P. , Blood/Urinary Nutrients, Arteriosclerosis Index(PWV /AI)
Part4 Yokohama Cross-over 2008	1 month + 1yr follow up	Middle-aged Main-land residents couples(40-69 yrs)	282	Delivery of Okinawan Bento +GOYA Juice	B.P. , Blood/ Urinary Nutrients, Arteriosclerosis Index(PWV /AI) Behavioral modification,

Macronutrient profile of popular diet and Chample Study Diet

High Carbo

Chample Study Diet

Low Carbo

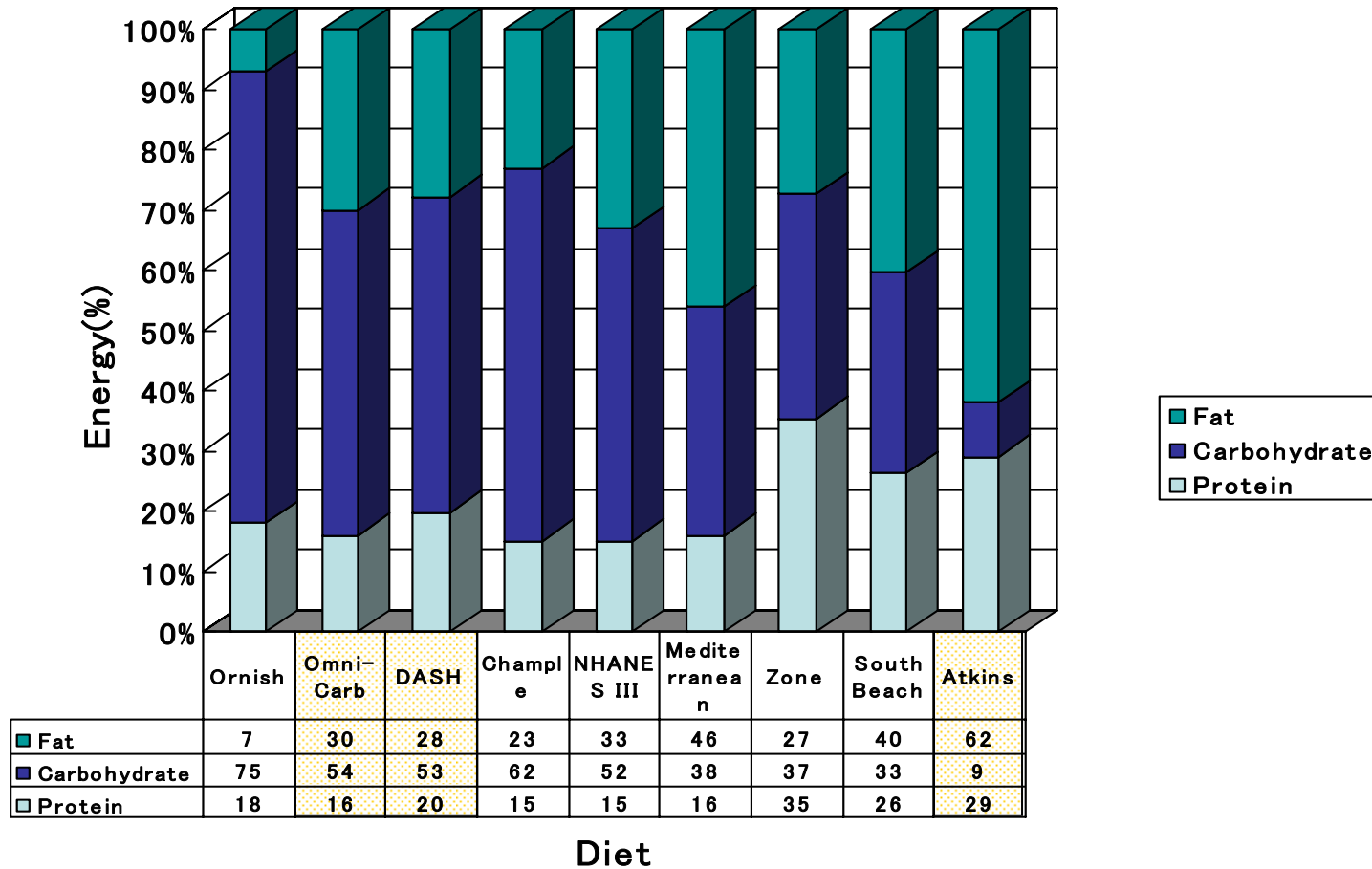
Low Fat

Dash Diet

High Fat

Moderate Protein

High Protein



Conclusion

- The traditional Okinawa diet, although unique in culinary approach, has similar composition of nutrients and food groups to the DASH diet and seems to achieve similar results. Americans subjects have a good reputation of Okinawan Bento diet(71% of subjects would like to purchase the delivered BENTO).
- The Okinawa diet offers a new, Asian dietary approach to preventing and treating hypertension.

**Thank you !
Nihe de biru!
Gokurou sama
deshita!**

