A RANDOMIZED TRIAL OF A SOUTH BEACH-PATTERNED DIET FOR WEIGHT LOSS AND HYPERTENSION

(RESEARCH PAPER)

ANDREW LORENZ C. NODADO

CAVITE NATIONAL HIGH SCHOOL

DIVISION OF CAVITE CITY

REGION IV-A CALABARZON

AN OFFICIAL ENTRY TO THE REGIONAL SCIENCE AND TECHNOLOGY FAIR 2015 (SCIENCE INVESTIGATORY PROJECT)

INDIVIDUAL CATEGORY (LIFE SCIENCE)

OCTOBER 2015

TABLE OF CONTENTS

NODADO, A.L. ***A Randomized Trial of the South Beach Diet for Weight Loss and Hypertension.*** **Research paper for the Regional Science and Technology Fair 2015 (Individual Category, Life Science) Cavite National High School, Cavite City, Region IV-A CALABARZON.**

ABSTRACT

This study aims to determine the effect of a locally-created South Beach-patterned Diet program in the changes of weight and blood pressure. The nutritional content was determined after the dieting period. The food acceptability of the recipes are evaluated after the period. Mean was used for the obtained data for food acceptability

The results show that the weights of the subjects who were subjected in the patterned diet program were lessened as opposed to the results in the normal diet program. The systolic pressure decreases on the patterned diet group; however, the diastolic pressure varies. Results showed that the nutritional content of the ingredients and recipes vary; however, the higher values in the patterned diet recipes are noticeable. The variations of nutritional content caused the variation of change in weight per phase.

In terms of the food acceptability, the results evidently showed that the recipes included in the South Beach Diet program are acceptable when it comes to the sensors, such as: appearance, taste, consistency, aroma, and overall acceptability.

In conclusion, the South Beach-patterned Diet program is effective in terms of weight loss only. This study can be used as a basis for the future studies that will be conducted.

INTRODUCTION

Background of the Study

The increasing dominance of an epidemic in humans called obesity is continuously providing hazardous effects to the economical, medical, and health fields. The type of diet that people eat is considered one of the major causes of obesity. Statistics show that approximately 34% of men and 36% of women of the total population of the United States are considered overweight or obese (Go et al., 2013; Flegal, 2010; Ogden, 2010). Obesity triggers illnesses and responses such as hypertension that primarily causes cardiovascular diseases, which then leads to mortality. Hypertension is most likely to occur on the obese, rather than the non-obese (Dustan, 1985; Kotchen, 2010; Hsueh, 1994). The hypertension-experiencing obese are most likely to have higher mortality rates (Chiang et al., 1969; Allison, 1999; Duflou, 1995). Katzmarzyk and Ardern (2004), and Ng et al. (2013) stated that the trend in mortality rates is constantly increasing due to overweight and obesity. The rise of this matter has led different personalities to come up with solutions to lessen the prevalent effect of obesity.

Dieting has been one of the most effective ways to lose weight. Choosing the right foods to eat will help someone to lose weight. Nutritionists and dietitians are still coming up with different programs when it comes to losing weight. Samaha et al. (2003) and Shai et al. (2008) conducted a study to determine what type of diet would make obese respondents have a greater weight loss; and after the experiment has been conducted, the data shows that the subjects belonged to the low-carb diet program lost more weight than the other included diets in a certain period of time.

South Beach (SBe) Diet is one of the commercial low-carb diet programs known, along with Atkins and Zone diets. The said diet does not need any calorie counting and encourages subjects to eat meals and snacks from time to time; however, is demanding to subjects who are generally used to high-carbohydrate diet, and also is time consuming.

Even with the presence of testimonies and subject reviews, there are only a few researches using the SBe Diet as a variable. With this prior information, this study attempts to determine the effectivity of a South Beach-patterned (SBeP) Diet meal plan in terms of weight loss and hypertension.

Objectives of the Study

Determining the effectivity of a SBeP diet program in terms of weight loss and hypertension is the primary purpose of this study. Specifically, this study aims to:

1. create a localized meal plan patterned to the SBe Diet meal plan;
2. determine the effect of the meal plan on weight by comparing it to a normal diet;
3. determine the effect of the meal plan on blood pressure by comparing it to a normal diet;
4. compare the nutritional content of the ingredients of the recipes of the two meal plans;

5. compare the nutritional content of the recipes to the Recommended Dietary Allowance (RDA); and,
6. test the two meal plans by using sensory evaluation tests.

Significance of the Study

With the increasing cases of obesity and obesity-related hypertension, this study of the SBeP diet program will be of great help in lessening their risks. Determining the effectivity of the meal plan will be of great help to different members of the society, and to lessen the hazardous effects of the said epidemic:

Overweight and obese subjects. With this study, they can fully understand the concepts of dieting and the SBe Diet program. Providing them reliable information enables them to replicate the meal plan, in order for the subjects to lose their weight and so as to lessen their risks of cardiovascular diseases.

Nutritionists and dietitians. Practitioners can use this study for information about the strict rules and concepts of the diet program. Through the efforts of these professionals, the provided information can be used on their clients by giving nutritious recipes in order to maximize their potential in weight loss.

Future researchers. This study can be used as a baseline for future investigatory projects. The provided information will be able to ease their understanding of the concepts of dieting in order for the researchers to have more accurate findings of their study.

Scope and Limitations:

This study primarily focuses on determining the effectivity of a SBeP diet program in terms of weight loss and hypertension. The design of the meal plan is originated from the original SBe Diet program. The recipes are chosen by giving importance to the restrictions of the plan. The ingredients are bought and gathered from the marketplace and from grocery stores. The subjects who volunteered for this study are selected by two criteria: 1) the BMI range of 25.0 kg./m^2 and above; and 2) the history of cardiovascular diseases, therefore, the type of obese subjects in this study are those with obesity-related hypertension. The testing of the study onto a large scale, with or without the other types of illnesses related to obesity; and the observation of different changes in body composition of the subjects goes beyond the scope of the study. The subjects were divided into two, whereas two subjects undergo per type of the diet plan. The effectivity of the diet program was determined by subjecting the subjects to a dieting period, whereas the changes in their weight and blood pressure are recorded each week. The nutritional content of the recipes are also gathered as the secondary data of the study.

The creation and testing of the diet program were done from June to August 2015 at Cavite National High School.

METHODOLOGY

The purpose of this study is to conduct an experiment in which a diet program, which is patterned to the South Beach (SBe) Diet Program, will be tested to determine its effectivity in weight loss and hypertension.

The materials included are the following:

- weighing scale – which is used to measure the initial weight of the subjects and the corresponding changes per week;
- sphygmomanometer – which is used to measure the initial blood pressure of the subjects and the corresponding changes per week;
- South Beach Diet plan design – which is used as the basis of the created plan.

Preparation for the Dieting Period

In determining the effectivity of the South Beach-patterned (SBeP) Diet Program in weight loss and hypertension, two setups were made; SBeP Diet group as the experimental setup and Normal Diet group as the control set up.

The diet program that is tested on this experiment is based on the design made for the three phases of the original SBe Diet Program. The restrictions on the diet are recognized from the start of the dieting period. The recipes that are needed were selected based on the design of the said program. The following tables show the design of the program.

Table 1: The Meal Plan for the Phase One and the corresponding values of each type of food per meal.

Meal Plan – Phase 1			
Food Type	**Breakfast**	**Lunch**	**Dinner**
Protein	Quantity is not limited.	Quantity is not limited.	Quantity is not limited.
Vegetables	Minimum of 112.00 g.	Minimum of 448.00 g.	Minimum of 448.00 g.
Fruit	None	None	None
Starch	None	None	None
Milk/Dairy	473.00 mL. allowed daily (including yogurt)	473.00 mL. allowed daily (including yogurt)	473.00 mL. allowed daily (including yogurt)
Fat	4.93 mL. – 14.79 mL. (mayonnaise, trans-free margarine)	14.79 mL. (mayonnaise or oil)	14.79 mL. (mayonnaise or oil)

Table 2: The Meal Plan for the Phase Two and the corresponding values of each type of food per meal.

Meal Plan – Phase 2			
Food Type	**Breakfast**	**Lunch**	**Dinner**
Protein	Quantity is not limited.	Quantity is not limited.	Quantity is not limited.
Vegetables	Minimum of 448.00 g. ($\propto$ # of fruits)	Minimum of 560.00 g. ($\propto$ # of fruits)	Minimum of 224.00 g. ($\propto$ # of fruits)
Fruit	Minimum of 56.00 g.	Minimum of 56.00 g.	Minimum of 56.00 g.
Starch	Minimum of 56.00 g. ($\leq$ to the amount of fruits)	Minimum of 56.00 g. ($\leq$ to the amount of fruits)	Minimum of 56.00 g. ($\leq$ to the amount of fruits)
Milk/Dairy	236.50 mL. allowed daily	236.50 mL. allowed daily	236.50 mL. allowed daily
Fat	4.93 mL. only	4.93 mL. only	4.93 mL. only

Table 3: The Meal Plan for the Phase Three and the corresponding values of each type of food per meal.

Meal Plan – Phase 3			
Food Type	**Breakfast**	**Lunch**	**Dinner**
Protein	Quantity is not limited.	Quantity is not limited.	Quantity is not limited.

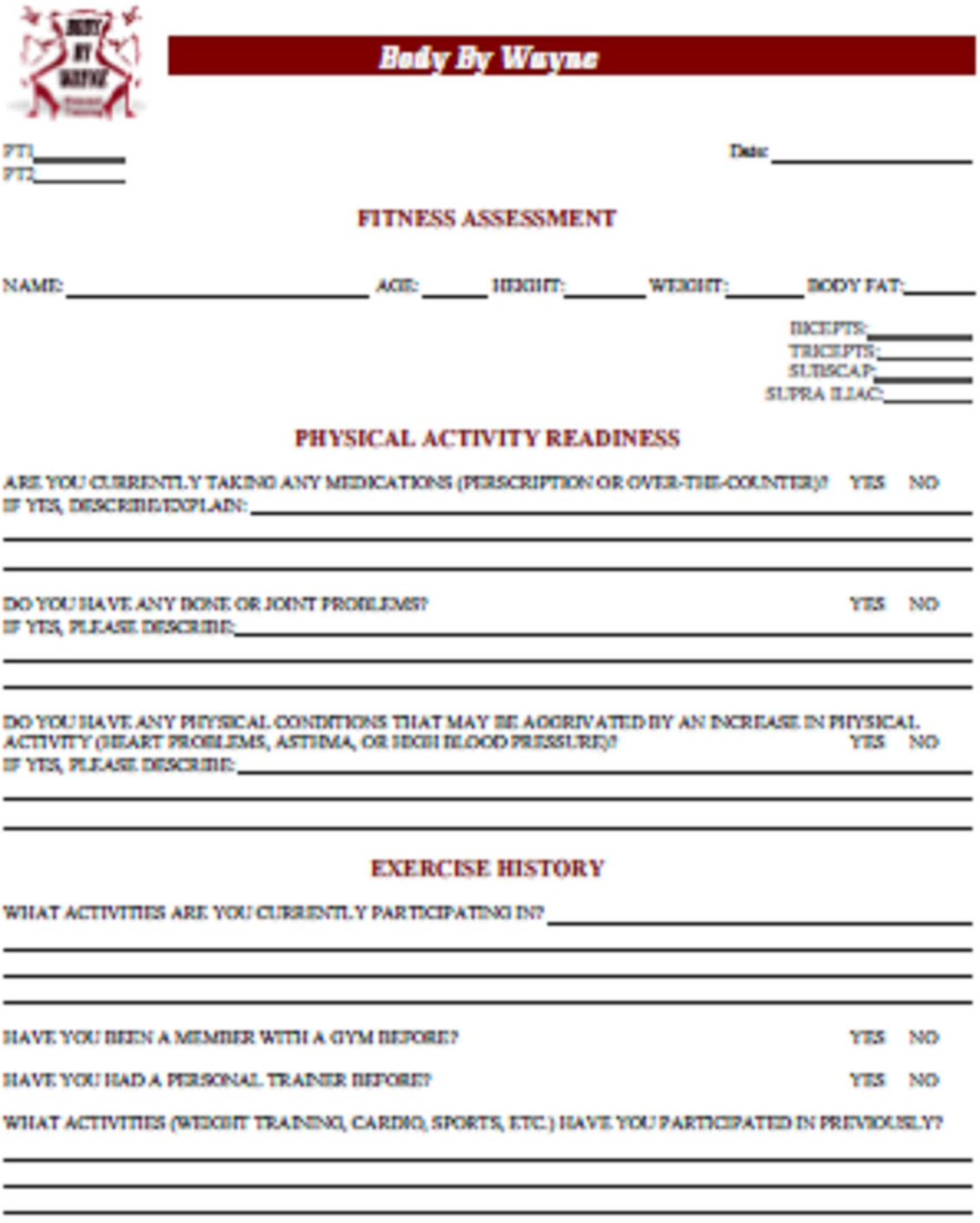
Vegetable	Minimum of 112.00 g. (∝ # of fruits)	Minimum of 448.00 g. (∝ # of fruits)	Minimum of 448.00 g. (∝ # of fruits)
Fruit	Minimum of 56.00 g.	Minimum of 56.00 g.	Minimum of 56.00 g.
Starch	Minimum of 56.00 g. (∝ # of fruits)	Minimum of 56.00 g. (∝ # of fruits)	Minimum of 56.00 g. (∝ # of fruits)
Milk/Dairy	236.50 mL. allowed daily	236.50 mL. allowed daily	236.50 mL. allowed daily
Fat	4.93 mL. only	4.93 mL. only	4.93 mL. only

In each setup, there are two subjects. Through an interview, the each subject underwent a physical examination. The subjects have the Body Mass Index (BMI) of 25.00 kg/m^2. or above. The subjects do not have any serious medical history with the exception of hypertension. They were not subjected into any medications before and during the dieting period. A consent form was, therefore, prepared and was answered by the respondents before the dieting period to ensure the cooperation of the respondents during the experiment. Table 4 shows the summarization of the information of the subjects in each setup.

Table 4: Overview of the setups.

Respondent	**Diet Program**	**Body Mass Index (BMI) (kg/m^2)**		**Medical History**	**Medication**
		Calculated BMI	**Required BMI**		
1	SBeP Diet	37.00	≥ 25.00	Hypertension	None
2		25.30		Hypertension	None
3	Normal Diet	26.10	≥ 25.00	Hypertension	None
4		31.60		Hypertension	None

Figure 1 shows the sample profile answered by the subjects.



Body By Wayne

PT1:_____
PT2:_____

Date: _____

FITNESS ASSESSMENT

NAME: _____ AGE: _____ HEIGHT: _____ WEIGHT: _____ BODY FAT: _____

BICEPTS: _____
TRICEPTS: _____
SUBSCAP: _____
SUPRA ILIAC: _____

PHYSICAL ACTIVITY READINESS

ARE YOU CURRENTLY TAKING ANY MEDICATIONS (PERSCRIPTION OR OVER-THE-COUNTER)? YES NO
IF YES, DESCRIBE/EXPLAIN: _____

DO YOU HAVE ANY BONE OR JOINT PROBLEMS? YES NO
IF YES, PLEASE DESCRIBE: _____

DO YOU HAVE ANY PHYSICAL CONDITIONS THAT MAY BE AGGRIVATED BY AN INCREASE IN PHYSICAL ACTIVITY (HEART PROBLEMS, ASTHMA, OR HIGH BLOOD PRESSURE)? YES NO
IF YES, PLEASE DESCRIBE: _____

EXERCISE HISTORY

WHAT ACTIVITIES ARE YOU CURRENTLY PARTICIPATING IN? _____

HAVE YOU BEEN A MEMBER WITH A GYM BEFORE? YES NO

HAVE YOU HAD A PERSONAL TRAINER BEFORE? YES NO

WHAT ACTIVITIES (WEIGHT TRAINING, CARDIO, SPORTS, ETC.) HAVE YOU PARTICIPATED IN PREVIOUSLY? _____

Figure 1: Physical Assessment form.

(a) (b)

Figure 2: Materials that are used to measure the data, (a) weighing scale; (b) sphygmomanometer.

Preparation of the Recipes

Preliminary procedures were made before recreating the recipes to ensure the quality and the safety of the food.

(a) (b) (c)

Figure3: Procedures made to ensure the quality and safety of the food; (a) placing the ingredients in the refrigerator for future use, (b) cleaning the materials to be used in creating the materials, and (c) washing and cleaning the ingredients to prevent bacteria contamination.

Testing the Effectivity of the Patterned Plan

The initial weight and blood pressure of the respondents were measured and recorded before the start of the dieting period. The subjects underwent a dieting period

for four weeks, in which the recipes that were eaten are based on the type of the diet program the subjects are assigned respectively.

In the first phase of the dieting period, the weight and the blood pressure was measured to see the changes. The changes in the groups are then compared to each other. This was done in all of the three phases. The changes in weight the SBeP Diet group are also compared to the expected weight loss of the original SBe Diet plan.

The comparison in the nutritional content of the recipes is also made during this experiment. The nutritional content of the ingredients of the recipes are obtained from WolframAlpha (Wolfram Research, 2009) and SELFNutrition Data (Condé Nast Publications, 2003). The content of the ingredients is used as the basis for comparison of the two diet plans. The total nutritional content of the recipes per phase are compared to the Recommended Dietary Allowance (RDA) (National Academies Press, n.d.). These comparisons are made to support the primary data gathered.

The food acceptability of the recipes is evaluated in terms of its appearance, taste, consistency, aroma, and overall acceptability. Table 5 shows the ratings used for the evaluation.

Table 5: Rating scale for sensory evaluation.

Score	Verbal Description
1	Dislike extremely
2	Dislike very much
3	Dislike moderately
4	Dislike slightly
5	Neither like nor dislike
6	Like slightly
7	Like moderately
8	Like very much
9	Like extremely

Data Analysis

Comparisons were made to analyze the data gathered in the changes in weight and blood pressure, and the nutritional content of the ingredients and the recipes. Meanwhile, the quantitative data gathered in the sensory evaluation test were converted into a qualitative data. Mean was used for all obtained data for food acceptability.

Range	Description
0.00 – 1.49:	Dislike extremely
1.50 – 2.49:	Dislike very much
2.50 – 3.49:	Dislike moderately
3.50 – 4.49:	Dislike slightly
4.50 – 5.49:	Neither like nor dislike
5.50 – 6.49:	Like slightly
6.50 – 7.49:	Like moderately
7.50 – 8.49:	Like very much
8.50 – 9.00:	Like extremely

Figure 4 summarizes the methodology used in this study.

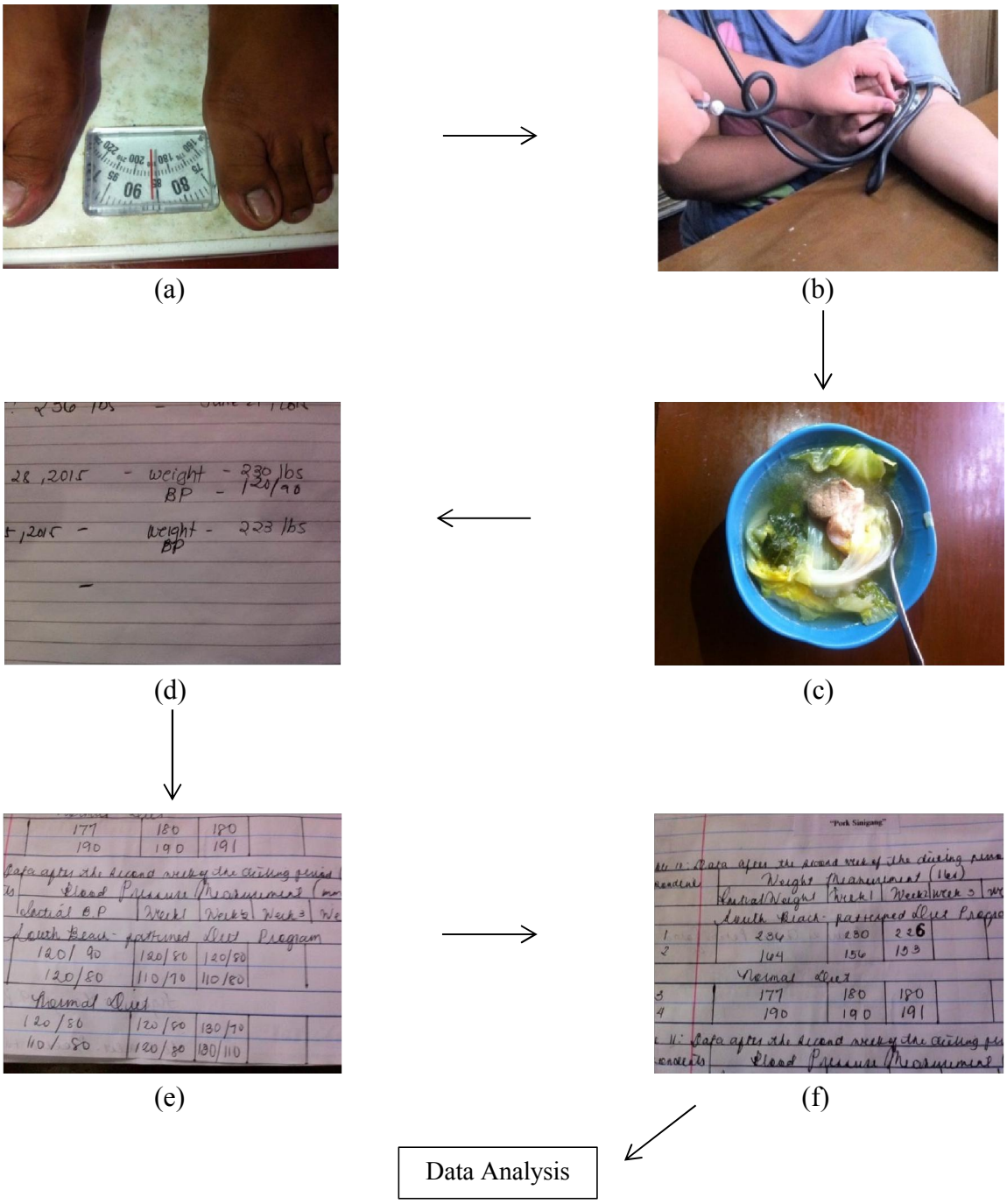


Figure 4: Summarized procedure of the study, (a) measuring the initial weight; (b) measuring the initial blood pressure; (c) undergoing the dieting period; (d) gathering data; (e) comparison of weight; (f) comparison of blood pressure; and analysis of data gathered.

RESULTS AND DISCUSSION

South Beach-Patterned Diet Program

The created program was patterned to the original plan of the South Beach (SBe) Diet Program and was evaluated on its effectivity in weight loss and hypertension. The following tabular and pictorial data shows the plan made (Table 6-9; Figure 5).

Table 6: The created, patterned Meal Plan for the first week of the dieting period.

Day	Breakfast	Lunch	Dinner
1	2 Hard-Boiled Eggs and Milk	Chicken Lettuce Roll	Chicken Ensalada
2	Scrambled Egg and Tuna	Pork and Chicken Ensalada	Pork and Chicken Ensalada
3	Scrambled Egg with Celery	Steamed Tilapia and Stir-Fried Cabbage	Steamed Tilapia and Stir-Fried Cabbage
4	Hard-Boiled egg and Milk	Pan-Fried Liempo and Cucumber Salad	Grilled Liempo
5	Egg and Ham and Milk	Fried Fish and Stir-Fried Bean Sprouts	Dried Anchovies sautéed with Spices
6	Avocado and Milk	Chicken Roll-ups	Pork Barbecue and Cucumber with Mayo Dip
7	Scrambled Egg with Ham and Onion and Milk	Grilled Fish and River Spinach Salad	Chicken/Pork Adobo

Table 7: The created, patterned Meal Plan for the second week of the dieting period.

Day	Breakfast	Lunch	Dinner
1	Scrambled Egg with Onion and Tomato and Milk	Grilled/Fried Pork with Stir-Fried Bokchoy	Grilled/Fried Pork and Stir-Fried Bokchoy
2	2 Hard-Boiled Eggs and Milk	Pork with String Beans	Chicken Barbecue
3	Corned Beef Omelet and Milk	Steamed Tilapia Stuffed with Onions and Tomatoes	Steamed Cabbage Rolls
4	Scrambled Egg with Milk	Chicken and Avocado Salad	Chicken and Avocado Salad
5	Avocado and Egg and Milk	Boneless Milkfish and Mongo Bean Soup	Boneless Milkfish and Mongo Bean Soup
6	Egg and Hotdogs and Milk	Chicken Potato Salad	Ramyun and Kimchi
7	Egg and Kimchi	Pork Sinigang	Pork Sinigang

Table 8: The created, patterned Meal Plan for the third week of the dieting period.

Day	Breakfast	Lunch	Dinner
1	Egg and Milk	Chicken Adobo and Coleslaw	Ham and Coleslaw Sandwich
2	Egg Sandwich and Milk	Chicken Salad with Nuts and Grapes	Chicken Salad with Nuts and Grapes
3	Oatmeal and Bread and Milk	Pork Nilaga	Pork Nilaga
4	Oatmeal with Banana and Milk	Grilled Chicken	Veggie Pancakes
5	Egg and Oatmeal and Milk	Grilled Chicken Breast	Scrambled Tuna
6	Hotdog and Egg and Milk	Pork Afritada	Pork Afritada
7	Avocado and Milk	Apple Colesaw	Beef Mami

Table 9: The created, patterned Meal Plan for the last week of the dieting period.

Day	Breakfast	Lunch	Dinner
1	Ham and Egg Sandwich	Pork-chop and Apple Coleslaw	Chicken Macaroni Soup
2	Egg Salad Sandwich	Sayote and Skinless Sausage	Boneless Bangus and Salted Egg with Tomato
3	Egg and Hotdog and Milk	Grilled Tilapia with Garlic, Lemon, and Basil	Grilled Tilapia with Garlic, Lemon, and Basil
4	South Beach-friendly Scramble	Beef and Bokchoy Stir-Fry	Beef and Bokhoy Stir-Fry
5	Avocado and Milk	Nilagang Baboy	Nilagang Baboy
6	Oatmeal and Milk	Pork Liempo	Buttered Vegetables
7	Bread and Milk	Pork Picadillo	Pork Picadillo

(a) (b) (c)

Figure 5: Example dishes/recipes made during the dieting period, (a) Buttered Vegetables; (b) Steamed Cabbage Rolls; and, (c) Chicken Potato Salad.

The recipes that are in the created plan are chosen based on the restrictions and the concepts of the SBe Diet Program. The patterned-plan is low in carbohydrates. The Phase 1 recipes contain no carbohydrates at all. The carbohydrate intake is introduced at Phase 2 and continued for Phase 3 for the maintenance.

South Beach-Patterned Diet Program and Weight Loss

The patterned plan was evaluated for four weeks in terms of weight loss. The results were then compared to the normal diet, by using two respondents per plan. The summarized findings are shown in Table 10 below. The trend of the results was shown in Figure 6.

Table 10: Summarized data of the change in weight of the respondents.

Respondent	Diet Program	Weight Measurement (kg.)		
		Initial Weight	Final Weight	Change in Weight (±)
1	**S.B.D.P**	107.00	100.70	**-6.30**
2		74.40	68.90	**-5.40**
3	**N.P**	80.30	83.50	**+3.20**
4		86.20	86.60	**+0.50**

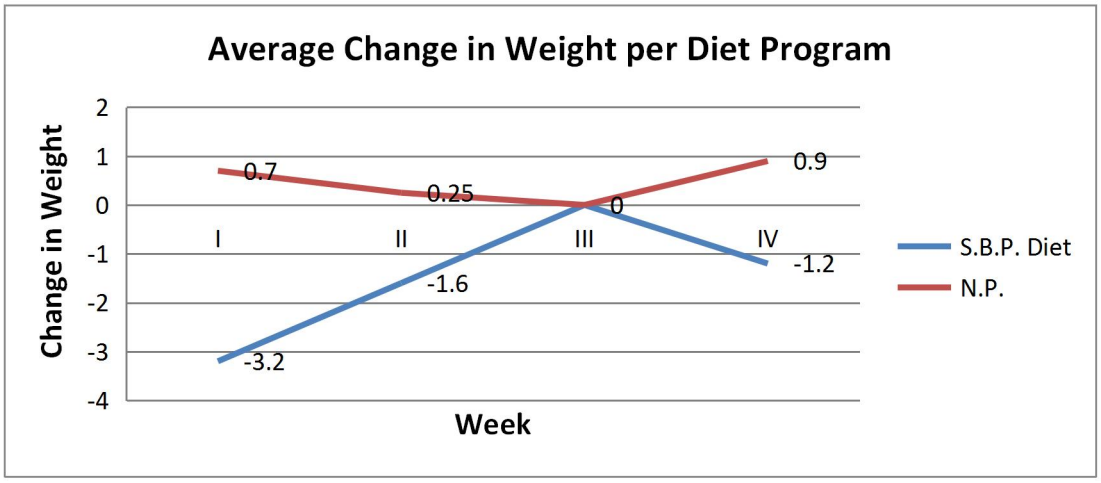


Figure 6: The trend of the average change in weight in both diet programs.

Based on the results, the weights of the respondents, in the South Beach-patterned (SBeP) Diet group, were greatly lessened after the dieting period; having an average weight loss of 5.90 kg. On the other hand, the weights of the respondents increased; with 1.85 kg. as an average weight gain. The results show that the patterned plan is effective when it comes to weight loss.

The graph showed (Figure 6) shows the average change of weight of the diet programs per week. The values of the graph show that the change in weight in SBeP Diet is in a decreasing manner, while increasing in the normal diet. Evidences to support the claim of its effectivity in terms of weight loss are shown below.

Table 11: Results in the patterned plan compared to the expected weight loss in the original plan.

	Weight Loss (kg.)					
	Phase 1			**Phase 2**	**Phase 3**	**T. Weight Loss**
	Week 1	**Week 2**	**Total**	**Week 3**	**Week 4**	
Original Plan	3.60 – 5.90			0.50 – 0.90	0 – 0.50	**4.10 – 7.30**
South Beach-patterned Diet Plan						
Respondent 1	2.70	1.80	4.50	0	1.80	**6.40**
Respondent 2	3.60	1.40	5.00	0	0.50	**5.40**

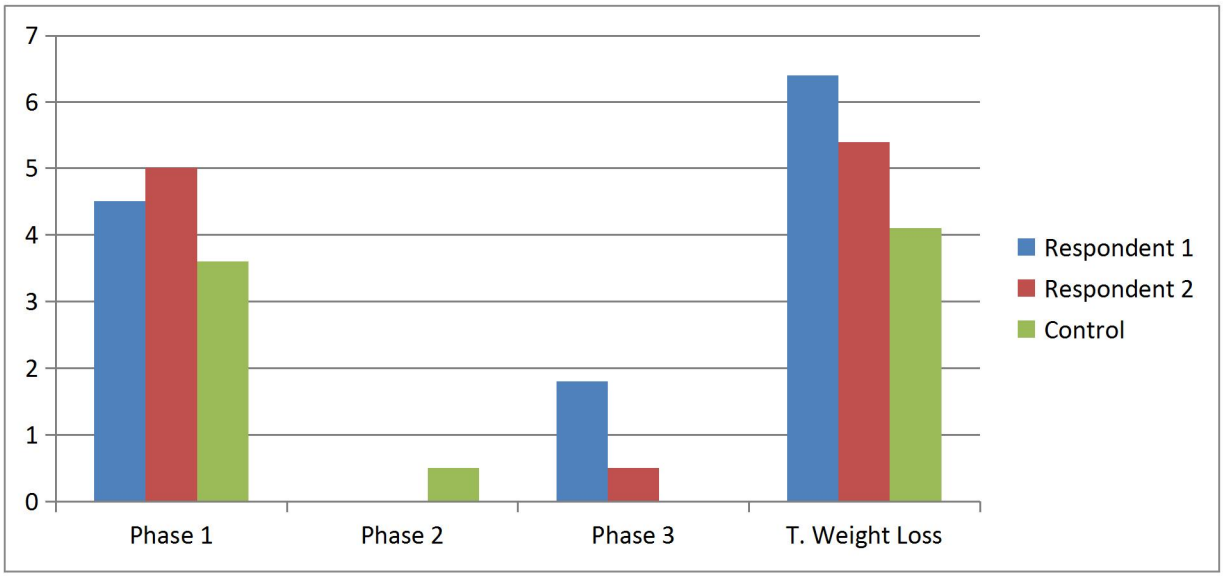


Figure 7: The trend of the weight loss of the respondents of patterned plan compared to the expected weight loss.

The data shows that the total weight loss of the respondents reached the expected weight loss of the original SBe Diet Program. In Phase 1, the expected weight loss of 3.60–5.90 was reached with Respondent 1 losing 4.50 kg. and Respondent 2 losing 5.00

kg. The expected weight loss on Phase 2 of 0.50–0.90, on the other hand, was not reached. The respondents did not lose weight in this phase. In Phase 3, Respondent 1 lost 1.80 kg. and Respondent 2 lost 0.50 kg. reaching the expected weight loss of 0 – 0.50.

Respondent 1 lost more weight than Respondent 2. Figure 6 shows that the respondents lost weight that are needed to support that the patterned plan is effective in weight loss. Phelan et al. (2012) and Shai et al. (2008) stated that weight loss is much effective on a low-carbohydrate diet because it affects metabolic biomarkers, such as leptin and C-reactive protein, more than what can other diets affect – which then leads to greater weight loss; the low-carbohydrate group also decreases cholesterol and other lipids in a person's body more than other diet programs.

South Beach-Patterned Diet Program and Lowering Hypertension

The patterned plan is evaluated by its effectivity in lowering hypertension. The evaluation lasted for four weeks. The findings were also compared to the findings of the normal plan. Table 12 shows the findings after the dieting period.

Table 12: Measured blood pressure of the respondents.

Respondent	Diet Program	Blood Pressure Measurement (mm Hg)				
		Initial Weight	Week 1	Week 2	Week 3	Week 4
1	S.B.D.P.	120/90	120/80	120/80	120/80	110/90
2		120/80	110/70	110/80	110/70	110/80
3	N.P	120/80	120/80	130/70	130/70	130/90
4		110/80	120/80	130/110	130/80	130/90

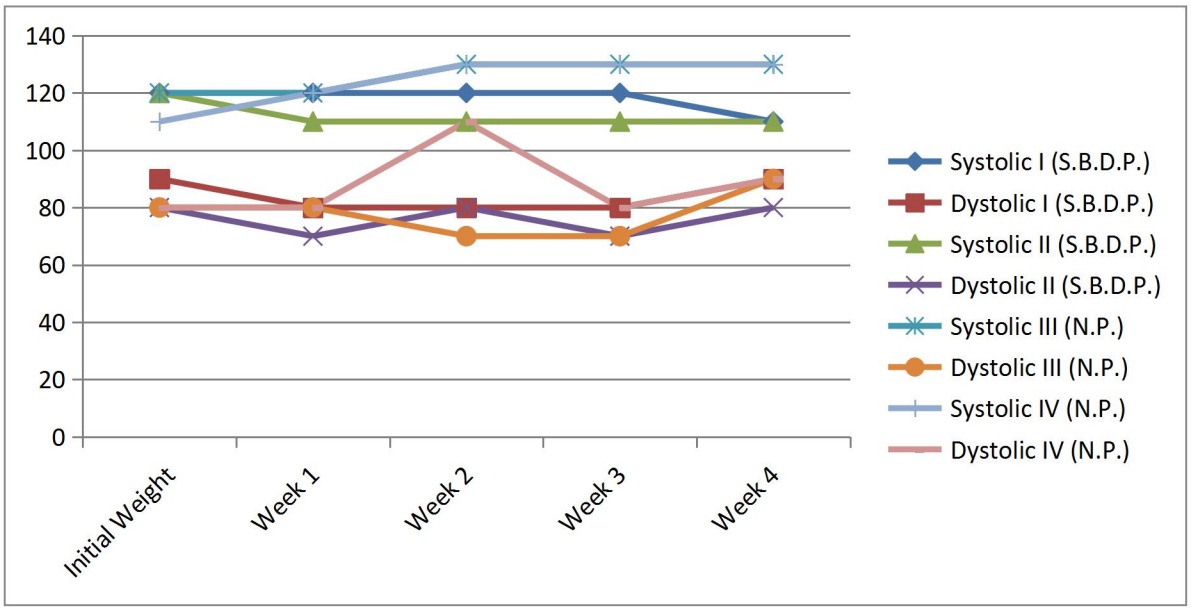


Figure 8: Graphical presentation of the findings in both diet programs.

Results show that the patterned plan decreases the systolic pressure, however the diastolic pressure – which is the indicator of weight loss varies per record, with no reliance to the type of diet.

The data suggest that the patterned diet is not capable of decreasing the risk of hypertension. Even Foster et al (2003) pointing out that risk factors for heart diseases such as hypertension can be lessened by going under a low-carbohydrate diet, Macdougall et al. (1992) study stated that the physical activity of the subject may have caused alterations on the diastolic pressure of the body.

Comparison of the Two Meal Plans in terms of the Nutritional Content of the Ingredients

After every phase of the dieting period, three recipes per plan were chosen to be compared by their nutritional content. The values of the nutritional content were gathered from WolframAlpha (Wolfram Research, 2009) and SELFNutrition Data (Condé Nast Publications, 2003). Ingredients were chosen from the recipes to be compared of. The data gathered are show in the corresponding tables below. (Table 13-21)

Table 13: Nutritional content of Phase 1 – Recipe 1 of both meal plans.

Nutritional Content	**Phase 1 – Recipe 1**			
	South Beach-patterned Diet		**Normal Diet**	
	Ingredient	**Amount**	**Ingredient**	**Amount**
Total Fat		26.9 g.		2.4 g.
Protein		24.4 g.		5.7 g.
Vitamin A		694.2 µg.		0.0 µg.
Vitamin C		0.4 mg.		0.0 mg.
Vitamin B6	Egg	0.3 mg.	Bread	0.0 mg.
Folate		66 µg.		83.4 µg
Calcium		156 mg.		113.4 mg.
Magnesium		26.4 mg.		17.4 mg.
Iron		2.6 mg.		3 mg.

Table 14: Nutritional content of Phase 1 – Recipe 2 of both meal plans.

Nutritional Content	Phase 1 – Recipe 2			
	South Beach – patterned Diet		Normal Diet	
	Ingredient	Amount	Ingredient	Amount
Total Fat	River Spinach	0.0 g.	Vegetable Oil	2 g.
Protein	Tilapia	26.1 g.	Milkfish	26.3 g.
Vitamin A	Tomatoes	996.6 µg.		654.6 µg.
Vitamin C		3.56 mg.	Onion	1.16 mg.
Vitamin B6	Cucumber	0.02 mg.	Milkfish	0.5 mg.
Folate	Tomatoes	6.44 µg.	Mung Bean	45.86 µg.
Calcium	River Spinach	8.16 mg.	Milkfish	65 mg.
Magnesium	Cucumber	4.82 mg.	Mung Bean	13.86 mg.
Iron	Tilapia	0.7 mg.		0.4 mg.

Table 15: Nutritional content of Phase 1 – Recipe 3 of both meal plans.

Nutritional Content	Phase 1 – Recipe 3			
	South Beach-patterned Diet		Normal Diet	
	Ingredient	Amount	Ingredient	Amount
Total Fat	Mayonnaise	2.95 g.		9.2 g.
Protein	Chicken	6.02 g.		34.4 g.
Vitamin A		3198.6 µg.	Mackerel Scad	95.4 µg.
Vitamin C	Lettuce	12.96 mg.		2.3 mg.
Vitamin B6		0.06 mg.		0.7 mg.
Folate	Tomato	6.44 µg.		216 µg.
Calcium	Chicken	2.86 mg.	Rice	11.2 mg.
Magnesium	Lettuce	9.36 mg.		48.4 mg.
Iron		0.62 mg.		5.6 mg.

Table 16: Nutritional content of Phase 2 – Recipe 1 of both meal plans.

Nutritional Content	Phase 2 – Recipe 1			
	South Beach-patterned Diet		Normal Diet	
	Ingredient	Amount	Ingredient	Amount
Total Fat		26.9 g.		26.9 g.
Protein	Egg	24.4 g.	Egg	24.4 g.
Vitamin A		694.2 µg		694.2 µg.
Vitamin C		0.0 mg.		0.0 mg.
Vitamin B6	Hotdog	0.0 mg.	Hotdog	0.0 mg.
Folate		47.7 µg.		47.7 µg.
Calcium		276 mg.		4.7 mg.
Magnesium	Milk	24.4 mg.	Coffee	7.1 mg.
Iron		0.1 mg.		0.0 mg.

Table 17: Nutritional content of Phase 2 – Recipe 2 of both meal plans.

Nutritional Content	Phase 2 – Recipe 2			
	South Beach-patterned Diet		Normal Diet	
	Ingredient	Amount	Ingredient	Amount
Total Fat	Chicken	8.41 g.	Chicken	8.41 g.
Protein		31.04 g.		31.04g.
Vitamin A	Celery	54 µg.	Bay leaf	16.2 µg.
Vitamin C	Grapes	2.04 mg.	Garlic	0.35 mg.
Vitamin B6	Chicken	0.32 mg.	Chicken	0.32 mg.
Folate	Celery	7.2 µg.	Rice	216 µg.
Calcium		14.71 mg.	Bay leaf	3.65 mg.
Magnesium	Chicken	24.90 mg.	Chicken	24.90 mg.
Iron		1.05 mg.		1.05 mg.

Table 18: Nutritional content of Phase 2 – Recipe 3 of both meal plans.

Nutritional Content	Phase 2 – Recipe 3			
	South Beach-patterned Diet		Normal Diet	
	Ingredient	Amount	Ingredient	Amount
Total Fat	Egg	2.35 g.	Milkfish	4.3 g.
Protein		2.7 g.		13.05 g.
Vitamin A	Sweet Potato	2581.35 µg.	Finger Chili	318 µg.
Vitamin C		3.5 mg.	Bitter melon	17.33 mg
Vitamin B6	Squash	0.05 mg.	Milkfish	0.25 mg.
Folate	Egg	14.03 µg.	Bitter melon	14.88 µg.
Calcium	Cheese	9.25 mg.	Vinegar	0.8 mg.
Magnesium	Sweet Potato	4.92 mg.	Ginger	0.78 mg.
Iron	Egg	0.8 mg.	Milkfish	33.5 mg.

Table 19: Nutritional content of Phase 3 – Recipe 1 of both meal plans.

Nutritional Content	Phase 3 – Recipe 1			
	South Beach-patterned Diet		Normal Diet	
	Ingredient	Amount	Ingredient	Amount
Total Fat	Bacon	3.6 g.	Ham	2.4 g.
Protein	Eggs	16.2 g.	Eggs	6.3 g.
Vitamin A		394.2 µg.		2010.6 µg.
Vitamin C	Bell Pepper	15 mg.	Ham	1.1 mg.
Vitamin B6	Bacon	0.15 mg.		0.1 mg.
Folate	Eggs	84.15 µg.	Bread	33.3 µg.
Calcium	Cheese	158.63 mg.	Coffee	4.7 mg.
Magnesium	Eggs	15.45 mg.	Bread	6.9 mg.
Iron		6.8 mg.	Egg	6.9 mg.

Table 20: Nutritional content of Phase 3 – Recipe 2 of both meal plans.

Nutritional Content	Phase 3 – Recipe 2			
	South Beach-patterned Diet		Normal Diet	
	Ingredient	Amount	Ingredient	Amount
Total Fat	Bokchoy	0.05 g.	Pork	22.5 g.
Protein	Steak	18.2 g.	Rice	88 g.
Vitamin A	Vinegar	150 µg.	Tomatoes	249.15 µg.
Vitamin C	Bokchoy	4.7 mg.	Onion	0.51 mg.
Vitamin B6	Steak	0.33 mg.	Pork	0.6 mg.
Folate	Rice	22.4 µg.	Tomatoes	8.05 µg.
Calcium	Bokchoy	95.25 mg.	Pork	35.65 mg.
Magnesium	Steak	13.6 mg.	Beef Broth	0.6 mg.
Iron	Bokchoy	0.1 mg.	Pork	2.25 mg.

Table 21: Nutritional content of Phase 3 – Recipe 3 of both meal plans.

Nutritional Content	Phase 3 – Recipe 3			
	South Beach-patterned Diet		Normal Diet	
	Ingredient	Amount	Ingredient	Amount
Total Fat	Butter	2.28 g.	Rice	0.8 g.
Protein	Corn Kernel	0.82 g.	Mackerel Scad	43 g.
Vitamin A	Carrot	940.32 µg.		119.25 µg.
Vitamin C	Snow Peas	1.72 mg.	Garlic	0.35 mg.
Vitamin B6		0.01 mg.	Rice	0.2 mg.
Folate	Corn Kernel	10.16 µg.	Bay Leaf	8 µg.
Calcium	Carrots	2.72 mg.	Soy Sauce	1.8 mg.
Magnesium	Corn Kernel	6.24 mg.	Mackerel Scad	6.94 mg.
Iron	Snow Peas	0.19 mg.	Garlic	0.7 mg

The tables shown above show that the nutritional content of the recipes vary on the ingredients being used. There are instances that the nutritional content of the patterned plan is higher than with the normal plan. Referring to Table 18, the Vitamin A content of the ingredient, sweet potato, of the patterned plan is higher – with the value of 2581.35 µg. – than with the ingredient, finger chili, of the normal diet plan – with the value of 318 µg. Some of the nutritional content of recipes in the patterned plan is lesser than the normal plan. Just as shown in Table 20, the protein content of the steak is lesser – with the value of 18.2 g. – than the rice of the normal plan – that has the value of 88 g. These clearly suggest that the variation of nutrient distribution in recipes can affect weight loss. This claim can be confirmed through the study of Abete et al. (2010) which states that through the variation of nutrient distribution, benefits such as variation of weight loss amounts, and appetite regulation can be achieved.

Comparison of the Nutritional Content of the Recipes and the Recommended Dietary Allowance (RDA)

After acquiring the data of the nutritional content of the recipes, the total amount of the nutritional content was computed per .recipe and was then compared to the standard Recommended Dietary Allowance (R.D.A.). The R.D.A. and the Daily Reference Intakes (D.R.I.) are retrieved from National Institutes of Health (N.I.H.) (National Academies Press, n.d.).

The summarized data was shown in in the following tables. (Table 22-24)

Table 22: Nutritional content for Phase 1 of both meals.

N.C.	Total Nutritional Content (Phase 1)								
	South Beach-patterned Diet				Normal Diet				RDA
	Recipe 1	Recipe 2	Recipe 3	Total per day	Recipe 1	Recipe 2	Recipe 3	Total per day	
Total Fat	34.8 g.	2.88 g.	4.75 g.	**42.43 g.**	2.4 g.	14.59 g.	10 g.	**26.99 g.**	**70 g/d**
Protein	32.9 g.	28.28 g.	9.4 g.	**70.57 g.**	5.0 g.	42.96 g.	43.2 g.	**91.16 g.**	**56-75 g/d**
Vitamin A	1078.2 µg.	133.8 µg.	3427.45 µg.	**4939.45 µg.**	0.0 µg.	475.52 µg.	95.4 µg.	**570.92 µg.**	**700-3000 µg/d**
Vitamin C	5 mg.	12.43 mg.	17.16 mg.	**34.59 mg.**	0.0 mg.	4.79 mg.	2.3 mg.	**7.09 mg.**	**75-2000 mg/d**
Vitamin B6	0.5 mg.	0.2 mg.	0.15 mg. + ~	**0.85 mg. + ~**	0.0 mg.	0.79 mg.	0.9 mg.	**1.69 mg.**	**1.3-100 mg/d**
Folate	94.7 µg.	27.48 µg.	37.31 µg. + ~	**159.49 µg. + ~**	88.1 µg.	294.62 µg.	217.5 µg.	**600.22 µg.**	**400-1000 µg./d**
Calcium	463.5 mg.	47.18 mg.	33.33 mg.	**544.41 mg.**	118.2 mg.	97.27 mg.	30.2 mg.	**245.67 mg.**	**1000 - 2500 mg/d**
Magnesium	59.8 mg.	48.83 mg.	18.39 mg. + ~	**127.02 mg. + ~**	24.5 mg.	111.4 mg.	103.9 mg.	**239.8 mg.**	**310-400 mg/d**
Iron	3 mg.	1.08 mg.	0.96 mg.	**5.04 mg.**	2.7 mg.	6.69 mg.	6.7 mg.	**16.09 mg.**	**8-45 mg/d**

Table 23: Nutritional content for Phase 2 of both meals.

N.C.	Total Nutritional Content (Phase 2)								
	South Beach-patterned Diet				Normal Diet				RDA
	Recipe 1	Recipe 2	Recipe 3	Total per day	Recipe 1	Recipe 2	Recipe 3	Total per day	
Total Fat	38.6 mg.	16.26 g.	5.02 g.	**59.88 g.**	30.7 g.	8.40 g.	4.37 g.	**43.47 g.**	**70 g/d**
Protein	40.5 g.	7 41 g.	15.47 g.	**63.38 g.**	32.6 g.	40.72 g.	13.43 g.	**86.75 g.**	**56-75 g/d**
Vitamin A	843.61 µg.	132.08 µg.	3475.1 µg.	**4450.79 µg.**	694.21 µg.	50.23 µg.	144.1 µg.	**888.54 µg.**	**700-3000 µg.**
Vitamin C	0.4 mg.	2.66 mg.	6.91 mg.	**9.61 mg.**	0.4 mg.	0.55 mg.	35.6 mg.	**36.19 mg.**	**75-2000 mg/d**
Vitamin B6	0.4 mg.	0.36 mg. + ~	0.12 mg.	**0.52 mg. + ~**	0.3 mg.	0.5 mg.	0.28 mg.	**1.08 mg.**	**1.3 - 100 mg/d**
Folate	125.9 µg.	12.76 µg. + ~	23.6 µg.	**162.26 µg. + ~**	118.4 µg.	225.22 µg.	25.82 µg.	**369.44 µg.**	**400-1000 µg./d**
Calcium	550.6 mg.	28.48 mg.	81 mg.	**660.08 mg.**	279.3 mg.	34.71 mg.	38.88 mg.	**352.89 mg.**	**1000-2500 mg/d**
Magnesium	68.8 mg.	47.97 mg.	12.96 mg.	**129.73 mg.**	51.5 mg.	76.65 mg.	25.3 mg.	**153.45 mg.**	**310-400 mg/d**
Iron	5.5 mg.	1.6 mg.	1.18 mg.	**8.28 mg.**	5.4 mg.	7.32 mg.	0.31 mg.	**13.03 mg.**	**8-45 mg/d**

Table 24: Nutritional content for Phase 3 of both meals.

N.C.	Total Nutritional Content (Phase 3)								
	South Beach-patterned Diet				Normal Diet				RDA
	Recipe 1	**Recipe 2**	**Recipe 3**	**Total per day**	**Recipe 1**	**Recipe 2**	**Recipe 3**	**Total per day**	
Total Fat	18.35 g.	18.15 g.	2.57 g.	**39.07 g.**	10.4 g.	23.15 g.	12.33 g.	**45.88 g.**	**70 g/d**
Protein	28.4 g.	22.85 g.	1.56 g.	**52.81 g.**	13.5 g.	52.85 g.	52.85 g.	**119.2 g.**	**56-75 g/d**
Vitamin A	451.08 µg.	341.4 µg.	1312.59 µg.	**2105.07 µg.**	201 µg.	249.32 µg.	119.3 µg.	**569.92 µg.**	**700-3000 µg./d**
Vitamin C	19.6 mg.	5.8 mg. + ~	3.88 mg.	**29.28 mg + ~**	1.1 mg.	5.41 mg.	29.1 mg	**35.61 mg.**	**75-2000 mg/d**
Vitamin B6	0.28 mg.	0.48 mg.	0.07 mg.	**0.83 mg.**	0.2 mg.	0.85 mg.	1.1 mg.	**2.15 mg.**	**1.3 - 100 mg/d**
Folate	97.61 µg.	107.63 µg.	17.2 µg.	**222.44 µg.**	63.5 µg.	223.85 µg.	254.48 µg.	**543.8 µg.**	**400-1000 µg./d**
Calcium	297.05 mg.	43.03 mg.	11.56 mg.	**351.64 mg.**	83.8 mg.	54.08 mg.	41.95 mg.	**179.83 mg.**	**1000 - 2500 mg/d**
Magnesium	36.56 mg.	36.78 mg.	11.38 mg.	**84.72 mg.**	26.2 mg.	79.19 mg.	65.56 mg.	**170.95 mg.**	**310-400 mg/d**
Iron	5.41 mg.	3.83 mg.	0.39 mg.	**9.63 mg.**	2.5 mg.	8.03 mg.	8.01 mg	**18.54 mg.**	**8-45 mg/d**

Results that are shown in the tables above show that the nutritional varies per phase. There are values that prove that the patterned plan is more effective to the normal plan due to its higher value. Referring to Table 22, the Vitamin A content of the patterned plan is 4939.45 µg., meanwhile, the value for the normal plan is 570.92 µg. Both values were included in the R.D.A., however, it is evident that the patterned plan has a higher value than that of the normal plan. There are also instances where as the value of the normal plan is higher than the patterned plan. This claim is shown in Table 23, whereas the protein content of the normal plan – which is 86.75 g. – is higher than that of the patterned plan – which is 63.38 g. However, there are also instances whereas the values of the patterned and the normal plan did not meet the requirement of the R.D.A. The value of magnesium in the patterned plan is 84.72 mg. and 170.95 mg. for the normal plan. Both did not meet the requirement of 310-400 mg/d. These observations may suggest that it may affect the amount of weight lost in a person.

Noakes et al. (2005) concluded in their study that an energy-restricted diet such as the SBe Diet Program, provides great nutritional and metabolic effects. In their study, it is evident that with the increase of the value of folate and Vitamin B6, and the decrease of the value of calcium, variations of weight loss occur.

Food Acceptability of the Patterned Plan

After the dieting period, the respondents were given a set of tables for the evaluation of the plan in terms of the food acceptability. The table below summarizes the tests made. (Table 25-28)

Table 25: Sensory evaluation for Phase One recipes.

Sensory	Sensory Evaluation (Phase 1)			
	Recipe 1	**Recipe 2**	**Recipe 3**	**Phase 1 Acceptability**
Appearance	8.50	8.00	8.00	**8.17**
Taste/Flavor	8.00	8.00	8.00	**8.00**
Texture/Consistency	8.00	7.00	8.50	**7.83**
Aroma/Smell	8.50	8.00	8.50	**8.33**
Overall Acceptability	8.00	7.50	8.50	**8.00**

Table 26: Sensory evaluation for Phase Two recipes.

Sensory	Sensory Evaluation (Phase 2)			
	Recipe 1	**Recipe 2**	**Recipe 3**	**Phase 2 Acceptability**
Appearance	7.50	8.50	9.00	**8.33**
Taste/Flavor	7.50	8.50	9.00	**8.33**
Texture/Consistency	8.00	8.00	9.00	**8.33**
Aroma/Smell	8.00	9.00	8.50	**8.50**
Overall Acceptability	8.00	8.50	9.00	**8.50**

Table 27: Sensory evaluation for Phase Three recipes.

Sensory	Sensory Evaluation (Phase 3)			
	Recipe 1	**Recipe 2**	**Recipe 3**	**Phase 3 Acceptability**
Appearance	7.50	8.00	9.00	**8.17**
Taste/Flavor	7.50	9.00	8.50	**8.33**
Texture/Consistency	8.50	9.00	8.50	**8.67**
Aroma/Smell	8.50	9.00	8.50	**8.67**
Overall Acceptability	7.50	9.00	8.50	**8.33**

Table 28: Sensory evaluation for the overall acceptability of the patterned plan.

Sensory	Overall Acceptability (S.B.P. Diet Program)			
	Phase 1	**Phase 2**	**Phase 3**	**S.B.P. Diet Acceptability**
Appearance	8.17	8.33	8.17	**8.22**
Taste/Flavor	8.00	8.33	8.33	**8.22**
Texture/Consistency	7.83	8.33	8.67	**8.28**
Aroma/Smell	8.33	8.50	8.67	**8.50**
Overall Acceptability	8.00	8.50	8.33	**8.28**

The acceptability of the patterned plan is evaluated by using the following scale.

Range	**Description**
0.00 – 1.49:	Dislike extremely
1.50 – 2.49:	Dislike very much
2.50 – 3.49:	Dislike moderately
3.50 – 4.49:	Dislike slightly
4.50 – 5.49:	Neither like nor dislike
5.50 – 6.49:	Like slightly
6.50 – 7.49:	Like moderately
7.50 – 8.49:	Like very much
8.50 – 9.00:	Like extremely

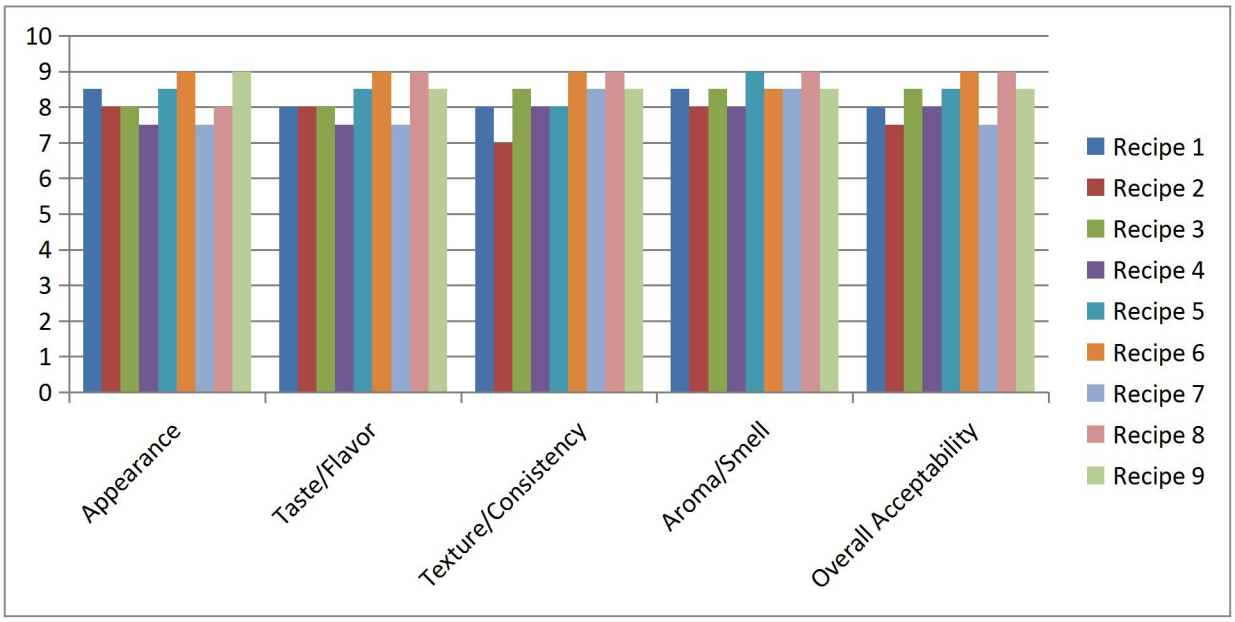


Figure 8: Graphical presentation of the food acceptability of the recipes of the South Beach-patterned Diet Program.

As a summary, the recipes per phase passed in the sensory evaluation tests. The rate of the recipes is ranging from 7.50–9.00. After computing the overall acceptability, it is evident that the patterned plan is liked very much by the respondents; with 8.22 rating for appearance, 8.22 for the taste/flavor, 8.28 for texture/consistency, and, 8.28 for overall acceptability; the program got its highest rate of 8.50 in the aroma/smell sensory. However, it is a must to consider that the information gathered by using the sensory tests involves uncertainty. The information that were and will be gathered will be based on the perception of the respondent. Martinez (2007) stated that the data acquired by using our senses clearly involve imprecision thus making it an important problem to be addressed as it is considered as the process of earning uncertain knowledge.

SUMMARY AND CONCLUSION

This study primarily aims to determine the effectivity of a South Beach-patterned (SBeP) diet program in terms of weight loss and hypertension. The created program is based on the design of the original South Beach (SBe) Diet Program, and was tested on subjects who underwent an interview-based physical examination. The subjects, therefore, underwent a 4-week dieting period for the collection of data. The program was compared to a normal diet, in terms of the changes in their weight and their blood pressure by measuring the given quantities per week, given that there are equal numbers of respondents per program. The nutritional content of the ingredients and the recipes are then obtained from WolframAlpha (Wolfram Research, 2009) and SELFNutrition Data (Condé Nast Publications, 2006) and was used for comparison between the diet programs. The total nutritional content of the recipes per phase are compared to the Recommended Dietary Allowance (RDA) (National Academies Press, n.d.). Lastly, the food acceptability of the recipes is evaluated at the end of the dieting period, by using the sensory evaluation test. Mean was used for all the obtained data for food acceptability.

Results showed that the weights of the subjects, in the SBeP Diet group, were greatly decreased as opposed to the change in the weights of the subjects in the Normal diet group that were increased. The results suggest that the SBeP Diet group, indeed, is effective when it comes to weight loss; and to further support this claim, the results of the change of weight of the subjects in the SBeP Diet group showed that the weight loss of the subjects in the patterned program reached the expected weight loss in the original plan.

For the change in the blood pressure, both programs showed sudden changes on the systolic pressure, especially on the first week of the dieting period, on the SBeP Diet group; with Respondent 2 having an initial blood pressure of 120/80 to 110/70 on the first week. However, the changes in the latter part of the dieting period are not that big or less; the findings are the same on the other respondents. The diastolic pressure however varies without reliance to the type of diet. This may suggest that the type of diet does not lessen or increase the blood pressure – if physical activity is not being recognized.

When it comes to the nutritional content, the values on both diet groups do not have trends but, rather, fluctuates per type of nutritional content. The variation of the values depends on the ingredient that was used and the quantity of the used ingredients. The phases in both diet groups surpassed the Recommended Daily Allowance (RDA); but the values in the recipes of the SBeP Diet group is greater than the values in the Normal diet recipes, especially in the nutritional content of Folate. These variations can support the variation of the weight loss that occurred on the subjects.

Lastly, for the food acceptability, the recipes per phase passed in the sensory evaluation test. All of the phases had ratings involved in the bracket of 7.50 – 8.49; meanwhile, the rest got the rating of 8.50 in some of the sensory acceptability. However, even the data gathered inflicted these results, it is best to consider the uncertainty of these results, for these are obtained through the sensory perceptions of the subjects.

As a summary, the SBeP Diet program is shown to be effective when it comes to weight loss and the change in blood pressure. For the nutritional content, most of the values in the SBeP Diet recipes is greater than the values in the Normal Diet recipes, and these results suggest that the variations of the values have caused the variations of weight loss occurred. And lastly, the recipes of the SBeP Diet program passed as acceptable.

Recommendations

To further understand the concepts of this diet program to be used in the future, researchers may include the following topics in their study, such as:

1. experimentation and application of the program in a large scale, to have a more accurate result in the aspect of weight loss;
2. effectivity of the program in treatment of various illness, such as respiratory illnesses and diabetes;
3. effectivity of the program in the changes of body composition, such as blood glucose and triglycerides;
4. chemical analysis of the recipes included in the program, to further understand how this program became effective in weight loss; and,
5. application of the program on subjects with certain body conditions, such as pre-natal and post-natal conditions, insulin-resistant and insulin-dependent conditions, and subjects with polio.

REFERENCES

Abete, I., Astrup, A., Martinez, J.A., Thorsdottir, I., & Zulet, M.A. (2010). Obesity and the metabolic syndrome: role of different dietary macronutrient distribution patterns and specific nutritional components on weight loss and maintenance. *Nutrition Reviews*, 68(4): 214-231. doi:http://dx.doi.org/10.1111/j.1753-4887.2010.00280.x.

Allison, D.B., Fontaine, K.R., Manson, J.E., Stevens, J., & VanItallie, T.B. (1999). Annual Deaths Attributable to Obesity in the United States. *The Journal of American Medical Association,* 282 (16): 1530-1538. doi:10.1001/jama.282.16.1530.

Chiang, B.N., Perlman, L.V., & Epstein, F.H. (1969). Overweight and Hypertension: A Review. *Circulation*, 39: 403-421. doi:10.1161/01.CIR.39.3.403.

Condé Nast Publications. (2006 July 20). SELFNutrition Data. (4 July 2015). Retrieved from www.nutritiondata.self.com.

Duflou, J., Virmani, R., Rabin, I., Burke, A., Farb, A., & Smialek, J. (1995). Sudden death as a result of heart disease in morbid obesity. *American Heart Journal*, 130 (2): 306-313. doi:10.1016/0002-8703(95)90445-X.

Dustan, H.P. (1985). Obesity and Hypertension. *Annals of Internal Medicine,* 103 (6.2): 1047-1049. doi:10.7326/0003-4819-103-6-1047.

Flegal, K.M., Carroll, M.D., Ogden, C.L., & Curtin, L.R. (2010). Prevalence and Trends in Obesity Among US Adults, 1999-2008. *The Journal of American Medical Association,* 303 (3): 235-241. doi:10.1001/jama.2009.2014.

Foster, G.D., Wyatt, H.R., Hill, J.O., McGuckin, B.G., Brill, C., Mohammed, B.S., … Klein, S. (2003). A Randomized Trial of a Low-Carbohydrate Diet for Obesity. *The New England Journal of Medicine*, 348: 2082-2090. doi:10.1056/NEJMoa022207.

Go, A.S., Roger, M.D., Berry, B.E.J., Borden, W.B., Bravata, D.M., Ford, D.S., … Turner, W.D., (2013). Overweight & Obesity. *Circulation*, 127. Retrieved from http://www.heart.org/idc/groups/heart-public/@wcm/@sop/@smd/documents/downloadable/ucm_319588.pdf.

Hsueh, W.A., & Buchanan, T.A. (1994). Obesity and hypertension. *Endocrinology and Metabolism Clinics of North America,* 23 (2): 405-427. Retrieved from http://europepmc.org/abstract/med/8070430.

Katzmarzyk, P.T., & Ardern, C.I. (2004). Overweight and Obesity Mortality Trends in Canada, 1985-2000. *Canadian Journal of Public Health / Revue Canadienne de Sante'e Publique,* 05 (1): 16-20. Retrieved from http://www.jstor.org/stable/41993755?seq=1#page_scan_tab_contents.

Kotchen, T.A. (2010). Obesity-Related Hypertension: Epidemiology, Pathophysiology, and Clinical Management. *American Journal of Hypertension,* 23 (11): 1170-1178. doi:10.1038/ajh.2010.172.

Larsen, T.M., Dalskov, S.M., van Baak, M., Jebb, S.A., Papadaki, A., Pfeiffer, A.F.H., … Astrup, A. (2010). Diets with High or Low Protein Content and Glycemic Index for Weight-Loss Maintenance. *The New England Journal of Medicine*, 363: 2102-2113. doi:10.1056/NEJMoa1007137.

MacDougall, J.D., McKelvie, R.S., Moroz, D.E., Sale, D.G., McCartney, N., Buick, F. (1992). Factors affecting blood pressure during heavy weight lifting and static contractions. *Journal of Applied Physiology,* 73(4): 1590-1597. Retrieved from http://jap.physiology.org/content/73/4/1590.short.

Martinez, L. (2007). Sensory evaluation based on linguistic decision analysis. *International Journal of Approximate Reasoning*, 44(2):148-164. doi:10.1016/j.ijar.2006.07.006.

National Institutes of Health. (n.d.). NUTRIENT RECOMMENDATIONS: DIETARY REFERENCE INTAKES (DRI). (8 July 2015). Retrieved from https://ods.od.nih.gov/Health_Information/Dietary_Reference_Intakes.aspx.

Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., …Barquera, S. (2014). Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet,* 384 (9945): 766-781. Retrieved from http://www.sciencedirect.com/science/article/pii/S0140673614604608.

Noakes, M., Keogh, J.B., Foster, P.R., & Clifton, P.M. (2005). Effect of an energy-restricted, high-protein, low-fat diet relative to a conventional high-carbohydrate, low-fat diet on weight loss, body composition, nutritional status, and markers of cardiovascular health in obese women. *The American Journal of Clinical Nutrition*, 81(6): 1298-1306. Retrieved from http://ajcn.nutrition.org/content/81/6/1298.short.

Ogden, C.L., Carroll, M.D., Curtin, L.R., Lamb, M.M., & Flegal, K.M. (2010). Prevalence of High Body Mass Index in US Children and Adolescents, 2007-2008. *The Journal of the American Medical Association.* 303 (3): 242-249. doi:10.1001/jama.2009.2012.

Phelan, S., Wyatt, H., Nassery, S., DiBello, J., Fava, J., Hill J.O., .. Wing, R.R. (2007). Three-Year Weight Change in Successful Weight Losers Who Lost Weight on a Low-Carbohydrate Diet. *Obesity*, 15(10): 2470-2477. doi:10.1038/oby.2007.293.

Samaha, F.F., Iqbal, N., Seshadri, P., Chicano, K.L., Daily, D.A., McGrory, J., … Stern, L. (2003). A Low-Carbohydrate as Compared with a Low-Fat Diet in Severe Obesity.*The New England Journal of Medicine,* 348 (21): 2074-2081. doi:10.1056/NEJMoa022637.

Shai, I., R.D., Schwarzfuchs, D., Henkin, Y., Shahar, D.R., Witkow, S., Greenberg, I., R.D., …Stampfer, M.J. (2008). Weight Loss with a Low-Carbohydrate, Mediterranean, or Low Fat Diet. *The New England Journal of Medicine,* 359 (3): 229-241. doi:10.1056/NEJMoa0708681.

Wolfram Research. (2009 May 18). *WolframAlpha: computational knowledge engine.* Retrieved from www.wolframalpha.com.

ACKNOWLEDGEMENT

The sincerest gratitude and thanks are given to all individuals who helped to further make this study welcoming to the field of science. These thanks may never be sufficient to supply all of the help you gave, but, therefore, I express my love to you all by the means of this research/investigatory project. I, may not be able to give thanks to everyone, but as I encode this, your help will always be on my heart and mind.

First of all, I would like to give thanks to our Lord, the Creator, who guided me willingly and blessed me to be in a path directed by His perfect will.

Second, I would like to mention certain family names, Chico Family, Nodado Family, Gallarde Family, and Mananghaya Family, who gave an all through-out support in every step of the way. You helped me build a foundation of courage and strength in times where evil and darkness lie upon the throne of dignity and bravery.

Third, I would like to give my deepest thanks to the mentors who guided me in the subject, Research. They are the ones who gave light, when all other lights go out. Thanks, Ma'am Cherry Leen Marquez, for starting it all, for giving me the idea of making South Beach Diet as the focus of my research projects in my high school life. Thanks, Ma'am Jocelyn Ibanez, for guiding me and my classmates as we go on our first Research subject, in the past year. And lastly, I would like to thank Sir Joald Calpo, for making us realize that research really never stops, that we must go to extreme lengths just to hit that right, simple spot. Thanks for giving us a more, technical way; on how should

we must write paragraphs, and such. Some may not acknowledge the importance of this for they will think that they will never use it to make advancements in our spacious heads, I will always cherish everything that you had taught us about writing technicalities, especially when we moved our lives into college.

Lastly, I would love to give thanks to certain people, my friends, and you know who you are. Thanks for pushing me through to continue my research. Thanks for giving me the information, mostly at the times I forgot stuffs. And also, I express my love to you all for giving me support and me to you, like we should do.