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The University of the West Indies

Title: Perception of Fruits and Vegetable Intake to predict Weight Loss

Student Name: Kristin Cooper

Project Supervisor: Dr. I. Granderson

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Department of Agricultural Economics & Extension
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TITLE

PERCEPTION OF FRIUTS AND VEGETABLE INTAKE TO PREDICT WEIGHT LOSS

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Thanks to God because with him all things are possible. Secondly, a special thank you to Mrs. I. Granderson for her time and patient in assisting me in doing this research. Last, thank you to all the students of Milner Hall for participating in the research, also to the hall committee for allowing me to conduct this study on hall.

TABLE OF CONTENTS

Page No.

List of Tables and Figures

The Perception of fruits and vegetables Intake in prediction to weight loss.

Abstract

Objective. To determine the association between intake of fruits and vegetables and the perception of intake of fruits and vegetables to predict weight loss among university students.
Background. The effects of weight loss perceptions and fruits and vegetable consumption and obesity are not totally understood. We examined these associations in 103 university students.
Method. A convenience sample was done on Milner Hall of 103 student's males and females ages 18 – 44, both local and regional. The study was carried out during the months of March and April 2010 using self-administered questionnaires. Students were asked to report on fruit and vegetable consumption, weight loss perceptions, family history, physical activity and demographic variables.
Results.
The comparison between male subjects and female subjects with the perception of fruits and vegetables in prediction to weight loss shows that females had a higher perception than males.
More females 14 (13.6 %) met the required servings for fruits than males 4 (3.9 %). More females 4 (3.9 %) met the required servings for vegetables than males 1 (1 %)
Conclusion.
From the information that was analyzed it can be concluded that men and women have a high perception that fruits and vegetables can contribute to weight loss and that females had a higher consumption of fruits and vegetables. Because fruit and vegetable intake is low among university students, intervention should take place to increase F&V intake. A comparison of different types and amounts of fruits and vegetables along with different consumption patterns (before, during, after meals) will lead to an understanding on how best to incorporate fruits and vegetables in the diet to manage weight.

Key Words

- Fruit, vegetable, weight, perception, obesity

Introduction

According to the World Health Organization, "obesity is a major public health problem in both developed and developing countries."(WHO 2002) The importance of prevention and control of obesity is increasingly recognized; and the identification of modifiable risk factors, such as usual food intake, for body weight control is of great relevance (World Health Organization 2003).

Inadequate consumption of fruits and vegetables is one of the five factors in the global burden of disease (WHO 2002). Obesity has reached epidemic proportions globally. With more than one billion adults overweight, at least three hundred million of them clinically obese this is a major contributor to the global burden of chronic disease and disability. Often coexisting in developing countries with under-nutrition, obesity is a complex condition, with serious social and psychological dimensions, affecting virtually all ages and socioeconomic groups (WHO 2003).

Fruits and vegetables are important foods in the composition of a healthy diet, since they have low energy density and are sources of micronutrients, fiber, and other components with functional properties (MAS Van Duyn 2000). Due to the global need to decrease the incidence of chronic, non-communicable diseases such as obesity, in 2003 the WHO proposed a worldwide prevention strategy to promote healthy eating practices (WHO 2003). The rising epidemic reflects the profound changes in society and in behavioral patterns of communities over recent decades. While genes are important in determining a person's susceptibility to weight gain, energy balance is determined by calorie intake and physical activity.

A fruit is a structure of a plant that contains its seeds. The term has different meanings dependent on the context. In non-technical usage, such as food preparation, fruit normally means the fleshy seed-associated structure of certain plants that are sweet and edible in the raw state, such as apples, oranges, grapes, strawberries, juniper berries and bananas, or similar-looking in other plants, even if they are non-edible sweet in the raw state, such as lemons and olives (Mauseth, James D. 2003)

A vegetable is used in scientific and technical contexts with a different and much broader meaning, namely of "related to plants" or "plant grown for food" whether edible or not. (Swedenborg, Emanuel 2003). A vegetable is an edible plant or part of a plant. However, the word is not scientific, and its meaning is largely based on culinary and cultural tradition (US Department of Agriculture 2009).

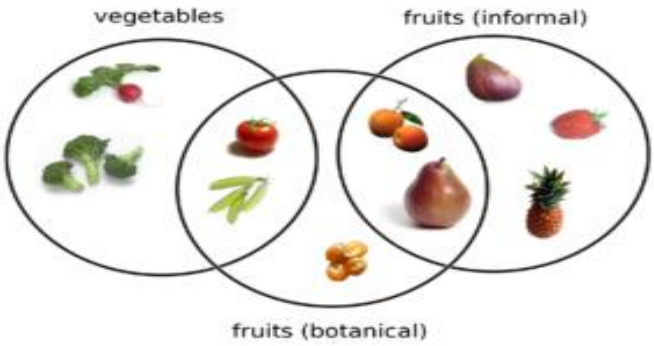

Figure 1. An Euler diagram showing the overlaps between “fruits” and vegetables” in the informal (culinary) sense, and “fruits” in the botanical sense (Jorge Stolfi 2009).

One of the principal recommendations was increased consumption of fruits and vegetables, the reference for which was a recommended daily intake of 400g, or the equivalent of 4-5 servings of these foods (WHO 2004).

Unfortunately, numerous studies have found that the majority of both adults and adolescents are not meeting these recommendations (Pesa J.A. and L.W. Turner 2001). With the growing trend for “fast foods” on our campus The University of the West Indies Trinidad campus, fruits and vegetable intakes are drastically reduced in students’ diet. Obesity and overweight pose a major risk for serious diet-related chronic diseases, including type 2 diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer. The health consequences range from increased risk of premature death, to serious chronic conditions that reduce the overall quality of life (WHO 2003).

When looking at the perception of individuals, we are looking at three stages, selection, organization and interpretation. Perception therefore is the process by which we attach meaning to the world around us, which includes experiences and objects that influence us. It is the process of attaining awareness or understanding of sensory information (Sternberg, Robert 2003).

The aim of the study is to determine the association between intake of fruits and vegetables and the perception of intake of fruits and vegetables to predict weight loss among university students. The

secondary objectives are to determine whether university students' perception of fruits and vegetable intake predicts weight loss, identify factors that affect fruits and vegetable intake among university students, examine the possible factors that influence students, perception of fruits and vegetables in predicting weight loss and to asses the consumption of fruits and vegetables among university students. There is no known data on the consumption of fruits and vegetables among university students neither is there on the perception of fruits and vegetables regarding weight loss. As a result, the research is interested in finding out the perception of fruits and vegetable intake to contribute to weight loss among a group of university students.

Rational

Due to the growing prevalence of obesity among adolescents and young adults, and many persons are looking at increasing their fruit and vegetable intakes to loose weight.

Fruit and vegetables are important components of a healthy diet, and their sufficient daily consumption could help prevent major diseases, such as cardiovascular diseases, obesity and certain cancers. Overall, it is estimated that up to 2.7 million lives could potentially be saved each year if fruit and vegetable consumption were sufficiently increased.

A recently published WHO/FAO report recommends the intake of a minimum of 400g of fruit and vegetables per day for the prevention of chronic diseases such obesity.

Purpose and Goal Of the Study.

Determine the association between intake of fruits and vegetables and the perception of intake of fruits and vegetables to predict weight loss among university students.

Objectives

- ✓ To determine whether university student's perception of fruits and vegetable intake predicts weight loss.
- ✓ Identify factors that affect fruits and vegetable intake among university students.
- ✓ Examine the possible factors that influence students, perception of fruits and vegetables in predicting weight loss.
- ✓ Asses the consumption of fruits and vegetables among university students

Background / Literature Review

Epidemiologic evidence from the WHO suggest that energy-dense foods promote weight gain and that energy-diluted foods such as fruits and vegetables could protect against overweight (WHO 1998).With the prevalence of obesity doubling since 1980 (Ogden CL, et al 2006), there is an urgent need for effective, nutritionally balanced weight-loss strategies. Although many diets produce short-term weight loss, long-term dietary adherence and maintenance of weight loss are difficult to achieve (Makris AP, Foster GD 2005). Approaches to reduce energy intake typically focus on limiting portions or food choices; however, such restrictive approaches may lead to hunger and dissatisfaction. In clinical trials, hungers have been associated with a lack of weight loss or with weight regain (Elfhag K, Rossner S 2005, Pasman WJ et al 1999, Cuntz U et al 2001).

A high fiber intake has been associated with weight loss in some studies (Liu S et al 2003). The usual food consumption has been considered as one of the main modified risk factors for obesity, and there is growing evidence of the role of food intake in the promotion of the quality of life of the individuals (WHO 2003). Weight loss is the consequence of a state of negative energy balance due to increased physical activity or decreased energy intake. In recent decades, the prescription of hypo-caloric diets has been promoted with the aim of creating a negative energy balance. However, their effects on weight control over time are not satisfactory (Ogden Cl. Et el 2004). So many researchers try to ascertain the specific influence of different macronutrients and micronutrients and other non-nutritional elements contained in food items with the goal of devising reasonable strategies to induce weight loss successfully and prevent further weight gain (Ogden Cl. et al 2004, Foster GD. et al 2003, Skov AR. et al 1999, Stubbs RJ et al 1996). Current evidence points to the beneficial effects of eating at least five daily portions of fruits and vegetables on the prevention of chronic and non-communicable diseases (WHO 2003).

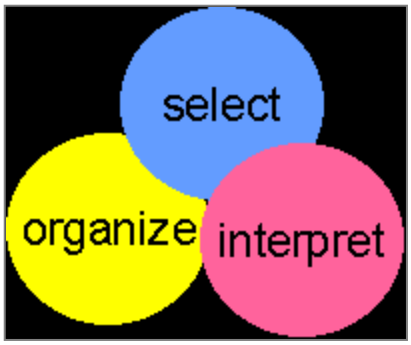

Figure 2.Process of Perception.

When looking at the perception of individuals, we are looking at three stages, selection, organization and interpretation (Sternberg, Robert 2003).

Max Wertheimer explains Gestalt thinking as a philosophical system rooted in experience and the psychology examining parts in terms of a whole. Gestalt theory was the outcome of concrete investigations in psychology, logic, and epistemology. The prevailing situation at the time of its origin may be briefly sketched as follows. We go from the world of everyday events to that of science, and not unnaturally assume that in making this transition we shall gain a deeper and more precise understanding of essentials. The transition should mark an advance. Yet, though one may have learned a great deal, one is poorer than before (Ellis W.D. 1997). The fundamental "formula" of Gestalt theory might be expressed in this way (Ellis W.D. 1997). There are wholes, the behavior of which is not determined by that of their individual elements, but where the part-processes are themselves determined by the intrinsic nature of the whole. Perception is the process by which organisms interpret and organize sensation to produce a meaningful experience of the world. Perception describes one's ultimate experience of the world and typically involves further processing of sensory input. In practice, sensation and perception are virtually impossible to separate, because they are part of one continuous process (Lindsay Peter and Donald A. Norman 1997). Dieting and weight control perceptions, goals and behaviors are common among both adults and adolescents (Grunbaum et al 2002, USDA 1996, French and Jeffery 1994, Story et al and Neumark-Sztainer et al 2000). National studies have found that approximately two-thirds of adolescent girls and about one-quarter, adolescent boys are actively attempting to control their weight (Story M. et al 1998). Dieting and weight control behaviors can have varying effects on food intake (French S. A and R.W. Jeffery1994). In a review article titled “What Can Intervention Studies Tell Us about the Relationship between Fruit and Vegetable Consumption and Weight Management?” by Barbara J. Rolls, Ph.D., Julia A. Ello-Martin, M.S., and Beth Carlton Tohill, Ph.D., M.S.P.H. states “consumption of fruits and vegetables affects satiety, food intake, and body weight. In the article, they considered fruits and

vegetables together because “they are frequently associated with dietary advice, such as “eat more fruits and vegetables”. In addition, although fruits and vegetables may differ greatly in their sensory and nutritional profiles, they are usually low in fat content and energy density (kcal/g) and high in water and dietary fiber. All of these properties can contribute to increased satiety, reduced food intake, and may be beneficial for weight management (Barbara J. Rolls et al 2004). The type and amount of carbohydrates in fruits and vegetables may affect satiety and food intake (Roberts SB 2000). As carbohydrates are digested, they are converted to glucose; the rate of this conversion process can be measured by assessing plasma glucose concentrations over time (i.e., the glycemic response). The glycemic response during the 2 hours after consumption of an amount of a food containing 50 g carbohydrate is used to compare foods by creating an “index” for them. A food with a high glycemic index (GI) causes a rapid but short-lived rise in blood glucose, while a food with a low GI causes a slower, more sustained rise. Foods with a low GI have been proposed to be more satiating than those with a high GI, but a robust relationship between GI and satiety, food intake, or body weight has not been found (Raben A.2002).

The article also highlighted that fruits and vegetables could affect energy regulation (Rolls BJ et al 1998). Energy density is defined as the energy content in a given weight of a food (kcal/g or kJ/g). Water is the component of food that has the biggest impact on energy density because it adds weight to food without increasing calories, thereby decreasing energy density [(13)]. Fiber also reduces energy density, but its influence is small compared to that of water because most foods have more water than fiber. Conversely, fat, the most energy-dense nutrient (9kcal/g versus 4 kcal/g for carbohydrate and protein), increases energy density. Most fruits and vegetables are low in energy density because of their high water and low fat content. Adding fruits and vegetables to the diet reduces overall energy density and increases the amount of food that can be consumed for a given level of calories (Rolls BJ 1999).

Research has shown that increasing the water content of a preload, thereby decreasing its energy density, while keeping the macronutrient and energy content constant, increased satiety and decreased energy intake at a subsequent meal. Thus, fruits and vegetables could enhance satiety through

their high water content and low energy density (Poppitt SD and Prentice AM 1996, Rolls BJ and Bell EA 2000, Yao M and Roberts SB)

Methodology

Sample

The aim of the study was to determine the association between intake of fruits and vegetables and the perception of intake of fruits and vegetables to predict weight loss among university students. The sample consisted of university students residing on Milner Hall, were identified to participate in the study. Milner Hall consists of five blocks, South Block, North Block, I Block, West Block and Post Graduate Block, and houses approximately 270 students' male and female for the period January – May 2010. The study population comprised of males and females ages 18 – 44, both local and regional.

Study Design

The study was carried out during the months of March and April 2010. Permission to conduct the study was obtained from the Hall Chairman. All students on Hall interested in participating were selected. A convenience sample of one hundred and twenty students was chosen to take part in the study.

Instrument

The instrument used was a self-administered questionnaire and some personal interviews. Person's height and weight were obtained using a Stadiometer and a bioelectrical impedance scale. The questionnaire contained six sections. Section 1- questions pertaining to fruit and vegetable consumption, Section 2- a food frequency on fruits and vegetables , Section – 3 Weight loss questions, Section 4 – Demographics, Section 5 – physical activity and Section 6 - Family history.

Conduct of the Study

The questionnaires were given out between the hours of 6 o'clock pm and 9 o'clock pm from Thursday March 18 – Thursday 1 April 2010. Height and weight were taken before questionnaires were administered. All were given out on the premises of Milner Hall.

Analysis

Data was coded, entered into a database program and analyzed. All statistical analyzes were carried out using SPSS (version 12.0) with the level of significance set at P< .05. Frequencies, and cross tabulations were used to analyze data. Correlations were analyzed based on strong correlation - r> .70 or r < -.70, moderate correlation - r is between .30 and .70 or r is between - .30 and - .70 and weak correlation - r is between zero and .30 or r is between zero and -.30

Results

TABLE 1
DEMOGRAPHIC DISTRIBUTION OF CHARACTERISTICS OF SAMPLE

NO. OF SAMPLE	MALE		FEMALE		TOTAL
	45		58		103
SUBJECTS (AGE)					
18-24	38	36.9 %	47	45.6 %	82.5%
25-34	6	5.8 %	10	9.7 %	15. 5 %
35-44	1	1 %	1	1 %	1.9 %
SUBJECTS (ETHNICITY)	MALE		FEMALE		
AFRICAN	28	27.2%	37	35.9 %	63.1 %
INDIAN	6	5.8 %	4	3.9 %	9.7 %
CAUCASIAN	2	1.9 %	1	1 %	2.9 %
MIXED	9	8.7 %	16	15.5 %	24.3 %
FACULTY	MALES		FEMALE		
FSA	24	23.3 %	30	29.1 %	52.4 %
FSS	8	7.8 %	18	17.5 %	25.3 %
ENG	12	11.7 %	3	2.9 %	14.6 %
MED	0	0	3	2.9 %	2.9 %
HUM	1	1 %	4	3.9 %	4.9 %
EMPLOYMENT STATUS	MALE		FEMALE		
UNEMPLOYED	45	43.7 %	57	55.3 %	99.0 %
EMPLOYED F/T OUTSIDE	-	-	1	1 %	1. 0%
OCCUPATION	MALE		FEMALE		
STUDENT	45	43.7%	58	56.3%	100 %
MARITAL STATUS	MALE		FEMALE		
SINGLE	45	43.7 %	58	56.3 %	100 %

Table 1 shows the demographic distribution of the study sample.
The majority of the respondents were females 58 (55.3%) while males comprise of 45 (43.7 %)
The majority of the population within the age range of 18-24 with 38 (36.9%) were males and 47 (45.6 %) were females.
The larger part of the participants 68.3 % were of African descent with 28 (27.2 %) being males and 37 (35.9 %).
Greater part of the respondents were registered in the faculty of science and agriculture with 24 (23.3 %) were males and 30 (29.1 %) were females.
On the employment status majority of the sample were unemployed, 45 (43.7 %) males, 57 (55.3 %) were females.
All participants were full time students and their marital status was single.

Table 2
Comparisons of males and females in their Prediction to weight loss

	Men	Percentage	Women	Percentage	
No. of subjects	**45**		**58**		**103**
Does Fruits/Veg contribute to wt. loss	37	35.9 %	51	49.5 %	**85.4 %**
Include fruits/Veg in Diet	29	28.2 %	48	46.6 %	**74.8 %**
How important is F/V					
Very Important	3	2.9 %	15	14.6 %	**17.5 %**
Important	10	9.7 %	26	25.2 %	**35 %**
Consumed F/V for weight Loss	0	0	0	0	
Increase in Fruit intake	10	9.7 %	34	33 %	**42.7 %**
Increase in Veg. intake	8	7.8 %	31	30.1 %	**37.9 %**
Decrease in Fruit intake	7	6.8 %	13	12.6 %	**19.4 %**
Decrease in veg. intake	8	7.8 %	15	14.6 %	**23 %**
Weight loss Diet (yes)	6	5.8 %	25	24.3%	**30.1 %**
All fruit Diet	2	1.9 %	14	13.6 %	**15.5 %**
All veg. Diet	2	1.9 %	5	4.9 %	**6.8 %**
Diagnosed with Obesity:					
Individual	1	1 %	-	-	**1 %**
Family	2	2.2 %	4	4.4 %	**6.7%**

As shown in Table 2 the majority of males 37 (35.9 %) and females 51 (49.5 %) perceived that fruits and vegetables contribute to weight loss.
Twenty-nine % of males include fruits and vegetables in their diet while 48 (46.6 %) females did.
The majority of females 15 (14.6) and 26 (25.2) respectively, stated that fruits and vegetables in the diet were either very important or important.
None of the participants consumed fruits and vegetables for weight loss. Although their perceptions were high on fruits and vegetables contributing to weight loss, we see none of the participants, male nor do females consume fruits or vegetables for weight loss.
Thirty-four (33%) and thirty-one (30.1 %) females increased their intake of fruits and vegetables in the past 3 months.
The greater part of the sample that were on a fruit and vegetable diet were females 14 (13.6 %) fruit diet, and 5 (4.9 %) on a vegetable diet.
One participant, male, was diagnosed with obesity. Participants family that were diagnosed with obesity were 2 (2.2 %) of the male group and 4 (4.4 %) of the female group.

Table 3
Relationships with demographic variables for female subjects.

FEMALE	AGE
Fruits & veg. for wt. loss	**.021**
Fruits & veg. in diet	**.022**
Importance of fruits & veg.	.191
Amt. of money spent on fruits & veg.	.643
Fruit loss diet	.198
Veg. loss diet	.286
Recommend diet	.247

Correlation is significant at the 0.05 level (2-tailed).

As shown in Table 3, there were significance with perception and age with the female group (.021). It showed that females 18 -25 years perceive that fruits and vegetables contributed to weight loss.

Table 4
Relationships with demographic variables for male subjects.

MALE	AGE	FACULTY
Fruits & veg. for wt. loss	.714	**.020**
Fruits & veg. in diet	.816	.486
Importance of fruits & veg.	.670	.267
Amt. of money spent on fruits & veg.	**.020**	.126
Fruit loss diet	.296	.278
Veg. loss diet	.566	.637
Recommend diet	.459	.417

Correlation is significant at the 0.05 level (2-tailed).

Shown in Table 4 there were significance with age and the amount of money spent on fruits and vegetables among the male participants. The 18-24 group spent less money on fruits and vegetables. There was also significance with faculties and perception. Science and Agriculture students had a higher perception that fruits and vegetables contributed to weigh loss.

Table 5
Correlation between female subjects perception with demographic characteristics

FEMALE	AGE	ETHNICITY	FACULTY	EMPLOYMENT STATUS
Fruits & veg. for wt. loss				
Pearson Correlation	**.303***	.107	-.015	.049
Strong				
Moderate	✓			
Weak		✓	✓	✓
Fruits & veg. in diet				
Pearson Correlation	**.300***	.050	.196	.060
Strong				
Moderate	✓			
Weak		✓	✓	✓
Importance of fruits & veg.				
Pearson Correlation	-.174	.097	-.224	-.143
Strong				
Moderate				
Weak	✓	✓	✓	✓
Amt. of money spent on fruits & veg.				
Person Correlation	.062	.047	.010	.106
Strong				
Moderate				
Weak	✓	✓	✓	✓
Fruit loss diet				
Pearson Correlation	.171	-.048	.112	-.075
Strong				
Moderate				
Weak	✓	✓	✓	✓
Veg. loss diet				
Pearson Correlation	.143	.106	.026	-.041
Strong				
Moderate				
Weak	✓	✓	✓	✓

Pearson Correlation (r): Strong correlation - r> .70 or r < -.70, Moderate correlation - r is between .30 and .70 or r is between - .30 and - .70; Weak correlation - r is between zero and .30 or r is between zero and - .30.

There was moderate correlation between the perception of fruits and vegetables contributing to weight loss and age r = .303
There was moderate correlation between including fruits and vegetables in the diet and age r = .300
There was no correlation with ethnicity, nor was there any correlation with employment status.

Table 6
Correlation between male subjects perception with demographic characteristics

MALE	Age	Ethnicity	Faculty
Fruits & veg. for wt. loss			
Pearson Correlation	-.056	.141	**.345***
Strong			
Moderate			✓
Weak	✓	✓	
Fruits & veg. in diet			
Pearson Correlation	-.036	-.111	-.106
Strong			
Moderate			
Weak	✓	✓	✓
Importance of fruits & veg in diet. **Pearson Correlation**	-.065	-.070	-.169
Strong			
Moderate			
Weak	✓	✓	✓
Amt. of money spent on fruits & veg.			
Person Correlation	**.346***	-.138	-.232
Strong			
Moderate	✓		
Weak		✓	✓
All Fruit diet			
Pearson Correlation	-.159	.033	.165
Strong			
Moderate			
Weak	✓	✓	✓
All Veg diet			
Pearson Correlation	.088	-.134	.072
Strong			
Moderate			
Weak	✓	✓	✓

Pearson Correlation (r): Strong correlation - r> .70 or r < -.70, Moderate correlation - r is between .30 and .70 or r is between - .30 and - .70; Weak correlation - r is between zero and .30 or r is between zero and - .30

There was moderate correlation between the amount of money spent on fruits and vegetables and age, r = .346
There was moderate correlation between perception of fruits and vegetables contributing to weight loss and faculty r = .345
There was no correlation between perception and ethnicity.

Table 7
Number of servings of fruits per day.

		Gender		
		Female	Male	Total
Fruits intake	<1 Poor	20	11	31
		19.4%	10.7%	30.1%
	1-3 Needs improvement	24	30	54
		23.3%	29.1%	52.4%
	4- 6 Met requirements	9	3	12
		8.7%	2.9%	11.7%
	>6 Excellent	5	1	6
		4.9%	1.0%	5.8%
Total		58	45	103
		56.3%	43.7%	100.0%

As shown in **Table 7** more females 14 (13.6 %) met the required servings for fruits than males 4 (3.9 %).

Table 8
Number of servings of vegetables per day

		Gender		
		Female	Male	Total
Vegetables intake	<1 Poor	13	21	34
		12.6%	20.4%	33.0%
	1-3 Needs improvement	41	23	64
		39.8%	22.3%	62.1%
	4- 6 Met requirements	3	0	3
		2.9%	.0%	2.9%
	>6 Excellent	1	1	2
		1.0%	1.0%	1.9%
Total		58	45	103
		56.3%	43.7%	100.0%

As shown in **Table 8** more females 4 (3.9 %) met the required servings for vegetables than males 1 (1 %)

Discussion

The aim of the study is to determine university students' perception of fruits and vegetables intake predicts weight loss. The study showed that their perceptions were high but when compared with their intakes, only 18 persons (17.5 %) in which the female group were majority, are meeting the required servings for fruits and 5 persons (4.8 %) are meeting the required servings for vegetables per day. In a national study, they reported that 54% of boys and 53% of girls ages 12-19 were consuming less than one serving of fruit a day (USDA 1996). Because eating patterns and habits during adolescent affect health and may carry over into adulthood, it is important that we understand the variables and factors that influence fruit and vegetable intake during adolescent into early adulthood. Reports indicate that only 6-20% of children and adolescents eat five or more servings of fruits and vegetables per day (Reynolds K. D. et al 2000). Some of the factors that affected university students fruits and vegetable intake were, age socioeconomic, knowledge, perception, ethnicity and gender. Knowledge was a major factor in this study, majority of students in the Faculty of science and Agriculture consumed more fruits and vegetables than those students in other faculties did. Gender was another major variable that affected the consumption of fruits and vegetables, majority of females consumed it more than males did. In a study conducted by Nancy L. Cohen, we identified barriers to fruit and vegetable (F&V) consumption in a multiethnic worksite population and related them to F&V intake and demographics (Cohen et al 2008). In multivariate analysis, ethnicity, occupation, and age were no longer associated with the general barriers score when education and income were controlled. There was a significant education by income interaction. Only the general barriers score was significantly associated with F&V intake. In conclusion, perceived barriers to F&V intake increased with decreasing income and education, especially at low incomes, and were related to lower consumption of F&V. This study showed similar results, education had a major role to play in how it affects person's consumption of fruits and vegetables. Students in the science and agriculture faculty are assumed to have a greater knowledge on the health benefits of fruits and vegetables in the diet. Hence, the results show that persons in that particular faculty consumed more F/V than in other faculties. Supporting studies have shown similar results that were obtained from our

study. They looked at understanding the processes underlying this gender difference (Anna H. Baker, Jane Wardle 2003). Fruit and vegetable intake, nutrition knowledge, taste preferences, attitudes to fruit and vegetable intake, and dieting status, were assessed. Fewer men than women knew the current recommendations for fruit and vegetable intake, and fewer were aware of the links between fruit and vegetable consumption and disease prevention. Women rated their liking for vegetables but not fruit higher, and there were no differences in attitudes. Men were less likely to be dieting to lose weight. Multivariate analysis showed that the gender difference in intake was substantially attenuated by controlling for nutrition knowledge. There were no significant attenuating effects of preferences, attitudes or dieting status. These results indicate that men's poorer nutrition knowledge explains a significant part of their lower intake of fruit and vegetables (Anna H. Baker, Jane Wardle 2003).

A study led by Madeleine Nowak, investigating relationship between adolescents' food related beliefs and food intake behaviors; and the relationship between knowledge, beliefs and behaviors among the persons attempting weight loss, the findings suggested that beliefs about food and weight may be more important than knowledge in altering food related health behavior (Nowak M. 2000).

A nationwide study found that 79% of high school students had not eaten at least five servings of fruits and vegetables per day during the 7 days preceding the study (Grunbaun JA 2002). This supports our study that showed, 82.5 % of university students residing on campus had not eaten at least five servings of fruits usually, and 95.2 % had not eaten at least four servings of vegetables prior to the study. Males and females have different perceptions regarding weight loss, which could cause the association of perception to differ by gender (Neumark-Sztainer D. et al 2000)

Limitations

The time allotted to complete the research was short, and poor management of time a convenience sample was done. The target group was not well defined, again due to the short time in which to complete the study. There was high respondent burden; for the reason that persons were pre-occupied with other agendas.

While the available data suggest the role of fruits and vegetables to weight loss, more studies are needed to specifically test the effects.

Intervention trials are needed to separate the effects of fruits and vegetables from those related to other dietary changes and demographic factors.

Conclusion

From the information that was analyzed it can be concluded that women have a higher perception that fruits and vegetables can contribute to weight loss, evidenced by there intake. To optimize advice on the use of fruits and vegetables for weight management, more systematic studies are needed, in relation to the effects of these foods on satiety and energy intake. The results indicate that men's poorer nutrition knowledge explains a significant part of their lower intake of fruit and vegetables. A comparison of different types and amounts of fruits and vegetables along with different consumption patterns (before, during, after meals) will lead to an understanding on how best to incorporate fruits and vegetables in the diet.

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APPENDIX

Appendix 1 : Questionnaire