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A Research Paper

Submitted in partial requirements

for HUEC 3012

of

The University of the West Indies

Title: To assess fast food consumption amongst the University of The West Indies Students (19 -30 Years) and to assess possible relationships between obesity and being over weight

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TO ASSESS FAST FOOD CONSUMPTION AMONGST THE UNIVERSITY OF THE WEST INDIES STUDENTS (19 - 30YEARS) AND TO ASSESS POSSIBLE RELATIONSHIPS BETWEEN OBESITY AND BEING OVER WEIGHT

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ABSTRACT

Objective: To assess the students of the University of the West Indies (U.W.I) fast food perceptions, knowledge and consumption practices.

Design: Cross-sectional study.

Setting: The University of the West Indies (UWI).

Methods: Fast food knowledge, perceptions and consumption practices was assessed using a questionnaire. Body Composition Analysis was conducted using the Omron Full Body Sensor (Body Composition Monitor and Scale) HBF-510W . Blood Pressure readings were also collected from the population using a blood pressure machine.

Subjects: One hundred students of the UWI, all selected at random.

Results: There was no association found between gender, blood pressure and frequency of fast food consumption. Students within this population were also found to be knowledgeable on the health effects of fast food (over) consumption. Nonetheless there was a significant increase in weight gain and the frequency of fast food consumption ($<.05$) since commencement of studies. No association was found between frequency of fast food consumption and present weight (R, .002, p=.05).

Conclusion: Social interactions amongst family and friends as well as location of a fast food restaurant are strongly linked to the frequency of fast food consumption amongst students. It was also seen that there has been an increase in weight and level of fast food consumption since attending the University of the West Indies (U.W.I).

CHAPTER 1

INTRODUCTION

BACKGROUND

Research suggests a connection to fast food consumption and being overweight or obese (Duffey et al., 2007; Inagami et al., 2009; Currie et al., 2009). Obesity or being overweight, in the early adult years, is known to generally continue into late adulthood (Duffey et al., 2007). This is indicated by an increase in the participants Body Mass Index (BMI) (Inagami et. al., 2009; Duffey et al. 2007; Hickson et al., 2011). The fast food industry is a key component in forming an obesogenic environment, which is an environment that promotes a high energy intake and discourages physical activity (Nelms et al., 2010, 256). In addition, researchers have shown how the proximity between fast food restaurants and consumers can greatly increase the likelihood of purchase, which can further lead to increased obesity in the population (Currie et al., 2010; Inagami et al., 2009).

A typical meal served at a fast food restaurant are usually found to be high in both total levels of cholesterol, saturated fat and calories (Duffey et al., 2007). These restaurants serve large portions of energy dense food, at low cost, and often provide the consumer with extra options to further increase meal sizes (Nelms et al., 2010). Additionally, eating at fast food restaurants, when contrasted to eating home cooked meals, is correlated with an increase in an individual's body fatness, BMI, and total energy intake; this is especially true for those who rely on it for their food purchase (Inagami et. al., 2009; Duffey et al., 2007; Hickson et al., 2011). One study showed that the location of a fast food restaurant, within one-tenth of a mile of a school, was

associated with an increase of 1.7 percent in fast food consumption. This study shows that an increase in the number of fast food restaurants available can have an impact on a local population's weight levels (Currie et al., 2010).

Studies report that individuals are knowledgeable about at least some adverse health effects caused by the consumption of fast food. However, the taste, texture, and convenience was found to be too appealing to some, hence the (over) consumption (Mc Phail et al., 2011). Many individuals believe there are 'healthier' fast food chains and 'good' and 'bad' foods within these restaurants (Mc Phail et al., 2011). As such, individuals will consume the fast food they perceive to be 'healthier', regardless of the fact these products may not promote true healthy eating.

There also appears to be a connection between gender and the likelihood of fast food consumption. It was suggested that women consumed more fruits and vegetables and were more likely to have healthier food consumption patterns when compared to males who were more likely to consume soft drinks and eat unhealthily (Valerie et al., 2012). However, another study suggests that stress sensitivity may propel females to over consume a particular fast food which could lead to obesity (Pankevich and Bale 2008).

There are various adverse health effects for being overweight or obese. These include high blood pressure, type 2 diabetes, breathing problems, lipid abnormalities, arthritis, cancer, reproductive disorders, premature death and others (Nelms et al., 2010, 253).

RATIONALE

This study was conducted to assess fast food consumption practices amongst University of the West Indies (UWI) students, and to determine if there was any relationship between consumption of this type of food and overweight and/or obesity.

Within two decades, there has been a rapid increase of almost 400% in obesity rates within the Caribbean (Henry, PAHO; Xuereb et al. 2001). It has now become the most important underlying cause of death within the region (Henry, PAHO; Henry 2007, 2). Obesity poses a threat to public health by increasing chronic diseases (cardiovascular disease, hypertension, type 2 diabetes and cancer), which in turn increases healthcare spending throughout the Caribbean (Henry 2007; CARICOM Secretariat 2007). Studies conducted by the World Bank suggest obesity prevalence has increased, due partly to globalization and urbanization, both of which contribute to an increase in fast food consumption (Celia, 2011; CARICOM Secretariat 2007). Despite such an epidemic where almost half of the Caribbean adult population is overweight (Henry, PAHO), there still seems to be a rapid increase in obesity and overweight rates. Assessment in various Caribbean countries have found that 7-20% of males and 22-48% of females over 15 years of age exceed 120% of their BMI (Xureb et al. 2001; CARICOM Secretariat 2007).

A study conducted in 2007 by Ramdath (2011) in conjunction with the Caribbean Food and Nutrition Institute (CFNI/PAHO) provided a national nutrition survey on a representative sample of the Trinidad and Tobago population. It found that 20% of the participants were obese (BMI $>30kg/m^2$) and an additional 45% were overweight (BMI $>25kg/m^2$). Additionally a study by Hilaire (2010) on full-time UWI employees found that the prevalence of high waist circumference was 36%, with approximately 20% regarded as being obese. According to the World Health Organization (WHO), Trinidad and Tobago is ranked as the 20th fattest country in the world based on BMI (InfoPlease 2007).

Unfortunately, there are few data sets which give a representative and thorough analysis of obesity and overweight in relation to fast food consumption in Trinidad and Tobago. There have been no studies conducted in University students, in relation to

overweight or obesity, nor have any data sets been collected or analyzed on students' body fatness and consumption patterns in relation to weight. The goals of this report were focused on the students' nutritional habits and as well as frequency of fast food consumption. With such a rapid increase of obesity within the Caribbean, possible causes should be evaluated. Information collected in this report may be used for future research which may help in the development of strategies for the prevention and management of overweight and obesity in Trinidad and Tobago.

PROBLEM STATEMENT

There has been a rapid increase of almost 400% in obesity rates within the Caribbean (Henry, PAHO; Xuereb et al. 2001). The alarming increase in obesity within the Caribbean can be linked in part to current trends in globalization which have spawned an increase in the fast food industry throughout the West Indies (Houston, 2005). Obesity and overweight can lead to chronic diseases such as hypertension, type 2 diabetes, cancer, asthma, sleep apnea, reproductive complications, cardiovascular disease, and arthritis (Nelms et al., 2010, 253). In addition to the negative results which fast food consumption can have on personal health and wellbeing of individuals, widespread unhealthy eating habits can also have many negative externalities on society as a whole.

A regional increase in body weight will in turn cause a regional increase in chronic health conditions, imposing a greater strain on society through increased healthcare spending and decreased productivity in the working force. A study conducted in the United States showed that the total estimated healthcare cost to address illnesses related to poor eating habits was approximated at $147 billion (Finkelstein et al. 2009).

Thus, this research paper will ask by way of sampling of the local student body at U.W.I.: Is there a relationship between consumption of fast food, its location, and being obese or over weight?

OBJECTIVES

The specific objectives of this study were to:

1. Assess factors that may contribute to fast food consumption amongst U.W.I students.

2. Assess the association between the frequency of fast food consumption and current weight.

3. Determine if there has been a significant increase in weight since commencing University.

4. Determine if there has been an increase in fast food consumption since starting UWI.

5. Assess the students' knowledge on fast food consumption.

6. Determine if a relationship exists between gender and fast food consumption.

7. Determine if a relation exists between the location of the fast food restaurant and consumption.

8. Assess the association between the frequency of fast food consumption and blood pressure.

HYPOTHESIS

It was hypothesized that:

1. There would be various factors that contribute to fast food consumption amongst U.W.I students.

2. There is an association between the frequency of fast food consumption and current weight.

3. There has been an increase in weight gain since attending University.

4. There has been an increase in fast food consumption since attending UWI.

5. Students will have some knowledge about fast food consumption.

6. There will be no difference between the levels of fast food consumption between genders.

7. Fast food will be consumed more frequently on campus than off campus due to its close proximity to the student body.

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8. There is an association between fast food consumption and blood pressure.

KEYWORDS

For the purpose of this study, these terms were used throughout the research. These are definitions appropriate to the purpose of this research project.

Body Mass Index (BMI): weight in kilograms divided by height in meters squared (BMI = kg/m^2). BMI correlates well with estimates of body composition (Nelms et al., 2010)

Obesity: An excess of body fat or adipose tissue. Obesity is generally defined as a BMI =/> 30 (Nelms et al., 2010).

Overweight: An excess of body weight in relation to height; for adults, overweight is generally defined as a body mass index or BMI of 25.0 to 29.9 (Nelms et al., 2010).

Obesigenic Environment: One which promotes weight gain and the development of obesity by encouraging consumption of energy (Nelms et al., 2010)

CHAPTER 2

LITERATURE REVIEW

Studies have found that consumption of fast food is directly related to an increase in body weight and obesity in the general public. Global studies have sought to find a correlation between fast food consumption and the location and availability of fast food restaurants. The availability of fast food can be seen as the number of restaurants in proximity to a population, the ease of access, the low cost of each meal (with additional options to increase the meal size for a minor fee), and the relatively short preparation time required to produce each meal. Health risks related to fast food consumption (and over-consumption) have been well established in a number of studies, which in turn have shown the types of risks involved. Many of these health risks are the by-product of being overweight and obese. Obesity and health related issues, which originate from unhealthy eating habits, can have a substantial impact on healthcare spending. Numerous research articles have linked many diseases with being overweight and obese. The types of diseases span a broad range from hypertension to cancer and have been proven to increase healthcare spending in many developed countries. Obesity in the developed world, according to some studies, has been labelled an epidemic, which has also begun to emerge in the developing world as well. Many of these studies attribute this global increase in obesity with the proliferation of the fast food industry.

Food consumed in today's society is fast, easily accessible, and satisfies individuals in a relatively short period of time, hence the term *fast food* (Popkin 2006; Yardimci et. al., 2012). It is 'prepared and served quickly, designed for ready availability, use, or consumption and with little consideration given to quality or significance' (Merriam-Webster, 2003). Fast foods are extremely high in sugar, sodium, cholesterol,

energy density and fat; especially trans fatty acid but low in vitamins and dietary fibre (Azadbakht et. al., 2008; Yardimci et. al., 2012).

Studies further suggest that consumption of these foods poses the risk of energy imbalances which would cause an increase in related obesity levels and other diseases such as cardiovascular and cancer, due to their high levels of saturated and hydrogenated fats, salt content and empty calories (Agger 2011; Popkin 2006).   These findings were confirmed when popular foods eaten by consumers were analyzed by different dietary bodies. This yielded the following results: A 6" subway sandwich ranged from 280-860 g calories, 4.5 g-42 g fat and 1200 mg 2480 mg sodium. A 6" Blimpie sandwich contains between 430-640 calories, 14-41 g fat and 980-1440 mg sodium. A Burger King Sandwich rages from 470-800 calories, 18-46 g fat and 1100-1640 mg sodium. A large fries may contain 1474 calories 1474 calories, 71 g fat, 213 mg sodium. A Kentucky Fried Chicken Meal without side orders may contain between 279 - 1137 calories, 16.9 - 54.8g of fat and 280mg - >2000mg sodium. Doubles, which are a Trinidadian delight, would be classified as fast food based on the definition given. Contained in one doubles is: 345 calories, 12 g fat and 998-1000 mg sodium (fitnesspal 2005; nutracheck 2005; nutrition data 2012).

The idea of availability and consumption was supported by Popkin (2006) where it was proposed that the global shift in increased energy density in easily accessible foods contributed as a factor to the rise in obesity levels. Additionally, Crawford and Jeffery (2005) acceded that it has been 'shown experimentally that portion size has a significant impact on food consumption in single meal settings'. It has also been proven that foods that are highly energy dense less costly if analyzed in relation to calorie and are less costly than healthy ones. This has been suggested as the reason for the wide use of fast foods (Azadbakht et. al., 2008). A research paper published for the American Economic

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Journal established how the availability of fast food can relate to obesity levels. According to the report it was found that 'the presence of a fast food restaurant within one-tenth of a mile of a school is associated with at least a 5.2 percent increase in the obesity rate in that school' (Currie et al., 2010). Availability of fast food is further increased by offering large portions of food for a relatively low cost. Crawford and Jeffery (2005) stated 'These outlets generally engage in food promotion practices that may offer 'larger portion sizes for small increases in price' or at other times no increase at all'. Not all research has come to the same conclusion, Jeffery et al., (2006) published in a paper, the International Journal of Behavioral Nutrition and Physical Activity; it was reported that poor eating and exercise habits among children showed an association with higher BMI, however, the study was unable to draw any relationship between availability (proximity) and BMI.

Obesity and excess body weight has become a major public health issue over the past two to three decades. Obesity is defined as a 'proportion of body weight that is adipose tissue (percent body fat) that is greater than some standard' (Nelms et. al., 2007). Whereas, overweight is 'an excess of body weight in relationship to height' (Nelms et. al., 2007). Body Mass Index (BMI) which is an individual's weight in kilograms divided by height in meters squared (BMI = weight/height^2) is used as an acceptable measure of excessive weight and obesity (Crawford et. al., 2005).

The standard classification of BMI given by the World Health Organization (WHO) is as follows: underweight: <18.5 kg/m^2; healthy weight: 18.5 to 24.9 kg/m^2; overweight: 25.0 to 29.9 kg/m^2; obesity (class 1) :30.0 to 34.9 kg/m^2; obesity (class2): 35.0 to 39.9 kg/m^2; extreme obesity (class 3): ≥ 40.0 kg/m^2. A study by Shroeder et. al., (2007) proposed that 'BMI increased with the amount of fast food consumed.' The study concluded that 'frequent fast food consumption was directly related to BMI and the risk of

obesity'. Additionally a 'significant direct relationship between obesity and frequency of fast food consumption' was reported. Mahan et. al., (2008), establish that a BMI of 25 or greater predicts a higher risk of death. This was further supported when Shroeder et. al., (2007), reported 'the consumption of a product from a fast food outlet more than once per week increased the risk of being obese by 129% in comparison with no consumption'.

Excessive weight has become a chronic non-communicable disease which has begun increasing at an alarming rate throughout the world in both developing and developed nations (Crawford et. al., 2005; Popkin 2006; WHO 2010). According to WHO, in 2008 more than 1.4 billion adults were classified as overweight and 500 million were considered to be obese (WHO, 2010). In the Caribbean, obesity rates have grown by 400% within two decades (Henry, PAHO; Xuereb et al. 2001) and in Trinidad and Tobago, between 1980 and 2008, the average BMI has increased by nearly 10% (WHO, 2011).

Health consequences of being overweight and obese include type-2 diabetes, fatty liver disease, hypertension, myocardial infarction, stroke, gout, osteoarthritis, colon cancer, ovarian cancer, amongst others (Mahan et. al., 2008; Crawford et. al, 2005; Agger 2011). Furthermore, it is evidenced that obesity increases the incidence of lower back pain, sleep apnea and shortness of breath. Additionally, it contributes to psychological and social burdens such as reduced mobility and a poorer quality of life (Crawford et. al., 2005). In Janghorbani et al., (2007), it was proposed that the most prevalent condition associated with obesity is diabetes, which seems to grow proportionally in obese patients.

Obesity and excessive body weight are both related to an increase in blood pressure, also referred to as hypertension. According to a paper from North Carolina State University (NCSU xxxx) 'hypertension is found to be twice as common amongst

overweight persons as compared to those of normal weight' and that 'high blood pressure can be influenced by ones weight thus increasing ones predisposal to diseases associated with being overweight and obesity such as hypertension'. A high salt intake also increases the risk of developing hypertension. Fast foods generally contains a higher than required salt/sodium content (Agger 2011; Popkin 2006). A correlation study done by Spearman found a moderate relationship between frequent fast food consumption and hypertension. Furthermore, researchers at the Harvard Medical School agree there is a 'direct relation between ones intake of sodium and blood pressure although it is not exactly clear how it works' (Harvard Medical School 2010).

The American Heart Association has five blood pressure categories: normal has a systolic and diastolic pressure of < (120/80); pre-hypertensive (120-139/80-89); hypertension stage 1 (140-159/90-99); hypertension stage 2 ≥ (160/100); hypertension crisis > (180/110). The systolic pressure measures the pressure within the arteries as the heart beats. It is a major risk factor for cardiovascular disease due to stiffness within the arteries and plaque buildup. In today's society, a blood pressure reading of 120/80 is deemed to be pre hypertensive (NCSU). According to the American Heart Association, a blood pressure reading regarded as normal should be less than 120/80 mm Hg (less than 120 systolic AND less than 80 diastolic) for an adult age 20 or over'. In addition, it was noted that 'about one in three (33.5%) U.S. adults have high blood pressure'(AHA, 2013).

Studies have also shown a direct link between level of sodium intake and an increase in blood pressure levels. Health care professionals recommend a sodium intake between 1500 and 2300 milligrams, however a sodium is easily accessible through the consumption of processed foods which would accounts for 75 percent of the average person's sodium intake (NSCU). Research from Harvard Medical School states salt as an overlooked nutrient that is related to more than 100 000 deaths of Americans. This

nutrient is most times hidden away in processed foods which are consumed in great amounts in today's society. This is seen in the average American consuming 55 percent more of their salt intake compared to that of 1980 (HMS 2010).

Fast food consumption amongst students has also been examined. There were varying reported variables for fast food consumption amongst university students. These included 'limited time', 'convenience', 'enjoy taste' and 'inexpensive' and economical' (Morse et. al., 2009). The study conducted by Yardimci et. al., (2012) found that 'students ranked factors for their consumption of fast food from most important as 'easy access (28.5%), University life (26.2%) and taste (22.9%).' Additionally, it was found that students who resided at the family home had better eating habits than those who lived away from home as they were more likely to develop unfavourable eating habits such as increased fast food consumption (Papadaki et. al., 2007).

Research has also suggested that there may be gender differences between the level of fast food consumption and portion sizes. A study conducted by Driskell et. al., (2006) using a questionnaire, (developed to assess the frequency of meals consumed at fast food restaurants amongst a group of college students), based on sex and the factors influencing their eating habits found that men (84%) consumed more fast food than women (58%). Men were also reported to consume more high-calorie, high fat, and fast foods than women (Juang et al., 1994). One possible reason for this discrepancy may relate to how women may view fast food consumption as more of a social event. One study found that 'women (34%) as compared to men (13%) reported eating with family and friends as a fundamental reason for eating out at fast food restaurants' (Driskell et. al 2006; Morse et. al., 2009). Driskell (2006) also reported that 'women (53%) were more concerned with portion size than men (50%)'. However, in a contrasting study by

Yardimci et. al., (2012), it was found that 'fast-food consumption frequency did not differ in respect to gender (p >0.05).'

About one-third of total energy intake is derived from fast food consumption amongst the US population, as reported by Shroeder et. al., (2007). Due to this association, 'excessive weight and an overall low diet in children, adolescents and adults was reported as contributing to this excess in weight' (Shroeder et. al., 2007). However, Rosenheck (2008) found the association between fast food consumption and weight gain to be unclear. It was believed that ' few large epidemiological studies have been conducted in order to prove this potentially deleterious association' (Rosenheck, 2008). A study conducted by Ebbling et. al., (2004), raised the question 'if most children eat fast food regularly, why do some become overweight, whereas others do not?' It was hypothesized within this study that adolescents who regularly consumed fast food and did not gain additional weight compensated for the excessive energy provided by these foods by decreasing energy intake throughout the day (Ebbling et. al., 2004). The study concluded that overweight adolescents were less likely to compensate for their excessive energy intake than adolescents who were lean.

Aside from health risks to individuals, another consequence attributed to obesity is increased healthcare spending. In a report published online, Finkelstein et. al (2009) estimated that 'obesity is responsible for almost $40 billion of increased medical spending through 2006, including $7 billion in Medicare prescription drug costs'. The article also showed the relative cost obesity when compared to that of a person with normal weight; 'Across all payers, per capita medical spending for the obese is $1,429 higher per year, or roughly 42 percent higher, than for someone of normal weight'. The same publication concluded that 'the connection between rising rates of obesity and rising medical spending is undeniable.' Finkelstein et. al (2009).

A web publication from Laval University compared healthcare costs (across Western countries) with Obese BMI levels and found that the total expenditures to be anywhere from 2-8% of the total healthcare budget. (LU, xxxx).

A global trend seems to be emerging where regions with larger fast food industries are also exhibiting increases in consumption, obesity, and healthcare spending. Studies conducted by Shroeder et. al., 2007, Papadaki et al., (2007), Driskell et. al., (2006) and Morse et. al., (2009) amongst others has contributed fundamentally to the understanding and relationship between fast food consumption, obesity and being overweight. In addition, health issues have been attributed to obesity over a large number studies, and in turn have been shown to dramatically increase health spending.

CHAPTER 3

METHODOLOGY

SUBJECTS/PARTICIPANTS

Students from the University of the West Indies (U.W.I.) between 19 - 30 years of age (excluding pregnant women) were asked to participate in this research project. A total of 100 questionnaires were given; fifty (50) to males and fifty (50) to females. Body composition analysis and blood pressure was administered on all participants. The participants of this study were of a mixed ethnicities (African/Black (62%), East Indian (18%) and Mixed (20%).

DESIGN

A cross-sectional study was utilized for the purpose of this research. Students were selected at random at the University of the West Indies to have their blood pressure and height taken as well as complete a questionnaire. Weight gain was the dependent variable for this study whereas the fast food consumption was the independent variable.

The control used in this study was primarily based on age. Participants had to be at least 19 years old but no more than 30 years old. Also women, who may be or were pregnant, were excluded from this study. The factors used within this study were unmatched.

PROCEDURE

Students between the ages of 19-30 were asked to participate in this research project. All the students were at least 19 years of age; therefore, no form of written

consent was used in this study. The purpose and procedure of the study was thoroughly and adequately explained to students before administration of any form of data collection.

Students' blood pressure was first taken after they remained seated for 5 minutes. Three blood pressure readings were taken in total then the average was calculated for the purpose of this study. Height was then measured without footwear and a questionnaire administered. Upon completion of the questionnaire their body fat percentage, visceral fat, body mass index (BMI), skeletal muscle and body weight were analyzed using the Omron Full Body Sensor (Body Composition Monitor and Scale), model HBF-510W.

Upon completion of each analysis, the results were recorded on the 'Understanding Your Measurement Results' form, where it was explained and nutrition counseling given where necessary. Questions were then answered when presented by students.

The questionnaire consisted of 30 questions (close and open ended), section A (blood pressure and height) and section B (Body Composition Analysis). Included in the questionnaire were four (4) demographic questions, ten (10) frequency of consumption questions, four (4) perception questions, six (6) knowledge questions, five (5) weight questions and section A & B on blood pressure, height and body composition analysis. The University of the West Indies (UWI) students below 19 years of age, above 30 years and/or pregnant were excluded from this study.

STATISTICAL ANALYSIS

Data within this study were analyzed using the Statistical Package for Social Sciences (SPSS), Version 17 computerized program for windows. Statistical analysis for this study was evaluated at the 0.05 level of significance. Descriptive statistics was employed in the analysis of students' knowledge. Paired t-test was used in the analysis of

increase in weight, and increase in consumption of fast food amongst the sample. The difference between gender and fast food consumption was analyzed using the Independent samples t-test.. Regression Analysis was used in the analysis of factors contributing to fast food consumption and the frequency of fast food consumption in relation to weight. Additionally, bivariate correlation was used to determine the relationship between location and frequency of consumption..

RESULTS

<u>Table 1:</u> Assess possible factors that contribute to fast food consumption amongst the University of the West Indies (UWI) students.

On average how many times do you consume fast food each week?

		Sum of Squares	df	Mean Square	F	Sig.
Portion Size	Between Groups	17.980	3	5.993	3.041	**.033**
	Within Groups	183.278	93	1.971		
	Total	201.258	96			
Environment	Between Groups	.109	1	.109	.052	**.820**
	Within Groups	202.421	96	2.109		
	Total	202.531	97			
Fast Service	Between Groups	4.291	1	4.291	2.078	**.153**
	Within Groups	198.240	96	2.065		
	Total	202.531	97			
Price	Between Groups	1.291	1	1.291	.616	**.434**
	Within Groups	201.239	96	2.096		
	Total	202.531	97			
Taste	Between Groups	.985	2	.492	.232	**.793**
	Within Groups	201.546	95	2.122		
	Total	202.531	97			
Age	Between Groups	5.456	3	1.819	.867	**.461**

	Within Groups	197.075	94	2.097		
	Total	202.531	97			
Inability to Cook	Between Groups	3.757	1	3.757	1.814	**.181**
	Within Groups	198.774	96	2.071		
	Total	202.531	97			
Social Interactions	Between Groups	20.891	2	10.446	5.971	**.004**
	Within Groups	160.941	92	1.749		
	Total	181.832	94			
Ethnicity	Between Groups	8.847	2	4.423	2.353	**.101**
	Within Groups	172.985	92	1.880		
	Total	181.832	94			

Based on the table shown above, there is a significant association (p<0.05) between social interactions and the frequency of fast food association. However there was no significant association with other possible factors (p=>.05).

Table 2: To assess the association between the frequency of fast food consumption and current weight.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.002[a]	.000	-.010	34.06372

a. Predictors: (Constant), On average how many times do you consume fast food per week?

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	.409	1	.409	.000	.985[a]
	Residual	111392.352	96	1160.337		
	Total	111392.761	97			

a. Predictors: (Constant), On average how many times do you consume fast food per week?

b. Dependent Variable: weight

a. Dependent Variable: weight **Coefficients[a]**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	158.854	7.699		20.632	.000
On average how many times do you consume fast food per week?	-.045	2.394	-.002	-.019	.985

The tables above indicates that there is no relationship between frequency of fast food consumption and current weight, (p= <.05). Fast food consumption and present weight is negatively correlated with a downward change.

Table 3: To determine if there has been a significant increase in weight since commencing the UWI.

PAIRED SAMPLES STATISTICS

	MEAN	*N*	*STD. DEVIATION*	*STD. ERROR MEAN*
If yes, state	150.7000	60	36.31375	4.68808
weight	160.3000	60	32.77396	4.23110

PAIRED SAMPLES CORRELATIONS

	N	*CORRELATION*	*SIG.*
weight before UWI & weight	60	.878	.000

PAIRED SAMPLES TEST

	PAIRED DIFFERENCES			95% Confidence Interval of the Difference		t	df	Sig. (2 tailed)
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
weight before UWI - weight	-7.86333	16.90542	2.18248	-12.23047	-3.49620	-3.603	59	.001

Based on the tables shown above, there is a significant difference (p<0.05) in weight since commencing

U.W.I. This shows there has been a significant increase in weight since attending the U.W.I.

Table 4: To determine if there has been a significant increase in fast food consumption since starting UWI.

PAIRED SAMPLE STATS

	MEAN	N	STD. DEVIATION	STD. ERROR MEAN
On average how many times do you consume fast food per week?	2.8776	98	1.44497	.14596
Before attending UWI how often did you consume fast food?	1.3469	98	.99589	.10060

CORRELATION of PAIRED SAMPLES

	N	Correlation	Sig.
On average how many times do you consume fast food per week? & Before attending UWI how often did you consume fast food?	98	.295	.003

PAIRED SAMPLES TEST

	PAIRED DIFFERENCES					t	df	Sig. (2 tailed)
	Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
On average how many times do you consume fast food per week? - Before attending UWI how often did you consume fast food?	1.53061	1.49366	.15088	1.23115	1.83007	10.144	97	.000

Based on the tables shown above, there is a significant difference (p<0.05) in the level of fast food consumption before and after commencement of UWI. The results show an increase in consumption since attending U.W.I.

Objective 5: STUDENT'S KNOWLEDGE

Figure 1: 'What are calories?
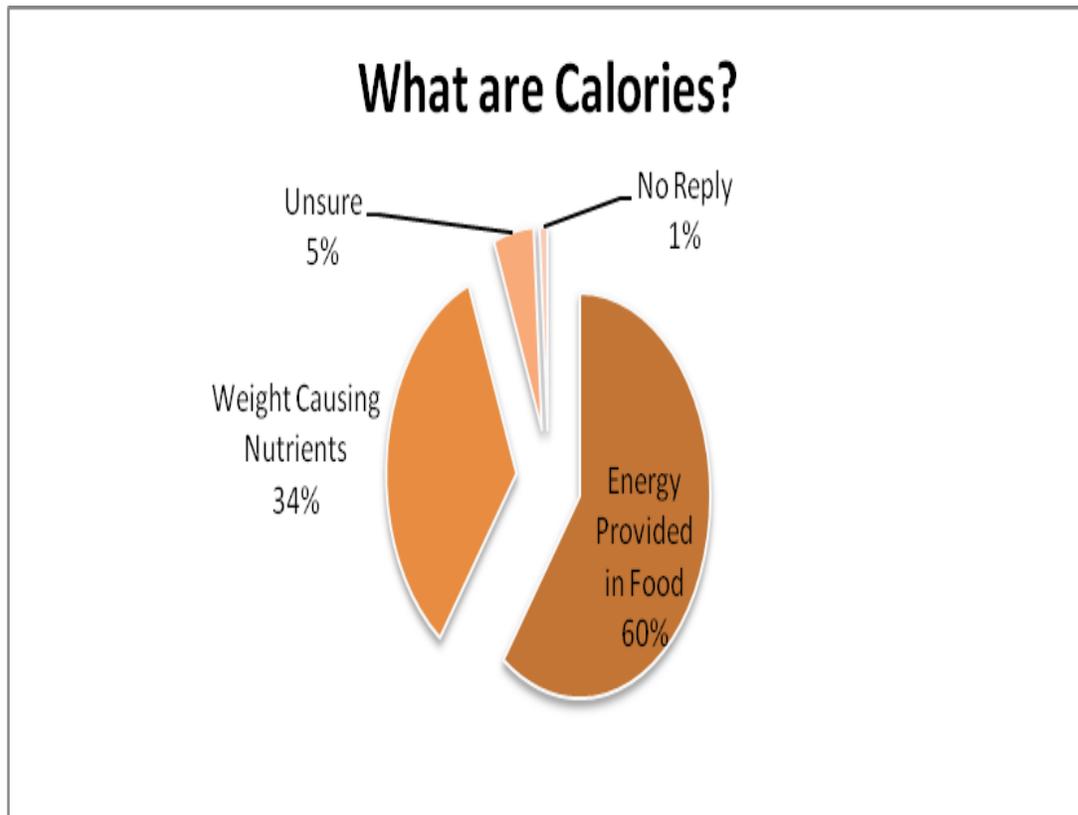
Figure 1 shows 60% of students thought 'calories' to be "energy provided by food" while 34% defined it as 'weight causing nutrients". Of the respondents, 5% were unsure and 1% o provided no answer.

Figure 2: What is a serving size?
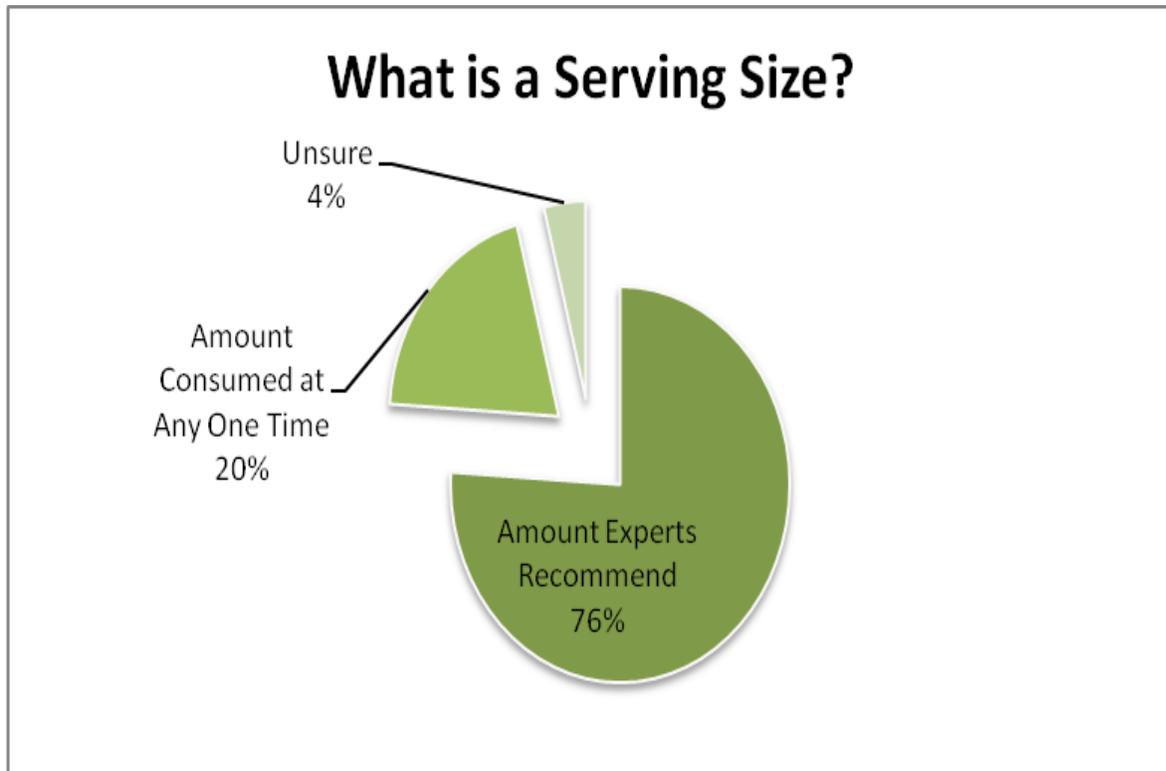
Figure 2 shows 76% of students thought serving size to be "amount experts recommend" while 20% defined it as 'amount consumed at any one time". Four percent (4%) of the respondents were unsure of what is a serving size.

Figure 3: **Calories in a Regular Box of KFC**
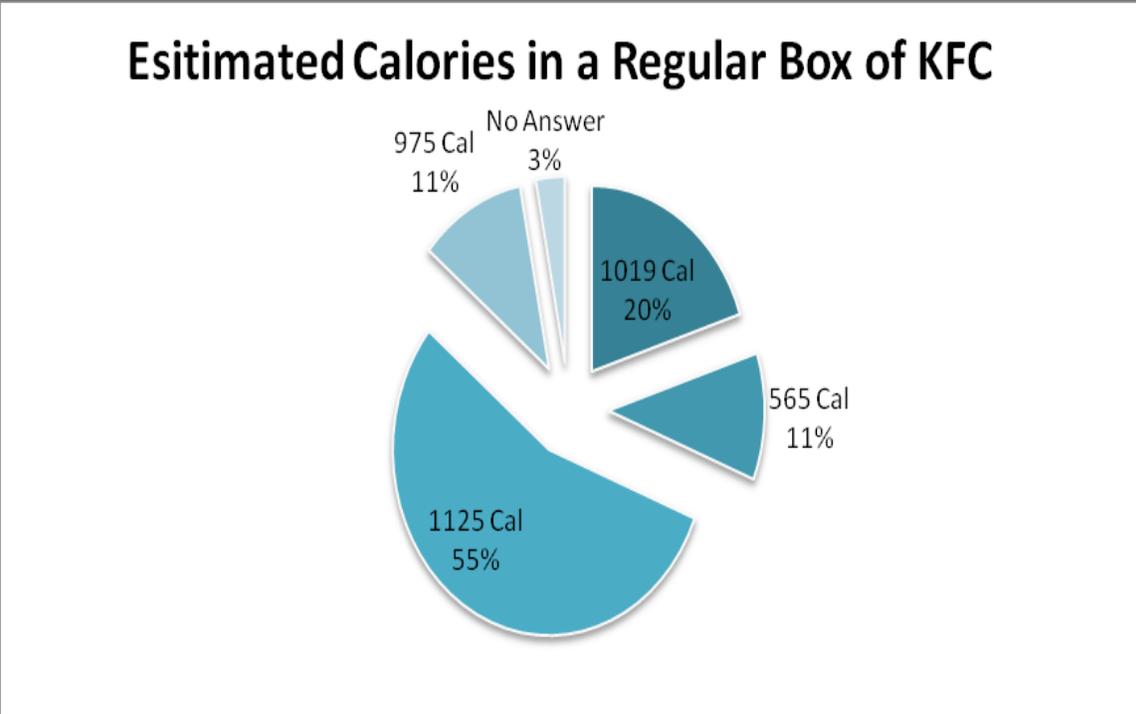
Figure 3 shows that the majority of the population (55%) estimates a regular box of KFC to have 1125 kcal. Twenty percent (20%) estimated it at 975kcal while 11% estimated it at 975kcal and 565kcal. Of the respondents, 3% gave no answer.

Figure 4: Fast Food Composition
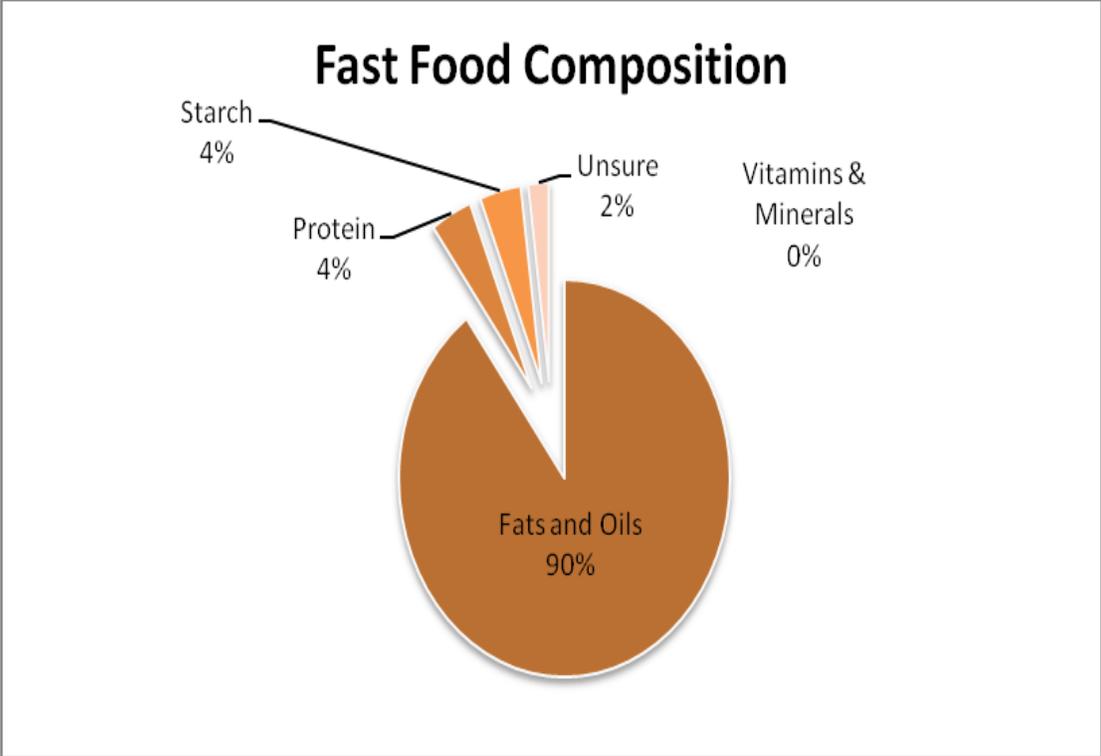
Figure 4 shows that majority (90%) of the population believed fast food to be composed of mainly fats and oils. Four percent (4%) believed it was composed of starch as well as protein. While no one believed vitamins and minerals were a main component of fast foods, 2% were unsure of a response.

Figure 5: Are there Diseases Associated with Fast Food Consumption?
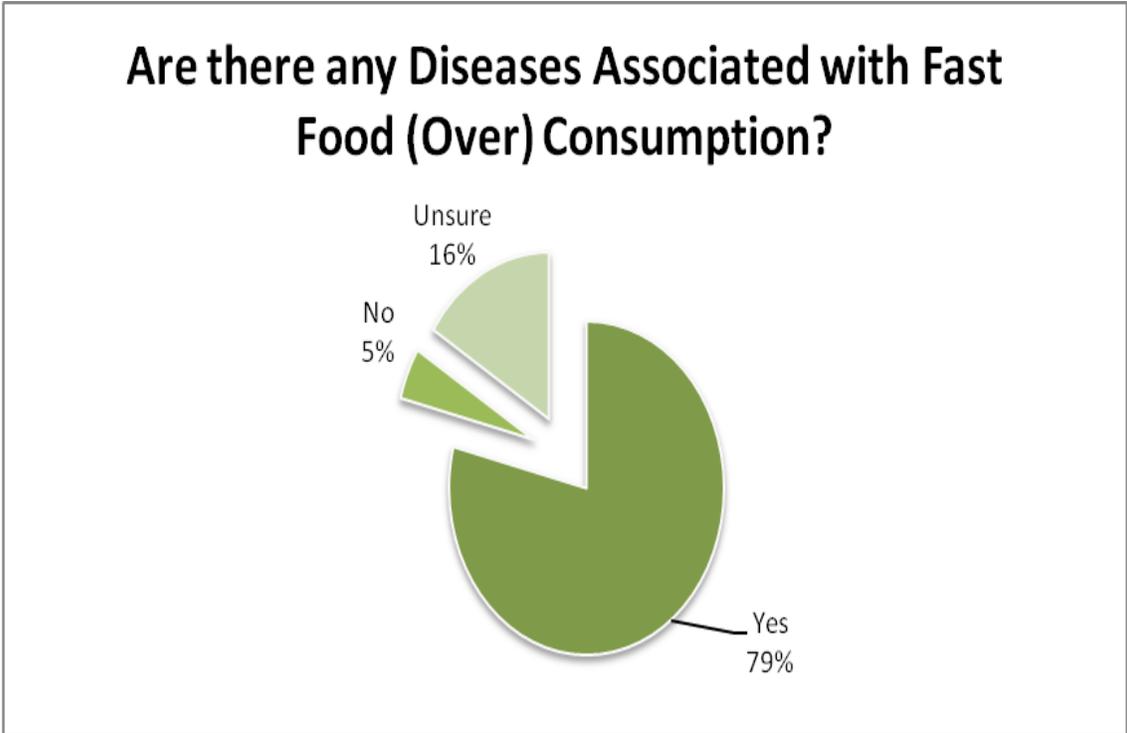
Figure 5 shows 79% reported there are diseases associated with the (over) consumption of fast food. A

further 5% believe there was no association and 16% was unsure.

Figure 6: Students Responses to Possible Adverse Health Effects
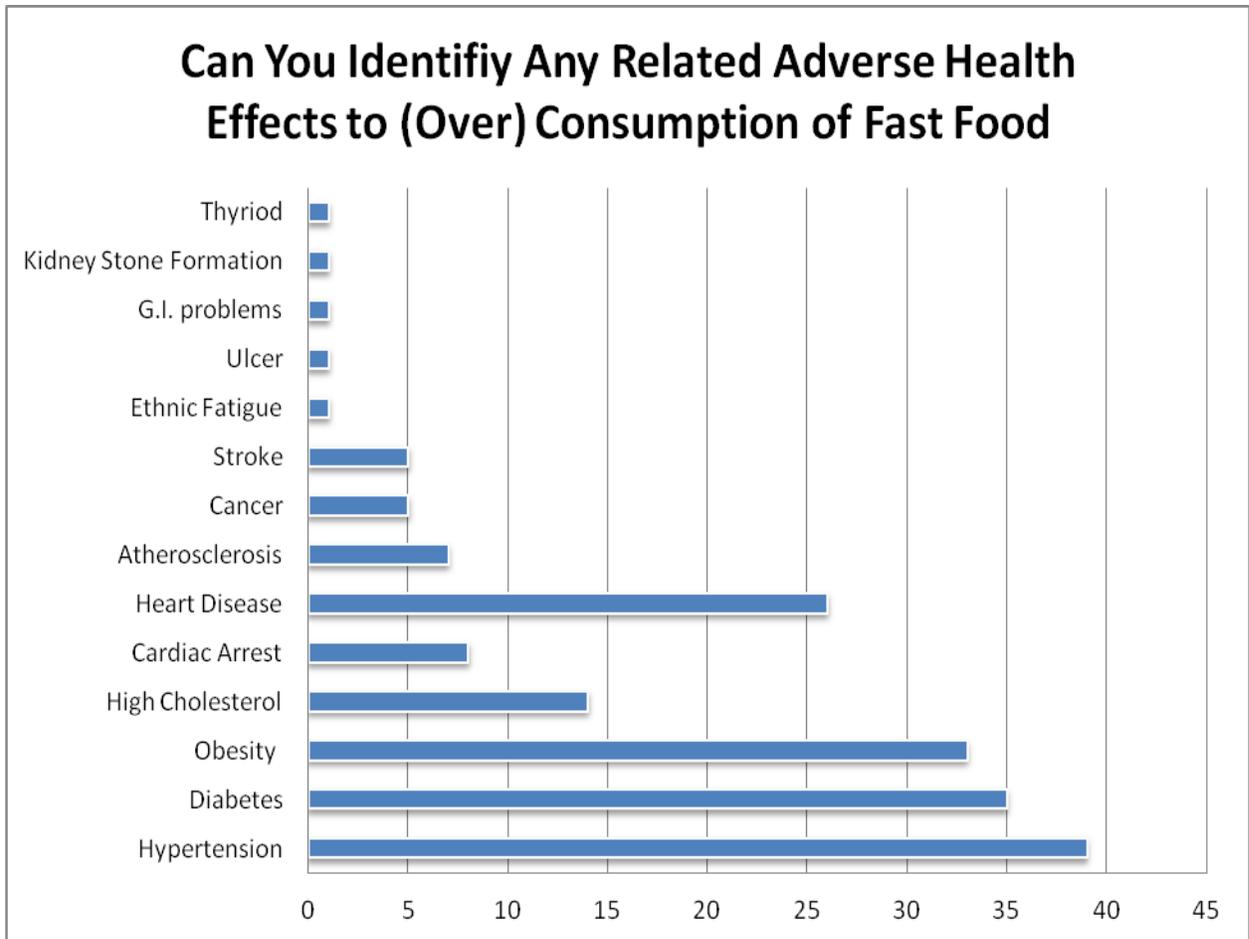
Figure 6 shows students responses given on possible diseases they believe can result, in relation to (over) consumption of fast food. Most students (40) associated over consumption of fast food with Hypertension. A further 35 and 33 related it to Diabetes and Obesity, respectfully. As well, 26 identified heart disease as a risk factor. High cholesterol (14), Atherosclerosis (7), Stroke and cancer (5) were the next highly ranked adverse health effects of (over) consumption.

Table 5: Determine if there is a difference between gender and fast food consumption.

<p align="center">Group Statistics</p>

	Gender	N	Mean	Std. Deviation	Std. Error Mean
On average how many times do you consume fast food per week?	Male	49	3.0816	1.55237	.22177
	Female	49	2.6735	1.31320	.18760

		Levene's Test for Equality of Variances		t-test for Equality of Means							
										95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
On average how many times do you consume fast food per week?	Equal variances assumed	1.775	.186	1.405	96	.163	.40816	.29047	-.16842	.98475
	Equal variances not assumed			1.405	93.432	.163	.40816	.29047	-.16862	.98495

Based on the tables above, the Levene's test >.05 indicates there is equal variances between both genders.

The t-test (.163) signifies there is no difference in means.

Table 6: Determine the relationship between the location of the fast food restaurant and consumption.

Descriptive Statistics			
	Mean	Std. Deviation	N
Where do you usually consume fast food	1.4141	.57161	99
On average how many times do you consume fast food per week?	2.8776	1.44497	98

Correlations

		Where do you usually consume fast food	On average how many times do you consume fast food per week?
Where do you usually consume fast food	Pearson Correlation	1	-.312[**]
	Sig. (2-tailed)		.002
	N	99	97
On average how many times do you consume fast food per week?	Pearson Correlation	-.312[**]	1
	Sig. (2-tailed)	.002	
	N	97	98

There was a significant positive relationship between frequency of fast food consumption and the location of it (r =.002).

Table 7: Assess the association between the frequency of fast food consumption and blood pressure.

Correlations

			On average how many times do you consume fast food per week?	blood pressure
Spearman's rho	On average how many times do you consume fast food per week?	Correlation Coefficient	1.000	.080
		Sig. (2-tailed)	.	.436
		N	98	98
	blood pressure	Correlation Coefficient	.080	1.000
		Sig. (2-tailed)	.436	.
		N	98	100

Based on the table shown above, Spearman (rs <1) signifies a moderately low relationship between frequency of fast food consumption and blood pressure.

DISCUSSION

In assessing possible factors that may contribute to fast food consumption amongst UWI students, it was found that social reasons was a significant factor in frequency of fast consumption p, <.05. This may be as students are more likely to eat out when they are having various social interactions with friends, especially in a campus or university setting. This was supported by Driskell et. al., (2006) and Morse et. al., (2009) who reported that men and especially women reported eating with family and friends as a main reason for eating out at restaurants. However, no significance was found between other possible factors such as age, environment, price, fast service, portion size, inability to cook and ethnicity (p, >.05), within this population. This could be a result of the student population within this university is different from the population in studies previously conducted. Students at the university of the west indies consist of a varied racial mix, background and 'trini' culture as opposed to the typical North American culture. As well, while Crawford and Jeffery (2005) acceded that potion size significantly impacts consumption in a 'single meal setting', it is possible that it would have an impact on a 'multiple setting' in this population. Therefore, the students desire to consume fast food may have different factors influencing their choices as opposed to the possible or common variables in the studies conducted before (Morse et. al., 2009).

There was no association found between the frequency of fast food consumption and students present weight (>.05 and R, .002). A negative correlation was found. The results of this study is supported by the findings of Rosenheck (2008) who found the association between the two variables to be 'unclear'. Additionally, Ebbling et al., (2004) found that individuals who were lean and regularly consumed fast food did not gain weigh because they decreased energy intake throughout the day while their overweight counterparts were unable to do so. As well, current weight in this study would be one

which should be indicative of a possible (excess) in weight and BMI. If students were previously underweight prior to admission, their frequency of consumption may have caused an increase in weight, however it would then fall within the bracket of 'normal or healthy weight: 18.5 to 24.9 kg/m^2 ' as defined by the World Health Organization (WHO). These are possible reason why no correlation was found between the two variables.

With a significant level of .003 (p<.05), this suggests a notable increase in fast food consumption since commencement of the University of the West Indies (U.W.I). This could be a result of a student's hectic school schedule where time that should be allotted to proper food preparation is taken by school tasks. As well, students living at home are more likely to have a caregiver who would prepare or aid in the preparation of (most times) healthy food. This is supported by Papadaki (2007) who reported that unfavourable consumption habits such as consuming fast food developed when students lived outside of the family home (Papadaki et. al., 2007). Additionally this may be due to the foods being easily accessible (Poplin 2006) to the student.

Results within this study, p=.001 (p<0.05), showed a significant increase in weight of the students since commencing university. Due to an increase in the frequency of consumption since commencing university, this may result in an increase in the weight of the students. Additionally, even if there is not an increase in the frequency of consumption, consumption on a regular basis over time poses the risk for imbalances in energy and weight gain by extension. This was supported by Agger (2011) and Popkin (2006). Fast foods are high in fats, especially trans fatty acids, with frequent consumption of these high energy foods, the body would then store the excess fat which would lead to additional fat cells thus contributing to the increased weight gain. A few foods frequently consumed by UWI students include KFC (279 - 1137 calories, 16.9 - 54.8g of fat and 280mg - >2000mg sodium), Subway (280-860 g calories, 4.5 g-42 g fat and 1200 mg

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2480 mg sodium), Doubles(345 calories, 12 g fat and 998-1000 mg sodium) , Blimpie (430-640 calories, 14-41 g fat and 980-1440 mg sodium) and others ((fitnesspal 2005; nutracheck 2005; nutrition data 2012). There total fat and calorie content are excessively high, as seen above, which leaves the student at risk of present possible unwanted gain and weight and future health related issues such as diabetes, cardiovascular disease, hypertension and other non-communicable diseases.

Although most studies have shown that individuals lacked knowledge about fast food, consumption and related health effects, results of this study proved otherwise. Most students (79%) proved knowledgeable about the possible association between (over) consumption of fast foods and serious health related risks. Of the student population examined seventy-nine percent (79%) knew of related health problems associated with fast food consumption. Possible health effects of (over) consumption of fast food given were: obesity, hypertension, diabetes, high cholesterol and heart disease, amongst others. Results also showed that 60% of students knew 'calories' to be "energy provided by food". A further 76% of the students examined was able to clearly define a serving size which would show that they may be able to identify what is the appropriate serving size within a meal. However, majority of the population (55%) over estimated the amount of kcal in a regular box of KFC. Despite the large kcal content assumed by the students KFc still remained one of popular choice for the population. Fats and Oils was selected by 90% of the population to be the main composition of fast foods.

Equal variance (>.05)was found between the male and female population in relation to fast food consumption. A t-test score of (.163) signifies there is no difference in means. Findings within the realm of this study was supported by Yardimci et. al., (2012), it was found that 'fast-food consumption frequency did not differ in respect to gender (p >0.05) (Yardimci et. al., 2012).' This is possible if both males and females

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within the study population lived in close proximity to a fast food restaurant then there would be an equal chance of consumption frequency. As well, since social gatherings was seen as a contributing factor to fast food consumption within this study then both sexes may have had similar level of social activity and gatherings.

Location was a strong indicator of frequency of fast food consumption. This was supported when it was reported by Currie (2010) that the closer the proximity of the school to the restaurant then there was a 5.2% increase in related obesity at the institution. (Currie et al., 2010). Although results may not be associated with obesity, it is associated with weight gain amongst students since commencement of studies.

There was a moderately low relationship between frequency of consumption and blood pressure levels, (r_s <1). Though the findings of this study may go against the norm, it is significant because although there may be a high consumption of foods high in sodium content, once the individual balances this off with a potassium rich diet (legumes, vegetables and bananas) would be no elevated readings in their blood pressure. As well, if the students are not salt sensitive then there also would not be much variation in relation to their blood pressure readings.

CONCLUSION and RECOMMENDATIONS

Findings from this study suggest that the prime factors that influence frequency of fast food consumption amongst students are social interaction and location of fast food restaurants. A relationship was unable to be made between frequency of consumption and present weight. However, it was still seen that there was an increase in the individuals body weight and an increase in their frequency of consumption. There was no difference in consumption between males and females therefore possible measures to be implemented may affect both parties equally.

Students were found to be knowledgeable about the ill effects of (over) consumption of fast food. It is suggested that more healthy eating choices be provided on campus. This could be done by the university creating a health food store and restaurant which prepares healthy and nutritious meals. Additionally, monitoring body can be instituted which will govern what is served in the fast food outlets. Since close proximity of the fast food outlet greatly increases consumption, then healthier outlets can be put in close(r) proximity and unhealthier outlets removed or 'pushed back'. Additionally, the university may put measures in place which require outlets to post the amount of calories, fats and sodium in the various meals being served in clear view of all patrons. This would aid in helping students to make healthier choices.

Upon completion of this study, it can be seen that although students were mostly knowledgeable, the possibility arises that if healthy (ier) food choices and restaurants are put in place, then more students would gravitate from the excess in fats and oils to more wholesome and nutritious food.

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APPENDICES

QUESTIONNAIRE

Thank you for your cooperation. The data entered here is **ANONYMOUS** and **CONFIDENTIAL**. Please tick (√) or mark with an (x) the appropriate choice. PLEASE READ THOROUGHLY AND ANSWER ALL QUESTIONS WHERE APPLICABLE.

DEMOGRAPHIC INFORMATION

1.   Age: _____

2.   Year/Level of Study: _____

3.   Gender: Male ◯   Female ◯

4.   Ethnicity/Race: African/Black ◯   Caucasian/White ◯   Chinese ◯   East Indian ◯   Mixed ◯
Other (specify) _____

FREQUENCY OF CONSUMPTION

Where A Question does NOT apply, please proceed to the next applicable question. Thank You.

5. Where do you generally consume fast food? (Please select only one)
      Campus ◯
      Off Campus ◯
      I don't consume fast food ◯

6. Do you go to fast-food restaurants? Yes ◯   No ◯

7. WHEN do you usually go to fast-food restaurants? Weekdays ◯   Weekend ◯   Both ◯

8. WHO do you usually go to fast-food restaurants with? Friends ◯   Family ◯   Alone ◯

9. What type of fast food do you generally consume? -

_____
_____

10. What do you think influences your habit of fast food consumption? (**Select ALL that Apply**)

Inability to cook ◯   Easy Access ◯   Taste ◯   Price ◯   Fast service ◯   Environment ◯

11. On average how many times do you consume fast-food?   _____ **per week**

12. Do you consume fast food on campus?

Yes ◯   No ◯   I Don't Consume Fast-food ◯

13. Before attending UWI, how often did you consume fast food?   _____ **per week**

14. Do you believe there has been an increase in your level of fast food consumption since commencement of UWI?

Yes ◯   NO ◯

PERCEPTIONS

15. Do you consider the 'fast food' you eat to be healthy?

Yes ◯   No ◯   I Don't Know ◯   I Don't Care ◯   I Do NOT Consume It ◯

16. Do you prefer fast food as compared to cooked meals?

Yes ◯   No ◯   I don't know ◯

17. Based on the portion served in a fast food meal, would you consider it……?

More than the required serving size ◯   Just Right ◯   Not Enough ◯   I don't know ◯

KNOWLEDGE

18. What are 'calories'?

Energy provided in food ◯

Weight causing Nutrients ◯

Unsure ◯

19. What is a serving size?

Amount of food experts recommend ○

Amount of food consumed at any one time ○

Unsure ○

20. How many calories are contained in one regular box of KFC (small portion fries and 2 piece leg and thigh) ?

1019 ○

565 ○

1125 ○

975 ○

21. Fast Food is mainly composed of?

Fats & Oils ○   Protein ○   Starch ○   Vitamins & Minerals ○   Unsure ○

22. Would the over-consumption of fast food lead to someone being overweight or obese?

Yes ○   No ○   Unsure ○

23. Do you know of any illnesses or diseases associated with the consumption or over consumption of fast food?

Yes ○   No ○   UnSure ○

b) If YES, (please SPECIFY)

_____

WEIGHT and BODY COMPOSITION ANALYSIS

24. Do you remember your weight before starting UWI?
    Yes ○   No ○

b) If yes, please state _____

25. Do you believe you have put on weight or size since attending University?

Yes ○   No ○   Not Sure ○

26. What is the cause of this weight gain?

Over Consumption of Fast Food ◯

Increase in Sedentary lifestyle ◯

Increase consumption of beverages ◯

I Don't Know ◯

27. IF you did not put on weight THEN do you believe you have lost weight since starting UWI?

Yes ◯   NO ◯   NOT SURE ◯

28. What do you believe is the cause of this loss in weight?

Inadequate Nutrition ◯

Increased Physical Activity ◯

I Don't Know ◯

Omron Full Body Sensor (Body Composition Monitor and Scale) HBF-510W

Blood Pressure   1) _____   2)_____   3)_____

Height _____

Body Weight _____

Body Fat Percentage_____

Visceral Fat _____

Body Mass Index (BMI)   _____

Skeletal Muscle _____