THE UNIVERSITY OF THE WEST INDIES
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A Research Paper

Submitted in partial requirements

for HUEC 3012

of

The University of the West Indies

Title: A comparison of Fruit and Vegetable intake between nutrition and non-nutrition Students in the Faculty of Food and Agriculture at the University of the West Indies St. Augustine

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Year Submitted: 2014

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A COMPARISON OF FRUIT AND VEGETABLE INTAKE BETWEEN NUTRITION AND NON – NUTRITION STUDENTS IN THE FACULTY OF FOOD AND AGRICULTURE AT THE UNIVERSITY OF THE WEST INDIES ST. AUGUSTINE.

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2014

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Thank You.

Department of Agricultural Economics and Extension
THE UNIVERSITY OF THE WEST INDIES
Faculty of food and agriculture

Title of Study

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ABSTRACT

Background

Fruits and vegetables are gifts of nature which contains many health benefits, it is packed with vitamins and minerals which when consumed by humans give essential benefits such as protection against certain diseases and illness and it is readily convenient. This study had seek to tests the hypothesis of Nutrition students having a greater amount of fruit and vegetable intake than non-nutrition students in the faculty of food and agriculture. It also concluded the relationship between fruit and vegetable consumption and gender, living status, BMI and waist circumference of students in the faculty of food and agriculture. There are 864 students registered in this faculty, 80 of those were nutrition students.

Methodology

A cross sectional study was employed and nutrition tools such as a one day method (24 hr recall), fruit and vegetable frequency and cup equivalents was used to collect data about fruit and vegetable intake among students in the faculty of food and agriculture at the University of the West Indies. Eighty persons, forty nutrition students and forty non-nutrition students, more females completed it as males were not dominant in this faculty. Twenty two males and fifty eight females completed the survey. The data was collected, tabulated, coded and analysed. Independent t test, ANOVA and linear regression were performed.

Results

Analysis of the one day Recall, Fruit and vegetable Frequency and cup equivalents Questionnaire indicated that there is no association between Fruit Intake, Gender and BMI (Body Mass Index). Nutrition students had a higher fruit and vegetables intake and waist circumference and living status had a significant difference with fruit and vegetables index.

CONCLUSION

Nutrition students consumed significantly more fruit and vegetable than non-nutrition students in the Faculty of Food and Agriculture at the University of the West Indies. They also had a waist circumference in the normal range, livings status had a significant difference as well. Students living on campus had less fruit and vegetable consumption than those who resides at home. There was no significant difference in intake between genders nor did intake differ statistically by BMI ranges.

INTRODUCTION

Fruit and vegetables enable protective benefits as they consists of antioxidants, phytochemicals and dietary fibre. The United States department of Agriculture (USDA) recommends an average of 2 cups of fruits and 2 ½ cups of vegetables approximately 4 ½ cups daily are sufficient. This reduces the risk of certain cancers and cardiovascular disease. The Nurses' health study supported the fact that fruit and vegetables such as spinach, cabbage, broccoli and citrus fruits such as oranges and lemons (and their juices) made the most important contribution into reducing cardiovascular disease.

The American Cancer Society encourages beta carotene consumption as this is a major contributor for reducing cancers. Beta carotene is found in yellow-orange fruits. Yellow-orange fruits contain a lot of antioxidant which fight free radicals which lowers the risk of cancer as it contains ascorbic acid and beta carotene. Many previous studies indicated that it protect against lung and breast cancers. Lycopene containing food consist of vitamin A. Food rich in lycopene are tomatoes and this consist of vitamin A which can decrease throat and prostate cancer. Vitamin A increases white blood cell production which increased immunity and decreases free radicals and oxidative stress. (Stanford Medical Institute, 2013)

Phytochemicals protect against aging and certain heart diseases and reduces inflammation hence decreasing allergic reactions. They are found mostly in vibrantly coloured foods such as red, blue and yellow colour fruits. They contain anthocyanin, bioflavonoids and carotenoids. They also diminishes the risk of diabetes and hypertension. (Stanford Medical Institute, 2013)

Dietary fibre is another benefit that fruit and vegetable have. Fruit and vegetable assists in gastrointestinal health. As fibre passes along the digestive system it sops up water like a sponge and expands reducing constipation and triggering normal bowel movement. The softening action of insoluble fibre decreases the pressure inside the intestinal tract and may help prevent diverticulosis (the development of tiny, irritated pouches inside the colon) and diverticulitis (the painful inflammation of the

pouches). According to the USDA, fibre rich diets also decrease the risks of type 2 diabetes, hypertension, obesity and it generally improves overall health.

RATIONALE OF THE STUDY

Students with nutritional knowledge are more aware of the importance of fruit and vegetable. Fruit and vegetable are a healthy choice with convenience and are easily accessible especially in the Caribbean region. This study was done to compare if students within a nutrition degree consumed a greater amount of fruit and vegetable than students who are pursuing a non -nutrition degree in the faculty of food and agriculture at the University of the West Indies. The study also seeks to conclude the reasons for fruit and vegetable intake and what limits students from consuming them. The study further seeks to determine whether BMI, waist circumference and gender and are affected by fruit and vegetable intake and if living status contributed to consumption. Introduction to Nutrition is a course done at level 1 in the Nutrition degrees such as Human Nutrition and Dietetics, Human Ecology, Nutritional sciences, Food service systems management and Sports nutrition. This course entail lectures, group presentations, midterm and an examination at the end of the semester which cover a 12 week span. The course must be passed with a minimum grade of 40%, which then mean the course was effective to the individual. It is a great form of nutritional Intervention as it creates motivation and effectiveness for the nutrition degrees stated above.

PROBLEM STATEMENT

Non-nutrition students mostly consume less fruit and vegetable than nutrition students in the faculty of food and agriculture at the University of the West Indies as the non-nutrition students lack knowledge or Intervention about the benefits of fruit and vegetable.

OBJECTIVES

- To compare if nutrition students consume more fruit and vegetable than non-nutrition students in the faculty of food and agriculture.
- To evaluate what limits fruit and vegetable consumption within the group of university students and to look at gender differences.
- To compare if there is any difference in living status and fruit and vegetable intake.
- To determine if BMI and waist circumference have any relationship between fruit and vegetable intake.
- To conclude reasons for fruit and vegetable consumption.

HYPOTHESIS

- Nutrition students consume greater amount of fruit and vegetable than non- nutrition students as nutrition students have more knowledge of the benefits of fruit and vegetables.

- Females are more conscious of their health so they have a greater intake than males.

- BMI and waist circumference in the normal range is associated with greater fruit and vegetable intake.

- Students at home consumes a higher fruit and vegetable intake compared to those residing on campus.

SCOPE OF THE STUDY.

This study paid attention on fruit and vegetable intake among nutrition and non-nutrition students in the faculty of food and agriculture. Fruit and vegetable are a healthy meal as they are full of benefits and requires little or no preparation time. It is also easily accessible. Nutrition students who were selected to participate in this study was students who pursued the Introduction to Nutrition course. This was considered the intervention for the study. Non- nutrition students in the faculty of food and agriculture were selected from degree programs such as Agribusiness, Food Production and Geography. These non-nutrition students never pursue the Introduction to Nutrition course. The faculty of food and agriculture has a total of 864 students, 80 of this 864 are nutrition students.

Key terms

FFA – Faculty of food and agriculture

UWI- University of the West Indies

Nutrition Intervention- Nutritional education implied by various means as to improve eating habits and overall health.

Antioxidant- a molecule that is capable of reducing oxidative damage to cells and reduces free radicals.

Free Radicals- Molecules that has a free electron in its outermost shell that makes it extremely reactive with other molecules which results in damage to cells within the body.

BMI- Body Mass Index. A nutrition screening tool used to mark acceptable weight for height ranges. (kg/m^2)

Waist circumference- the distance around the waist.

LITERATURE REVIEW.

Increased fruit and vegetable intake have been linked to many positive health benefits in recent studies. Fruit and vegetable consumption is positively related to many health outcomes; individuals who consume fruit and vegetable at the recommended levels have lower risk of chronic health conditions, including diabetes, hypertension, obesity, cardiovascular disease and cancer. Despite the benefits of a food and vegetable rich diet, only 10% of US young adults (aged 19 to 30 years) consume the recommended 2 cups fruit and 2 ½ cups vegetable daily. (Dan J. Graham, et al. 2013)

Fruit and vegetable has also been linked to more positive body weight and desirable weight loss. In a study done it was seen that a diet coupled with low fat and recommended daily servings of fruit and vegetable had an outcome of individuals achieving desirable weight. Obesity has grown in the Caribbean during the past ten years. It also has a directly proportional relationship with type 2 diabetes, hypertension, cardiovascular disease and lately cancers (Henry 2007). A recent cross sectional study was performed in Southern Brazil which entailed 568 adolescents between the ages 12 to 18 years old. This study concluded that 50% of individuals consumed less than 2 servings per day of fruit and vegetable. The use of a fruit and vegetable frequency were used to obtain data. It was also found that there were no difference between gender and intake.

(Cullen 1995), showed that nutrition intervention played a role in fruit and vegetable intake. Persons who consumed fruit and vegetable at the recommended daily serving had some sort of knowledge about the benefits of them. In this study done before the intervention, adolescent consumed 2.5 servings of fruit and vegetable daily, after a span of three months intervention the values of servings increased to 4 servings daily.

In another study performed by (Lorsen et al.2009), found that adolescents aged between 12 to 18 years old consumed a lower fruit and vegetable intake and there were no difference between gender. The

group that mostly consumed 4 times or more were the lower age group of 2 to 5 years old. In this study family played a role in fruits intake as parents had a say as to what to be consumed. The most consumed fruit was found to be 100% fruit juice. Fruit and vegetable intake decreased as age ranges increased and the study concluded that the average intake of fruit and vegetable was significantly below the recommended servings.

It is proven by studies previously that intervention programs have been successful in increasing fruit and vegetable intake. Positive methods for intervention included community based programs which created awareness in fruit and vegetable intake and certain diseases. It was observed that the greatest change with respect to fruit and vegetables occurred mostly in persons who were already affected by some sort of disease or who was at an extreme risk for developing a disease. Hence it was great motivation (Pomerleau, et al. 2005). However follow up visits were limited due to cost and participants may have returned to their normal routine.

Methodology

Study Participants

Qualitative and quantitative methodologies were both employed for this study. UWI students in FFA was the target population for the study. A cross sectional study was carried out using surveys and it was administered to 80 students (40 nutrition and 40 non-nutrition students) who were willing to complete the survey. Twenty two males and fifty eight females completed the survey. Females being the larger number as they were more dominant than males in FFA.

The study contains a section about demographics (such as age, ethnicity), it also asked for persons height, weight and short questions in sections which contained a fruit and vegetable frequency, one day or 24 hr recall and cup equivalents. Popular obtained fruits and vegetable were given as choices in the survey. Cups equivalents were used to create a standard portion making it more user friendly, particularly to non-nutrition students unfamiliar with portion sizes.

PROCEDURE

Data was collected in a 3 weeks span. Students were instructed to tick the most applicable response. The survey or questionnaire was intended to collect information on the person's degree option, height, weight which was obtained by using a scale (in kg) and stadiometer or growth chart, BMI,waist circumference (by using a measuring tape), demographics, and 3 sections which consisted of a fruit and vegetable frequency, which required persons to select a response from past 7 days, 24 hr recall (yesterday) and cup equivalent which was on a daily basis.

Statistical Analysis

BMI was calculated firstly and all data apart from the scales (weight, height, BMI and waist

circumference) was assigned to codes. The data was then entered with their codes on the program SPSS. The Fruit and Vegetable Frequency, 24 hr recall (one day) and cups equivalents for each student was then calculated to an index which was named the fruit and vegetable index or F/V Index. The index was calculated by finding the sum of all variables that assessed consumption of fruits and vegetables (such as Fruits and vegetable frequency, 24 hr recall and cups equivalents) after finding this score, an individual could have attained a score from 12-84. For a simple interpretation, the score was transformed. Calculation: (Actual score/84)*100= New score out of 100. SPSS were used to analyse data. ANOVA, independent t test and linear regression analysis were performed. P=0.05 was the significant level used for all statistical tests where relevant.

RESULTS

STUDENT STATUS AND FRUIT INTAKE.

Eighty students completed this questionnaire. Forty nutrition and forty non nutrition (22 males and 58 females). There was statistically a significant difference between the nutrition and non-nutrition students and fruits and vegetable consumption (F/V Index) and programmes. An independent t test was done to compare means between these two groups; it was observed that there was a difference and a significant difference among these two groups. Table 1 shows the results of the independent t test. There was a significant difference as p=0.002. This can also tell that there was a difference in the means. Non nutrition students had a mean of 14 out of 100 while nutrition students had a mean of 22 out of 100. Hence nutrition students eat healthier as compare to the non- nutrition student. Although 22/100 is still a low intake.

Table 1: Showing results for independent t test and students' status and fruit and vegetable index.

STUDENTS STATUS	MEAN	STD. DEVIATION	SIGNIFICANCE
NON-NUTRITION	+14.020	8.340	0.002
NUTRITION	+22.620	14.816	0.002

Table 2 illustrates the daily intake of fruit and vegetable (cups) the data obtained from the cup equivalent. It can be seen that within the non-nutrition students only 10% of students consumed the daily servings which is 4 ½ cups of fruit and vegetables, 90% did not consume the average recommended intake. Within the nutrition students only 22.5% consumed the average daily recommended intake for fruit and vegetable while 77.5% did not. Both groups have insufficient intake of daily recommended fruit and vegetable.

TABLE 2: ILLUSTRATING STUDENTS STATUS AND THE DAILY RECOMMENDED INTAKE PERCENTAGE.

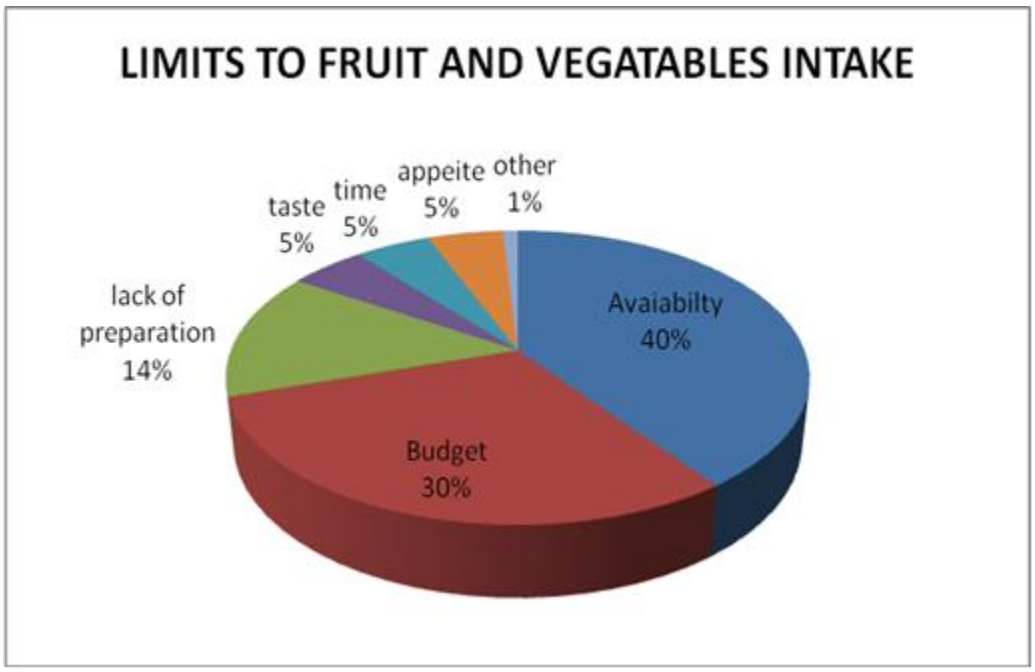
STUDENT STATUS	CUP EQUIVALENT % (FRUIT AND VEGETABLE)
NON-NUTRITION	1O
NUTRITION	22.5

FRUIT INTAKE AND GENDER

There was no association between gender and fruit consumption in the analysis (anova) between males and females, since the p values were not under 0.05. The value of significance was 0.289. Which means that gender differences, (males and females) and fruit and vegetable intake was not significant since p was 0.289.

LIMITS TO FRUIT AND VEGATABLES INTAKE

Figure 1: Pie chart showing the limits to fruits and vegetable consumption.



From the above diagram it can be seen that 40% of students suggested that availability was the main reason for not consuming enough fruits and vegetables. 30% suggested that budget was the next reason while 14% suggested lack of preparation and 5% said taste, time and appetite respectively. 1% suggested other.

Living status and fruits consumption

There was a significant difference in fruit and vegetable intake based on who resides on campus or at home. The ANOVA test was done for living status among the two groups of students and it can be seen from Table 3 that students who resides on campus have a significant difference than individuals who resides at home. P = 0.04. Students who rent/ reside on campus have a lower intake than those who resides at home. There was also a difference in the means between the students who resides at home and on campus. Eighteen students resides on campus while sixty two resides at home.

TABLE 3 : SHOWING ANOVA TEST RESULTS BASED ON LIVING STATUS AND FRUIT AND VEGETABLE CONSUMPTION.

LIVING STATUS	MEAN	STD.DEV	SIGNIFICANCE
HOME	+19.887	1.581	0.040
CAMPUS	+12.944	2.933	0.040

BMI, Waist circumference and Fruit Consumption

There was no relationship between BMI and fruit and vegetable consumption. A linear regression test was used to determine whether there were a relationship between these two but none was to be seen. Therefore fruit and vegetable intake had no impact on BMI. Table 4 shows BMI and fruit and vegetable consumption. However this sample indicated that it was a healthy sample as the mean was seen to be 22.939 as this is within the normal range, standard deviation of 4.703 and also a range of 23.4 with a minimum (person) being 15.1 and maximum (person) of 38.5. P value was 0.768 which means that there were no significant difference between BMI and Fruit and vegetable index.

Fruit and vegetables intake however had an impact on waist circumference. A linear regression was used to analyse this association, it was seen that as fruit and vegetable intake increased, waist circumference decreased. This is significant at the 10% level at a p value less than 0.10. It was seen to be -0.086, so hence there is a negative association between these two variables (waist circumference and fruit and vegetable intake). This negative association means as one factor increases such as the fruit and vegetables intake, the other factor waist circumference decreases. This means that this was a good sign.

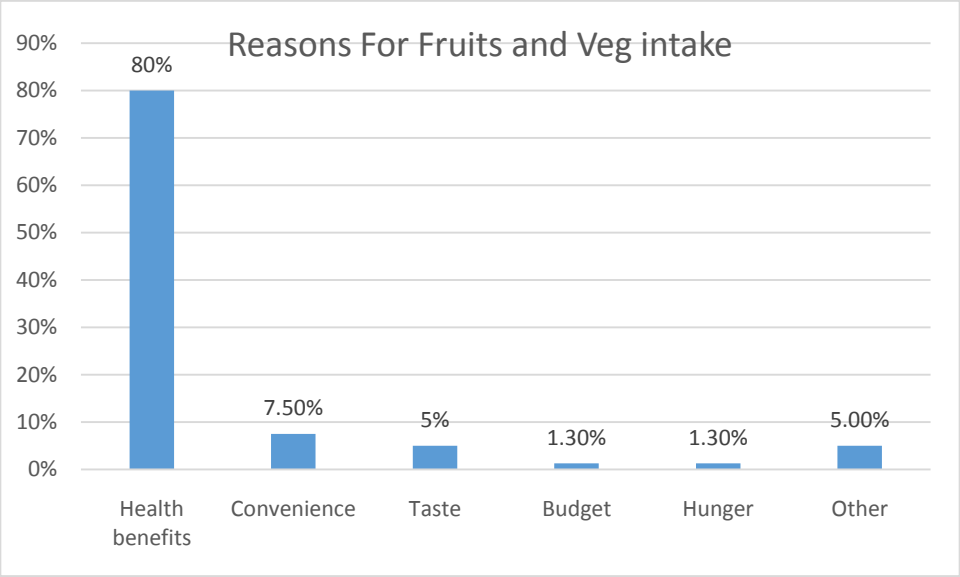
Table 4: BMI, waist circumference and fruit and vegetable index.

BMI (STD.DEV)	4.7038
MEAN	22.939
MINIMUM	15.1
MAXIMUM	38.5
SIGNIFICANCE	0.768
WAIST CIRCUMFERENCE	
SIGNIFICANCE	-0.086

REASONS FOR FRUIT AND VEGETABLES CONSUMPTION:

The main reason students consumed fruits and vegetables was for health benefits. 80% consumed it for health benefits, 7.5% consumed it as it was convenient, 5% consumed it for taste, and 1.3% consumed it as it was affordable, 1.3% consumed it because of hunger and 5% said other.

Figure 2: Bar chart below showing the reasons for fruits and vegetables intake.



DISCUSSION:

It was noticed from the study that fruit and vegetable consumption do differ among nutrition and non- nutrition students. Due to the increased level of education that nutrition students attain they have more understanding of eating healthy and how to prepare fruit and vegetables for consumption whereas non nutrition students lack this knowledge. In Brazil a study conducted among adolescents concluded a result similar to this, it concluded that education level played a role on fruit and vegetable consumption and that intervention effect was successful. (Reith, et al. 2012)

As can be seen from the study, the most common reason that both non-nutrition and nutrition students consumed fruit and vegetable was for health benefits. This indicated in both group that there were some sort of nutritional wisdom. Availability and budget were the two major constraints for persons in these two group for not being able to consume sufficient fruit and vegetable. Budget affected the intake as prices of fruit and vegetable are costly in supermarkets in Trinidad and Tobago. With high prices, it will be less likely for people to purchase fruit and vegetable. Hence availability will be the problem. Living status seemed to affect the intake with persons who are residing on campus as they consumed a significant less amount that those who are at home, those who resides on campus may not have accessibility to consuming fruit and vegetable whereas those students who reside at home may have a parent cook meals which contain fruit and vegetable, therefore availability was a problem again. Lack of preparation was another factor that non nutrition students suffered. Preparation skills were limited in the non- nutrition group of students hence they consumes less. Research done by (Dan J. Graham, 2013) found that students' frequency of purchasing foods/beverages on campus was associated with fruit intake and dietary quality, but was not associated with perceived healthfulness of the campus environment, this finding suggests that factors other than perceived healthfulness, such as convenience, taste, or cost, influence students' decisions about fruit and vegetable consumption.

There was no difference in fruit and vegetable consumption and gender. Similar studies done (Reith, et al. 2012) where both males and females consumed a significant amount of fruit and vegetable and the study concluded that no significant difference were seen among gender. As can be seen from this study done within these two group, gender did not affect the intake.

There was also no statistical differences with respect to BMI and fruit and vegetable consumption. The study population of the University does not support a recent UK based study in which Trinidad and Tobago was ranked the 3rd fattest country in the world with a BMI majority in the overweight range (Bond 2013). The participants in this study were of a healthy sample with the BMI having a range of 23.4 which is within the normal range. Waist circumference showed a significant difference with the consumption of fruit and vegetable. It showed a negative association where one variable, fruit and vegetable intake increased it caused an effect on another variable, waist circumference which decreased. This association was good as waist circumference is a scale or indicator for certain diseases such as obesity and cardiovascular disease.

SOURCES OF ERROR

Sources of error may have occurred for the 7 days fruit and vegetable frequency and the 24 hr recall since individuals may have forgotten what they consumed. The Introduction to Nutrition course was used as an intervention for the nutrition students but no data was obtained on whether the course was failed or passed. The sample size for males was small in this faculty hence the data collected on fruit and vegetable consumption for males may not be applicable to all male students at the University.

RECOMMENDATIONS

i)Students, both nutrition and non-nutrition should consume more fruit and vegetable. Although the nutrition students consumed a little more than the non-nutrition students this still was not sufficient. For their knowledge on eating habits and health is more at an advantage to other members in Geography, Food production and Agribusiness.

ii) Seeing that availability and cost were the main limits or barrier for fruits and vegetables to be consumed, the government of Trinidad and Tobago should work closely with the Ministry of Agriculture to work on matters such as food security so prices of fruits and vegetables can be reduce and there can be more exportation while having a sufficient amount for citizens and have less importation.

iii) Health wise Trinidad and most Caribbean countries are now being observed to have a number of diseases such as cancer, hypertension, obesity and type 2 diabetes. With having the recommended amount of fruits and vegetables per day which is a serving of 4.5 can reduce these risks. Students of UWI need to bring awareness to the public as they are well equipped with students graduating from Human Nutrition and Dietetics, Nutritional sciences and some public health degrees which can all benefit society by bringing awareness to the public of health and diseases. Not only shall they bring awareness to the persons outside of the University but also within themselves. Opening food stalls in the campus such as in the area where the students of FFA have classes so that fruit and vegetable will be readily available for purchase and it should be at a low cost since budget and availability was the major constraints. Also students should be told how to prepare certain fruits and vegetables so that maximum benefits can be obtained to combat these challenges to low fruit and vegetable intake.

CONCLUSION

There was a significant difference between fruits and vegetables intake between nutrition and non-nutrition students. The hypothesis for this may be supported or accepted as p=0.002 hence nutrition students are compared to consume more fruits and vegetables than non-nutrition students. There were no significant difference between genders. There was a significant difference based on who resides on campus or at home and fruit and vegetable consumption. This hypothesis may be supported as p value was 0.04. There were no significant difference between BMI and fruit and vegetable intake however there were an association between waist circumference and fruit and vegetable intake at the 0.1% level. The main reasons for fruits and vegetables consumption between the two groups of students was mainly for health reasons and the major barriers as to what limits them from consuming fruits and vegetables were availability and budget constraints.

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APPENDICIES

Questionnaire that was administered for the survey:

SECTION 1: DEMOGRAPHICS AND BARRIERS TO FRUIT AND VEGETABLES INTAKE.

Please select the response most applicable to you.

Wt_____kg
Ht_____cm
BMI_____
W.C_____

1. **SEX:** Male ( ) Female ( )

2. **AGE**: 18-24yrs ( ) 25-34 yrs ( ) 35-44yrs ( ) 45+ yrs ( )

3. **RACE / ETNICITY:** African ( ) E/ Indian ( ) Chinese ( ) Caucasian ( ) Other ( )

4. **Are you a nutrition student?** Yes ( ) No ( )

   Please note: *Students who are registered in any of the Human Ecology programme (HUEC) are nutrition students. Students registered in Agribusiness, Geography and Food production are non nutrition students. Students who are doing a minor or major in Agribusiness, Geography and Food production along with any HUEC courses are also considered nutrition students.*

5. **Do you think eating fruit and vegetables is important?** Yes ( ) No ( )

6. **Do you like to eat fruit and vegetables?** Yes ( ) No ( )

7. **Living status**: Home □ Renting/Not at Home □

8. **What is the main reason you consume fruit and vegetables?**

   Health Benefits □ Convenience □ Taste □ Budget □ Hunger□

   Other□ Please Specify_____

9. What limits you from consuming more fruit and vegetables? (please tick all that apply)

Availability □ Taste □ Budget/Constraints □ Time □ Appetite □

Family □ Lack of preparation skills □ other _____

SECTION 2: FRUIT AND VEGETABLES FREQENCY.

Please select the response most applicable to you.

1) **During the past 7 days, how many times did you drink 100 % fruit juice such as orange juice, apple juice or grapefruit juice**?
   [ ] never during the past 7 days
   [ ] 1 to 3 times during the past 7 days
   [ ] 4 to 6 times during the past 7 days
   [ ] 1 time per day
   [ ] 2 times per day
   [ ] 3 times per day
   [ ] 4 or more times per day

2) **During the past 7 days how many times did you eat fruits? (Do not count fruit juice)**
   [ ] never during the past 7 days
   [ ] 1 to 3 times during the past 7 days
   [ ] 4 to 6 times during the past 7 days
   [ ] 1 time per day
   [ ] 2 times per day
   [ ] 3 times per day
   [ ] 4 or more times per day

3) **During the past 7 days how many times did you eat green salad?**
   [ ] never during the past 7 days
   [ ] 1 to 3 times during the past 7 days
   [ ] 4 to 6 times during the past 7 days
   [ ] 1 time per day
   [ ] 2 times per day
   [ ] 3 times per day
   [ ] 4 or more times per day

4) **During the past 7 days how many times did you eat potatoes? (Do not count French fries, potato chips and fried potatoes)**

[ ] never during the past 7 days
[ ] 1 to 3 times during the past 7 days
[ ] 4 to 6 times during the past 7 days
[ ] 1 time per day
[ ] 2 times per day
[ ] 3 times per day
[ ] 4 or more times per day

5) **During the past 7 days, how many times did you eat carrots?**

[ ] never during the past 7 days
[ ] 1 to 3 times during the past 7 days
[ ] 4 to 6 times during the past 7 days
[ ] 1 time per day
[ ] 2 times per day
[ ] 3 times per day
[ ] 4 or more times per day

6) **During the past 7 days, how many times did you eat other vegetables? (Do not count green salad, carrots and potatoes).**

[ ] never during the past 7 days
[ ] 1 to 3 times during the past 7 days
[ ] 4 to 6 times during the past 7 day
[ ] 1 time per day
[ ] 2 times per day
[ ] 3 times per day
[ ] 4 or more times per day

YESTERDAY:

1) **Yesterday, how many times did you drink 100% fruit juices such as orange juice, grapefruit and apple juice?**

[ ] 0 times
[ ] 1 time
[ ] 2 times
[ ] 3 times
[ ] 4 times
[ ] 5 or more times

2) **Yesterday, how many times did you eat fruit? (Do not count fruit juice)**

[ ] 0 times
[ ] 1 time
[ ] 2 time
[ ] 3 times
[ ] 4 times
[ ] 5 or more times

3) **Yesterday, how many times did you eat green salad?**

[ ] 0 times
[ ] 1 time
[ ] 2 times
[ ] 3 times
[ ] 4 times
[ ] 5 or more times

4) **Yesterday, how many times did you eat potatoes? (Do not count French fries, fried potatoes or potato chips)**

[ ] 0 times
[ ] 1 time
[ ] 2 times
[ ] 3 times
[ ] 4 times
[ ] 5 or more times

5) **Yesterday, how many times did you eat carrots**?

[ ] 0 times
[ ] 1 time
[ ] 2 times
[ ] 3 times
[ ] 4 times
[ ] 5 or more times

6) **Yesterday, how many times did you eat other vegetables? (Do not count green salad, carrots and potatoes).**

[ ] 0 times
[ ] 1 time
[ ] 2 times
[ ] 3 times

[ ] 4 times
[ ] 5 or more times

SECTION 3: CUP EQUIVALENTS

Please select the response most applicable to you.

1) **About how many cups of fruit (including frozen, canned and dried fruit and <u>100% fruit juice</u>) do you eat or drink each day**?
   [ ] none
   [ ] ½ cup or less
   [ ] ½ to 1 cup
   [ ] 1 to 2 cups
   [ ] 2 to 3 cups
   [ ] 3 to 4 cups
   [ ] 4 or more cups

2) **About how many cups of vegetables (including frozen and canned vegetables and <u>100% vegetable juice</u>) do you eat or drink each day?**
   [ ] none
   [ ] ½ cup or less
   [ ] ½ to 1 cup
   [ ] 1 to 2 cups
   [ ] 2 to 3 cups
   [ ] 3 to 4 cups
   [ ] 4 or more cups

The End.

SPSS syntax and frequencies tables:

```
UNIANOVA

FVindex BY nutr.stu

/METHOD = SSTYPE(3)

/INTERCEPT = INCLUDE

/EMMEANS = TABLES(nutr.stu)

/CRITERIA = ALPHA(.05)

/DESIGN = nutr.stu


FREQUENCIES

VARIABLES=SEX AGE RACE nutr.stu fv_important LIKE LIVE Reason limits_availability Limits_taste Limit_budget

limit_time

limit_appetite limit_family limitlack_of_preparation limit_other drink_friuit eat_fruit eat_green potatoes carrots

other_veg

yestd.drink_juice eat_fruit_A eat_green_salad potatoes_A carrots_A other_vegetables cup.frt cups.veg

/ORDER= ANALYSIS

T-TEST GROUPS=nutr.stu(0 1)
  /MISSING=ANALYSIS
  /VARIABLES=FVindex
  /CRITERIA=CI(.9500).



FREQUENCIES

VARIABLES=BMI /FORMAT=NOTABLE
```

/STATISTICS=STDDEV RANGE MINIMUM MAXIMUM MEAN

/ORDER= ANALYSIS .

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT w.c

/METHOD=ENTER FVindex

FREQUENC TABLES:

SEX

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	27.5	27.5	27.5
	2	58	72.5	72.5	100.0
	Total	80	100.0	100.0	

AGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	67	83.8	83.8	83.8
	2	9	11.3	11.3	95.0
	3	3	3.8	3.8	98.8
	4	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

RACE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	27.5	27.5	27.5
	2	41	51.3	51.3	78.8
	5	17	21.3	21.3	100.0
	Total	80	100.0	100.0	

nutr.stu

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	40	50.0	50.0	50.0
	1	40	50.0	50.0	100.0
	Total	80	100.0	100.0	

f/v important

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	80	100.0	100.0	100.0

LIKE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	15	18.8	18.8	18.8
	1	65	81.3	81.3	100.0
	Total	80	100.0	100.0	

LIVE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	18	22.5	22.5	22.5
	1	62	77.5	77.5	100.0
	Total	80	100.0	100.0	

Reason.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	64	80.0	80.0	80.0
	2	6	7.5	7.5	87.5
	3	4	5.0	5.0	92.5
	4	1	1.3	1.3	93.8
	5	1	1.3	1.3	95.0
	6	4	5.0	5.0	100.0
	Total	80	100.0	100.0	

limits (availability)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	39	48.8	48.8	48.8
	1	41	51.3	51.3	100.0
	Total	80	100.0	100.0	

Limits (taste)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	58	72.5	72.5	72.5
	1	22	27.5	27.5	100.0

	Total	80	100.0	100.0	

Limit (budget)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	50	62.5	62.5	62.5
	1	30	37.5	37.5	100.0
	Total	80	100.0	100.0	

limit (time)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	55	68.8	68.8	68.8
	1	25	31.3	31.3	100.0
	Total	80	100.0	100.0	

limit (appetite)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	71	88.8	88.8	88.8
	1	9	11.3	11.3	100.0
	Total	80	100.0	100.0	

limit (family)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	73	91.3	91.3	91.3
	1	7	8.8	8.8	100.0
	Total	80	100.0	100.0	

limit(lack of preparation)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	55	68.8	68.8	68.8
	1	25	31.3	31.3	100.0
	Total	80	100.0	100.0	

limit (other)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	74	92.5	92.5	92.5
	1	6	7.5	7.5	100.0
	Total	80	100.0	100.0	

drink friuit					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	20	25.0	25.0	25.0

	1	46	57.5	57.5	82.5
	2	5	6.3	6.3	88.8
	3	2	2.5	2.5	91.3
	4	2	2.5	2.5	93.8
	5	4	5.0	5.0	98.8
	6	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

eat fruit					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	13	16.3	16.3	16.3
	1	39	48.8	48.8	65.0
	2	11	13.8	13.8	78.8
	3	7	8.8	8.8	87.5
	4	6	7.5	7.5	95.0
	5	2	2.5	2.5	97.5
	6	2	2.5	2.5	100.0
	Total	80	100.0	100.0	

eat green					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	21	26.3	26.3	26.3
	1	31	38.8	38.8	65.0
	2	13	16.3	16.3	81.3
	3	6	7.5	7.5	88.8
	4	6	7.5	7.5	96.3
	5	2	2.5	2.5	98.8
	6	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

potatoes					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	23	28.8	28.8	28.8
	1	43	53.8	53.8	82.5
	2	9	11.3	11.3	93.8
	3	3	3.8	3.8	97.5
	5	1	1.3	1.3	98.8
	6	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

carrots					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	34	42.5	42.5	42.5
	1	38	47.5	47.5	90.0
	2	5	6.3	6.3	96.3
	4	1	1.3	1.3	97.5
	5	1	1.3	1.3	98.8
	6	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

other veg					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	20	25.0	25.0	25.0
	1	32	40.0	40.0	65.0
	2	18	22.5	22.5	87.5
	3	3	3.8	3.8	91.3
	4	4	5.0	5.0	96.3
	6	3	3.8	3.8	100.0
	Total	80	100.0	100.0	

yestd.drink juice					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	39	48.8	48.8	48.8
	1	26	32.5	32.5	81.3
	2	7	8.8	8.8	90.0
	3	4	5.0	5.0	95.0
	4	3	3.8	3.8	98.8
	5	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

eat fruit					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	26	32.5	32.5	32.5
	1	28	35.0	35.0	67.5
	2	18	22.5	22.5	90.0
	3	5	6.3	6.3	96.3
	5	3	3.8	3.8	100.0
	Total	80	100.0	100.0	

eat green salad

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	46	57.5	57.5	57.5
	1	21	26.3	26.3	83.8
	2	12	15.0	15.0	98.8
	5	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

potatoes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	48	60.0	60.0	60.0
	1	26	32.5	32.5	92.5
	2	4	5.0	5.0	97.5
	3	1	1.3	1.3	98.8
	5	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

carrots					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	51	63.8	63.8	63.8
	1	17	21.3	21.3	85.0
	2	10	12.5	12.5	97.5
	3	1	1.3	1.3	98.8
	5	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

other vegetables					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	31	38.8	38.8	38.8
	1	22	27.5	27.5	66.3
	2	23	28.8	28.8	95.0
	3	3	3.8	3.8	98.8
	4	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

cup.fRUITS					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	11	13.8	13.8	13.8
	1	31	38.8	38.8	52.5
	2	18	22.5	22.5	75.0
	3	12	15.0	15.0	90.0

	4	5	6.3	6.3	96.3
	6	3	3.8	3.8	100.0
	Total	80	100.0	100.0	

cups.vegetables					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	20	25.0	25.0	25.0
	1	26	32.5	32.5	57.5
	2	17	21.3	21.3	78.8
	3	13	16.3	16.3	95.0
	4	3	3.8	3.8	98.8
	6	1	1.3	1.3	100.0
	Total	80	100.0	100.0	