



THE UNIVERSITY OF THE WEST INDIES
AT ST. AUGUSTINE, TRINIDAD AND TOBAGO

A Research Paper
Submitted in partial requirements
for HUEC 3012
of
The University of the West Indies

Title: Weight perception in relation to weight control behaviours among
University Students

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Year Submitted: 2014

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**WEIGHT PERCEPTION IN RELATION TO WEIGHT CONTROL BEHAVIOURS
AMONG UNIVERSITY STUDENTS**

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April 22nd 2014

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ACKNOWLEDGEMENTS

All praise and thanks is due to the Almighty God Jesus Christ for steering me towards the completion of my research project and for delivering me through all the challenges encountered while bestowing me with renewed strength. I extend this gratitude to others closes to my heart, family and friends, especially my mother Maxine Cabrera and my best friend Mahase Ramharrack- your comfort and support is deeply appreciated and will always be cherished.

I express much thanks to my research supervisor, Dr. Marquitta Webb, for her guidance, knowledge and learning opportunities provided. The lessons provided will definitely be used in my professional life.

Finally, I say thank you to all those who helped in whatever way they could: Mr. Lorenzo Molligan, Dr. Ronald Dyer and the Ramharrack sisters. It was a great comfort and relief to know that you were willing to assist in the completion of my work. My heartfelt thanks.

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ABSTRACT

Purpose: To examine how weight control practices are affected by the weight perceptions of university students.

Methodology: A self-administered questionnaire, which consisted of three sections (demographics: age, race, relationship status, gender, residential status and self-reported weight and height), weight perception and weight control behaviours, was used to examine the relationship between weight perceptions and weight control practices. The SPSS version 21.0 software was used to analyse data.

Results: Based on BMI 23.3%, 13.8% and 8.8% of students were underweight, overweight and obese, respectively. An overall of 39.8% of students were attempting to lose weight (12.0% males and 27.3% females). Majority of students (63.4%) correctly perceived their weight. Females (15.5%) tended to overestimate their weight than males (5.3%). Students most commonly used five practices to lose weight: increasing fruit and vegetable consumption (94.9%), reducing sugar intake (94.0%), consuming a balanced meal (93.5%), decreasing fat intake (93.4%) and exercising (93.0%).

Conclusion: Body weight perception strongly correlated with actual weight and weight control behaviour.

CHAPTER I: INTRODUCTION

Statement of the Problem

The prevalence of obesity is increasing, but the concern for and attempts to control weight are widespread (Bhurtun and Jeewon 2013). More and more individuals, especially females, are accepting an unhealthy light weight as normal (Johnson, et al. 2008). Corresponding to this trend, there has been a global increase in weight loss efforts resulting from high levels of weight dissatisfaction within the population (Mikolajczyk, et al. 2010). However, limited data is available on body weight perception and weight control practices among university students in Trinidad.

Weight perceptions greatly influence weight control practices and play a significant role in the weight-loss epidemic observed (Bellisle, et al. 1995). While weight loss is necessary for some, for others in who weigh reduction is unwarranted, the effects are negative and severe (Wardle, Haase and Steptoe, Body image and weight control in young adults: international comparisons in university students from 22 countries 2006). Such consequences include an increased incidence of eating disorders such as anorexia nervosa and bulimia; an increasingly underweight population; and the spread of self-induced under nutrition which, in turn, can adversely affect the academic quality of students (Wardle, Griffith, et al. 2000). Given the implications of body weight perception on weight control behaviours, this issue needs to be examined among local university students.

Therefore, this study was conducted to examine body weight perceptions and related socio-cultural factors, body weight satisfaction and weight control behaviours among male and female tertiary students of the University of the West Indies, St. Augustine.

Purpose

To examine how weight control practices are affected by the weight perceptions of university students.

Objectives

The objectives of this study were as follows:

1. To determine the BMI distribution among university students.
2. To measure the association between BMI and age, gender, race, relationship status, weight perception and weight control.
3. To measure the accuracy of students' weight perception based on estimated BMI.
4. To examine how weight perceptions influence weight control practices.

Hypotheses

It was hypothesized that:

1. H₁: BMI is randomly distributed among university students.
H₀: BMI is normally distributed among university students.
2. H₁: BMI is associated with age, gender, race, relationship status, weight perception and weight control.
H₀: BMI is not associated with age, gender, race, relationship status, weight perception and weight control.
3. H₁: Students accurately perceive their weights.
H₀: Students inaccurately perceived their weights.
4. H₁: Weight perceptions influence weight control behaviour.
H₀: Weight perceptions do not influence weight control behaviour.

Significance of the Study

Various studies have been conducted around the world concerning weight control practices in relation to weight perceptions; however there have been relatively few epidemiologic studies in Trinidad and the Caribbean. This study will help to verify the results of similar studies previously conducted, will assist in determining whether those findings are transferrable to tertiary students in Trinidad and will set the trend and foundation for future research in the aforementioned subject area if results deviate from previous findings.

This study will provide a better understanding of students' weight perceptions and related weight behaviours and would be able to provide some explanations the distribution of their BMIs. Furthermore, results of this survey can be used to make generalisations about the rest of the university population in Trinidad and help to predict weight control patterns and identify differences within specific groups and between genders. Additionally, survey findings may reveal maladaptive behaviours among students which have been listed as a precursor to depression and eating disorders (Nichols, et al. 2009) (Rawana 2013).

The benefits of conducting this study among university students are clear. Tertiary institutions represent an opportunity for reaching a large number of students to promote appropriate weight perceptions and healthy eating behaviours. This coupled with convenience explains my reasons for conducting my survey among tertiary students.

CHAPTER II: LITERATURE REVIEW

Overweight and obesity have been on the rise since the 1960s in Trinidad and Tobago according to the FAO- Nutrition Country Profiles, Trinidad and Tobago, which demonstrated that 31.4% of adults were overweight; more so in females than males, while 16.8% of this population were obese (Caribbean Food and Nutrition Institute 2003). The rapid increase in the prevalence of overweight and obesity has been attributed to unhealthy diet, and lack of physical activity (Caribbean Food and Nutrition Institute 2003). Despite the currently high prevalence of overweight and obesity, weight concern and weight control behaviours continue to increase steadily (Ministry of Health Trinidad and Tobago 2011).

The increased attention to the obesity epidemic, its largely publicised implications and the highly broadcasted message of weight loss might have skewed students perceptions, especially females, towards acceptance of a lighter body weight as normal (Johnson, et al. 2008). Furthermore, the high proportion of light weight persons in the university settings may normalise underweight. It may also mean that more normal weight persons perceive themselves as overweight.

Students, especially females, are highly concerned about their weight (Bellisle, et al. 1995) and have indulged in both healthy and unhealthy weight control behaviours to achieve their ideals. Although overweight and obesity are less common among young adults (Wardle, Haase and Steptoe, Body image and weight control in young adults: international comparisons in university students from 22 countries 2006), the young adult group continue to indulge in weight loss practices, both healthy and health compromising, to reach their physical feats: females often desiring a thin physique (Nichols, et al. 2009) and for males, a larger more muscular body (Grogan and Richards 2002).

Weight Perceptions

Weight control practices are preceded and influenced by weight perceptions (Swaminathan, et al. 2013), i.e., an individual's personal evaluation of him- or herself as underweight, normal weight, overweight or obese while ignoring actual body mass to height ratio (BMI) (Bhurtun and Jeewon 2013).

Perceptions do not always reflect reality. Persons often misperceive their weight status thereby creating a discrepancy between their actual and perceived weight statuses, an act that is practiced among both males and females, with greater pronouncements in females than males (Duncan, et al. 2011). Generally, males have been observed to perceive their weights more accurately than females, although overweight females are more accurate preceptors of their weight than lighter weight females (Wong and Say 2013).

Studies have shown that females have a tendency to overestimate their weight despite having a normal weight, while males underestimate their weight and often fail to recognise that their body weight is too high, which could explain the increased tendency of males to be overweight and females, especially young women, to be underweight (Bhurtun and Jeewon 2013) (Johnson, et al. 2008). Furthermore, non-overweight persons often perceive themselves as overweight, with an amplified likelihood among females than males (Cheung, et al. 2007).

Weight perception influences

Weight perceptions are often adopted from and influenced by our environment. Demographic factors such as age, race, and gender may a part in cultivating and shaping our weight perceptions (Bhurtun and Jeewon 2013). For example, one Caribbean study revealed that race and weight perception shared a statistical significance where females of African-descent

were more likely to report higher body weights than females of East Indian descent and other (Nichols, et al. 2009). Furthermore, various socio-cultural influences such as the media, culture and interpersonal relationships shared with peers, parents and other family members also play an important role in influencing weight perceptions (Gregory, et al. 2008) (Kim 2007) (Tang, et al. 2010) (Miller and Halberstadt 2005). Constant pressure from these environmental influences to conform to society's ideal body images can evoke body and weight dissatisfaction issues and can negatively impact upon an individual's personal body weight perceptions (Tang, et al. 2010).

The media acts as an unconscious stimulus in changing perceptual attitudes towards the acceptance of thin, underweight females and heavy muscular men as society's ideals (Bhurtun and Jeewon 2013). It has been observed that as the average body weight for height increases in a given population, the media strengthens its portrayal of society's ideal (Wronka, Suliga and Pawlińska-Chmara 2013). Children, especially adolescence are most susceptible to these ideas which are often kept during early adult years.

Parents too can influence weight perceptions, especially by expressing concern about their child's weight during childhood which can ultimately alter their weight perceptions, attitudes and behaviours. Such developmental changes may extend into adolescence and continue until early adulthood, including during university life (Wong and Say 2013). However, increasing evidence shows that friends are important contributors to the development of an individual's body image (weight) perceptions through cultivation of an appearance culture among friends. Deviation from these imposed standards may result in teasing and criticism of one's appearance which can increase an individual's pressure to conform. Females are most susceptible to succumb to such pressures and develop a negative body image (Wong and Say 2013).

Weight control practices

Weight control may involve healthy or unhealthy behaviours. Studies have shown that persons attempting to lose weight usually consume fewer calories; exercise; increase fruit and vegetable consumption; restrict fats, sugars and snacks; and reduce the quantity consumed at meals (Bhurtun and Jeewon 2013) (Wardle, Griffith, et al. 2000). However, the observed decline in physical activity and lack of consumption of healthy foods may encourage the use of faster, but unhealthy alternatives to manage weight. Such alternatives include starvation, induced vomiting and use of self-medication practices such as diet pills, laxatives, diuretics, or purging to lose weight and increasing fast food intake, and consuming all types of food regardless of its harmful effects in order to gain weight (Cheung, et al. 2007). Other studies reported no differences in eating breakfast, fruits or vegetables, skipping meals or fasting (Wardle, Griffith, et al. 2000).

Relationship between weigh perception and weight control practices

Body weight perceptions serve as a more effective predictor and motivator of nutritional habits and weight management than calculated BMI (Bhurtun and Jeewon 2013) (Brener, et al. 2004) (Cheung, et al. 2007). Inaccuracies in weight perception and high body weight dissatisfaction may result in unfavourable and unsafe weight related behaviours and may encourage or discourage weight loss (Liechty 2010). Furthermore, incorrect weight perceptions may lead to an increased incidence of underweight status and overweight and/or obesity. For example, persons who overestimate their weights are more likely to engage in weight loss behaviours while those who perceive themselves to be underweight despite the normalcy of their

actual weight have a greater tendency to indulge in weight gaining behaviours (M. M. Wong 2010) (Brener, et al. 2004).

Weight perceptions can negatively impact one's body image and weight status. For example, overweight and obese individuals who underestimate their weight and height are less likely to practice losing weight thereby hindering effective weight loss (Duncan, et al. 2011) (Kurth and Ellert 2010). Consequently such individuals may be unwilling to consume healthful foods and increase physical activity to lose weight.

Additionally, a negative perceptual body image (weight) can evoke stronger desires for dieting and thinness, as seen among light weight females who want to maintain or lose weight, which can encourage abnormal eating habits such as dietary restraint and binge-eating among others (Wong and Say 2013). It is worthy to note that while weight loss is desirable for some; unnecessary weight control practices may lead to malnutrition and disordered eating (Cheung, et al. 2007). Studies have shown that despite low rates of obesity, many university students, especially women, perceive themselves as overweight or fat and continue to diet to lose weight regardless of their already normal or underweight figures (Bellisle, et al. 1995) (Field, et al. 2004). These individuals are more susceptible to eating disorders than those who correctly estimate their weight and indulge in healthy weight control methods (Brener, et al. 2004) (Malinauskas, et al. 2006).

Inaccurate weight perceptions may also be linked to improved health by adopting healthy weight control practices. Research postulates that persons with a positive weight outlook participate in healthy weight control behaviours and have a normal BMI status (Wong and Say 2013). For example, overweight and obese individuals who perceive their weight as healthy, and therefore have reduced weight loss pressures, have been observed to be more healthful in their

weight behaviours than persons of the same group with a negative body image (Duncan, et al. 2011).

CHAPTER III: METHODOLOGY

Research Design

A cross-sectional descriptive study was carried out during the month of March, 2014 among students attending the University of the West Indies, St. Augustine campus, to examine the relationship between body weight perceptions (independent variable) and weight control practices (dependent variable).

Subjects

Originally, a total of 523 questionnaires were distributed, however only 459 students (199 male and 260 female) were used in the study. Subjects were excluded from the study if they were unwilling to participate in the study, did not return questionnaires, or omitted majority of the questionnaire. The study was conducted among full time and part-time undergraduate students attending the University of the West Indies, St. Augustine. The group had a minimum and maximum age of 18 and 57 years, respectfully, and belonged to the various faculties and disciplines of the academic institution. Students of all races/ethnicities and from all residential locations were included. In order to ensure the anonymity of responses, each questionnaire was randomly assigned an identification number which could not be retraced to the corresponding participant. All questionnaires contained the same questions and instructions and accompanying consent forms. Students agreed to participate in the study by signing the consent form. Ethical approval was granted by the ethics committee.

Instruments

A self-administered questionnaire was the survey instrument used to obtain data on the weight perceptions and weight control practices of students attending the University of the West Indies, St. Augustine. Questions used were adapted from a questionnaire previously used in another study (Bhurtun and Jeewon 2013). The questionnaire consisted of three sections. Section one consisted of five (6) questions relating to demographics (age, race, relationship status, gender, residential status and self-reported weight and height). Section two comprised of ten (10) weight perception questions and section three contained of thirteen (13) questions about weight control behaviours. Sections two and three consisted of multiple stage questions. The questionnaire took approximately 20 minutes to complete. Students were not required to answer all questions. Instructions were visible and clearly defined on questionnaires and students were well-informed of the minimum risk involved in their participation.

Procedure

A research supervisor was selected and the topic decided upon. After this time, the questionnaire was compiled and the research proposal completed, both of which, were approved by the research supervisor and the ethics committee, respectively. Questionnaires were hand-distributed to students around the campus using the convenience sampling method for the duration of one week. Statistical analyses were decided upon to test the various hypotheses and answer the following questions: (1) How is BMI distributed among the study population? (2) How strongly does weight perception associate with age, race, gender, relationship status, estimated BMI and weight control? (3) How accurate are students' weight perceptions compared to their actual weights? (4) Do weight perceptions influence weight control practices? Upon completion of questionnaire collection, data were analysed in the SPSS software and results interpreted. Findings were added to the proposal to complete the project.

Statistical Analysis

All data were analysed using the Statistical Package for Social Sciences (SPSS version 21.0, SPSS Inc., Chicago, IL, 2012). BMI distribution was tested for normality using the Shapiro-Wilk's test. Associations between BMI and age, and BMI and physical activity level were tested using Pearson correlation. Other BMI associations with relationship status and permanent residential status were tested using independent sample t-test. One way ANOVA was used to measure the association between BMI and physical activity level. Chi-square tests were used to measure the association between BMI and gender and the relationship between BMI and weight perceptions according to gender and race. Chi-square tests were also used to examine how weight perceptions influence weight control practices. Descriptive statistics were used to compile the data collected. For all inferential tests, a P value of ≤ 0.05 was considered statistically significant.

CHAPTER IV: RESULTS

Sample Characteristics

A total of four hundred and fifty-nine students (199 males and 260 females) participated in the study (standard deviation [SD], 0.50). Students had a mean age of 21.19 (SD, 3.37; median, 20; range, 18-57) years. The racial mix of the student population largely consisted of persons of East Indian (48.8%) and African (25.7%) descents. Table 1 summarises the socio-demographic characteristics of participants.

Table 1: Socio-Demographic Characteristics of Participants

		Male (n=199)	Female (n= 260)	Total
Age (Mean \pm SD)		21.3 \pm 2.9	21.1 \pm 3.7	21.2 \pm 3.4
Relationship status (%)	Yes	13.6	26.9	40.5
	No	29.0	30.5	59.5
Race (%)	African Descent	10.5	15.2	25.7
	East Indian Descent	19.8	29.0	48.8
	African-East Indian Descent	1.5	3.1	4.6
	Other	8.5	12.3	20.8
Permanent Residential Status (%)	Trinidad	42.4	55.8	98.2
	Other	0.9	0.9	1.8
BMI (kg/m²) (Mean \pm SD)		22.6 \pm 4.9	23.0 \pm 19.9	22.8 \pm 15.3
BMI (kg/m²)	Underweight (< 18.5)	8.5	14.7	23.3
	Normal weight (18.5 – 24.99)	23.0	31.1	54.1
	Overweight (25.0- 29.99)	8.5	5.3	8.8
	Obese (\geq 30.0)	3.5	5.3	8.8

BMI Distribution

A Shapiro-Wilk's test ($p < 0.05$) and an inspection of skewness and kurtosis measures and standard errors, and visual inspection of their histograms, normal Q-Q plots and box plot showed that BMI values were not approximately normally distributed between males and females (Figures 1-4).

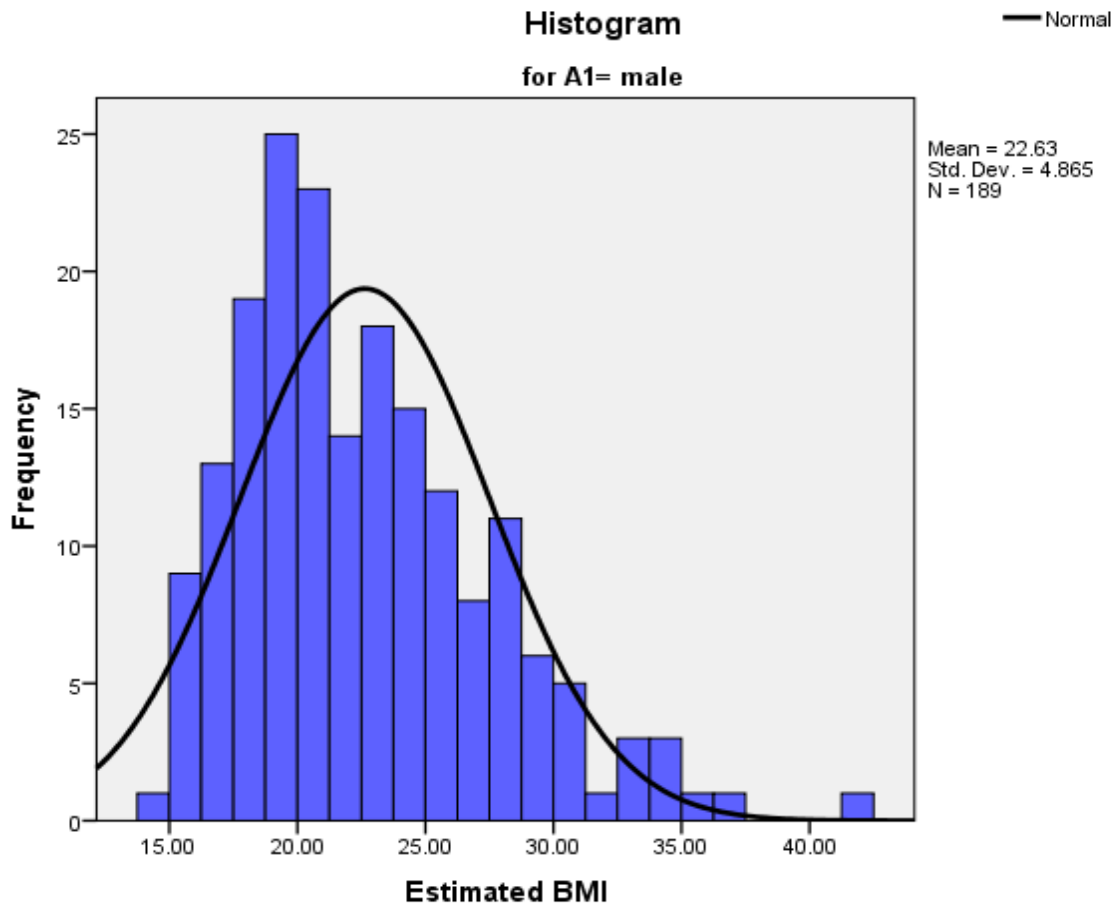


Figure 6: Histogram Showing Estimated BMI Distribution for Males

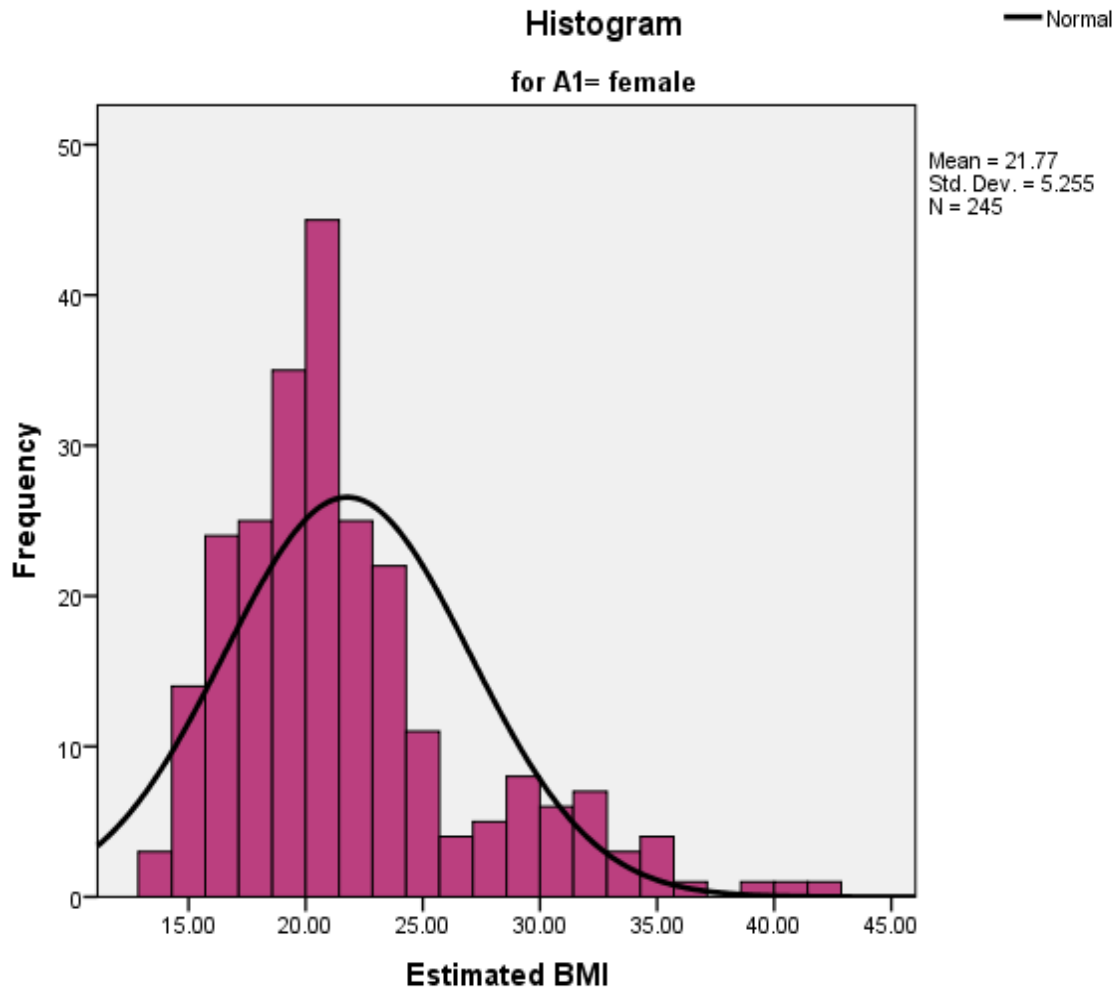


Figure 7: Histogram Showing Estimated BMI Distribution for Females

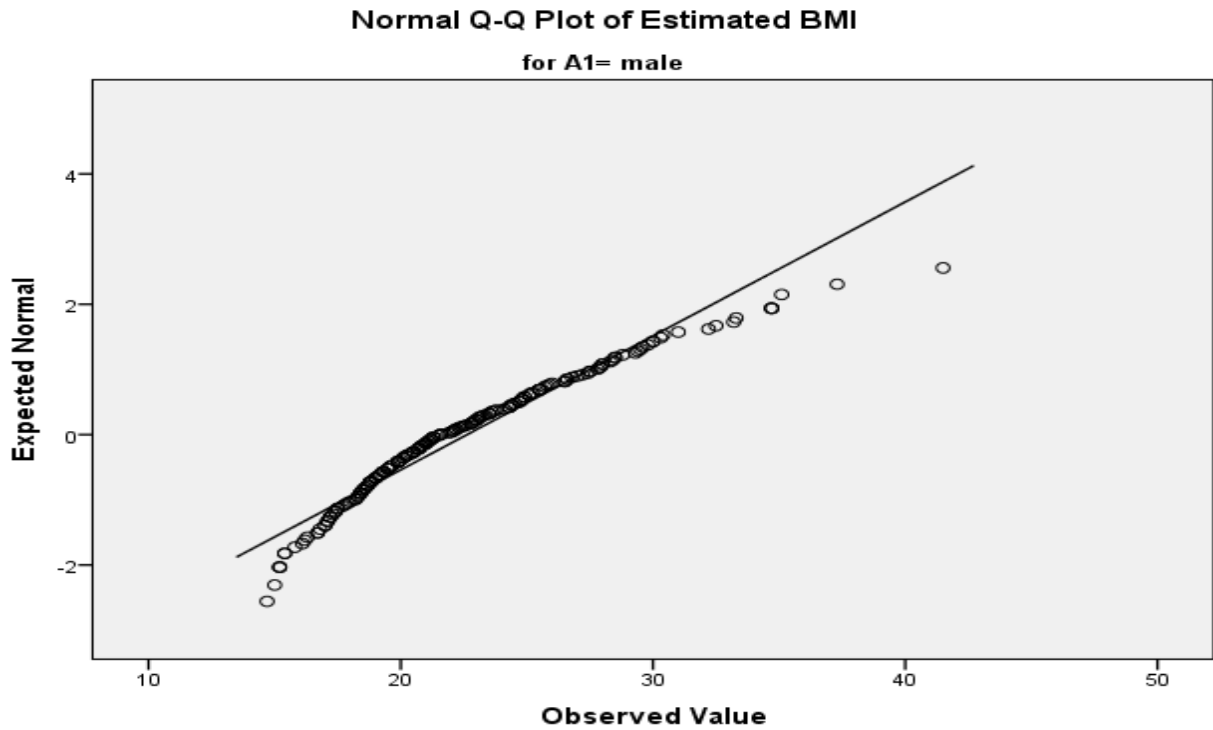


Figure 8: Normal Q-Q Plot of Estimated BMI for Males

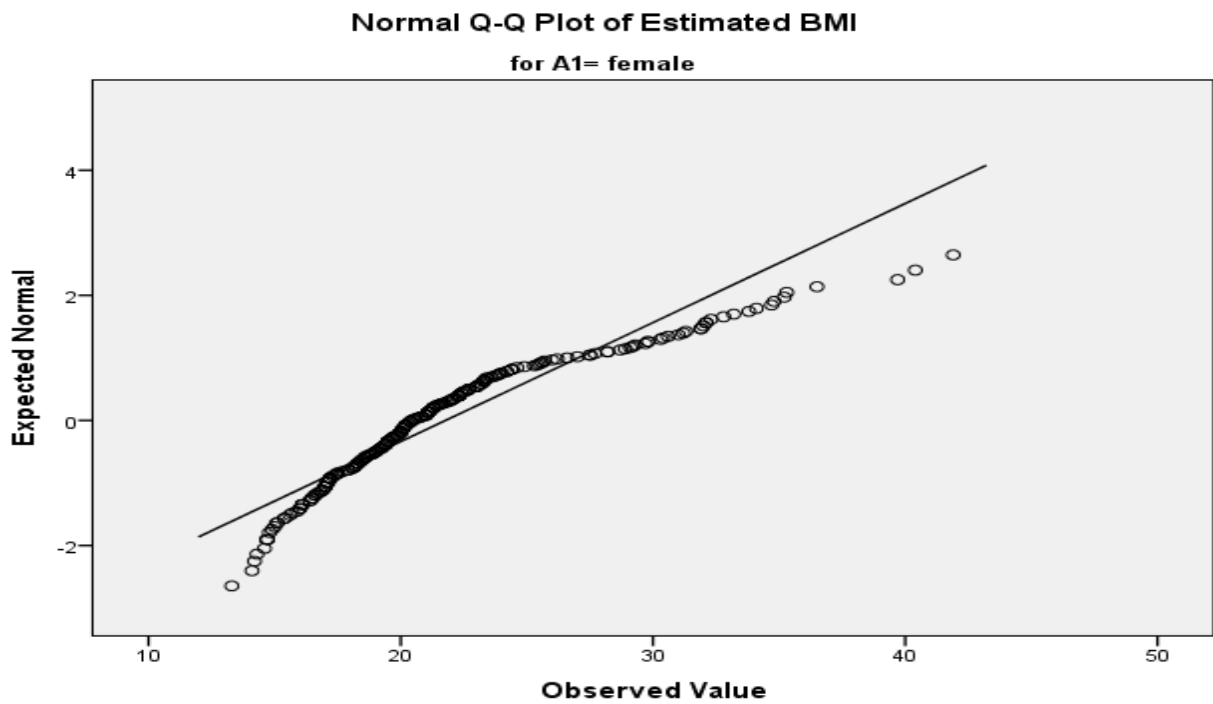


Figure 9: Normal Q-Q Plot of Estimated BMI for Females

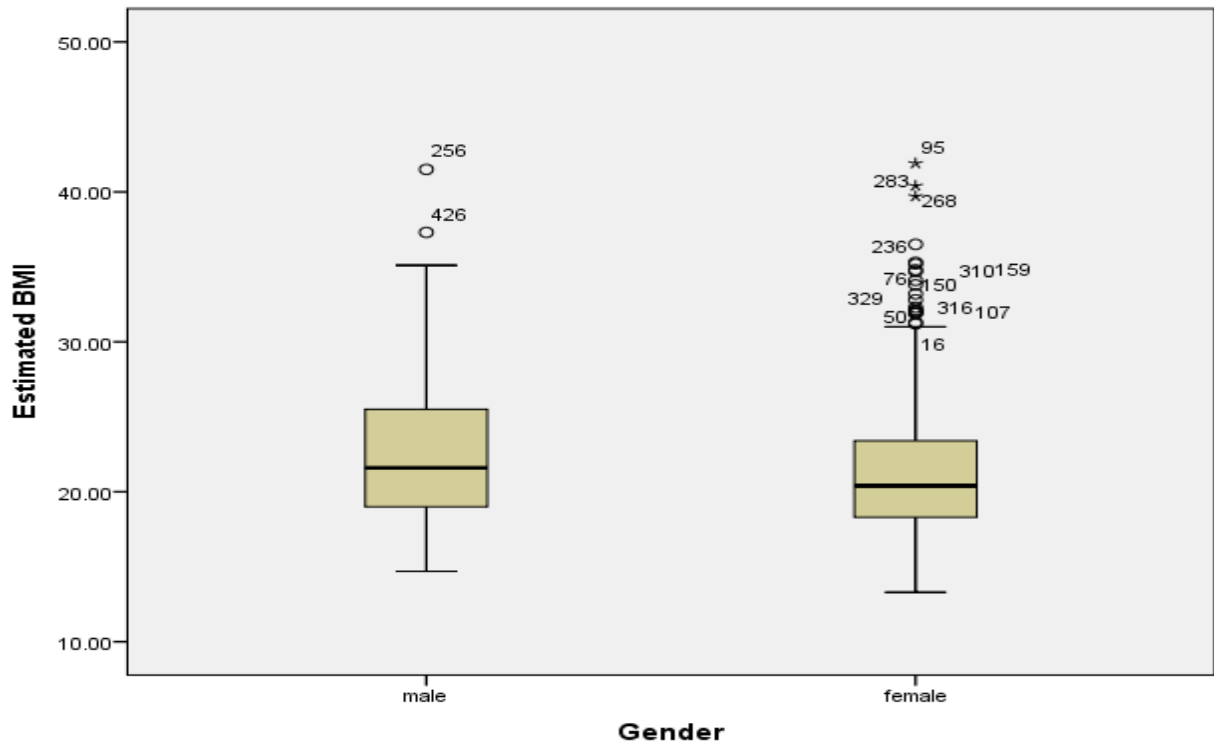


Figure 10: Box Plot Comparison of Estimated BMI between Genders

BMI and Demographic Associations

Independent sample t-tests and one way ANOVA analyses revealed no statistically significant differences between BMI and gender, relationship status and residential status ($p > 0.05$). However, Pearson correlation and chi-square tests revealed high statistical significance between BMI and age ($p = 0.001$) and BMI and race ($p < 0.001$), with a more pronounced effect on race.

Persons of African descent had a mean BMI of 22.95 (SD, 5.06) kg/m^2 while East Indians had a mean of 21.02 (SD, 4.93) kg/m^2 . Among the dominant races of the student population, underweight status (33.2%) and obesity (33.3%) were more prevalent among East Indian students than students of African descent. Table 2 below shows BMI classifications among the various races of the student population.

Table 2: Relationship Between BMI and Race

BMI Classifications	Race			
	African Descent (%)	East Indian Descent (%)	African-East Indian Mix (%)	Other (%)
Underweight (n=90)	12.2	66.7	4.4	16.7
Normal weight (n=196)	29.1	49.0	5.1	16.8
Overweight (n=49)	32.7	28.6	4.0	34.7
Obese (n=33)	27.3	33.3	3.0	36.4

Body Weight Perception

Students defined underweight (59.6%) and overweight/obesity (84.5%) in terms of actual body fat rather than by physical appearance. Majority of the students (95.8%) agreed that body weight was important for health, although only 63.0% of all students thought that they had a healthy weight. A total of 50.8% of students were dissatisfied with their weight while 48.3% were satisfied (25.5% females, 18.3% males).

To obtain clear cut values, ratings of “not important” and “slightly important” were both rated as “not important” while all other areas were considered “important”. Students placed least importance on the media, peers and parents respectively while placing most importance on health and appearance when rating the importance of those factors on their body weight perceptions.

A large percentage (71.3%) of students chose an underweight silhouette to represent their figure, 35.3% of who were of East Indian descent. Only 20.2% of students chose a normal weight silhouette to represent their ideal.

Chi-square tests revealed a statistically significant relationship between BMI and weight perceptions between genders and among races.

Table 3: A comparison Between BMI and Body Weigh Perceptions Among Males and Female

Population	Weight Based on BMI	Perceived Weight Status				P
		Underweigh t (%)	Normal Weight (%)	Overweigh t (%)	Obese (%)	
All (n=368)	Underweight	17.9	6.3	0.3	0.0	0.000
	Normal weight	8.8	37.8	6.8	0.0	
	Overweight	0.5	5.2	7.1	0.5	
	Obese	0.0	1.9	6.8	0.3	
Male (n=148)	Underweight	16.2	4.7	0.7	0.0	0.000
	Normal weight	15.6	31.1	4.7	0.0	
	Overweight	0.7	8.8	9.5	0.7	
	Obese	0.0	2.0	5.5	0.0	
Female (n=220)	Underweight	19.1	7.3	0.0	0.0	0.000
	Normal weight	4.2	42.3	8.2	0.0	
	Overweight	0.5	2.7	3.6	0.5	
	Obese	0.0	1.8	7.7	0.5	

Table 3 shows the results of a comparison between BMI and body weigh perceptions among males and females derived from chi-square tests. More than half (51.2%) the students perceived themselves as normal weight while 26.7%, 21.0%, 0.8% considered themselves to be underweight, overweight and obese, respectively. Overall 63.1% of students accurately perceived their weight, majority of who were males (63.1% males versus 56.8% females). Body weight underestimation and overestimation were reported by 23.2% and 13.9%, respectively.

Table 4: A comparison Between BMI and Body Weigh Perceptions Among the Various Races

Race	Weight Based on BMI	Perceived Weight Status				P
		Underweight (%)	Normal Weight (%)	Overweight (%)	Obese (%)	
African Descent (n=93)	Underweight	10.8	1.1	0.0	0.0	0.000
	normal weight	7.5	48.4	5.4	0.0	
	Overweight	0.0	7.5	9.7	0.0	
	Obese	0.0	3.2	6.5	0.0	
East Indian Descent (n=181)	Underweight	23.2	9.4	0.6	0	0.000
	normal weight	9.4	35.4	8.3	0	
	Overweight	1.1	1.7	4.4	0.6	
	Obese	0.0	0.6	5.0	0.6	
African-East Indian Mix (n=17)	Underweight	23.5	0.0	0.0	0.0	0.012
	normal weight	5.9	47.1	5.9	0.0	
	Overweight	0.0	0.0	5.9	5.9	
	Obese	0.0	5.9	0.0	0.0	
Other (n=77)	Underweight	13.0	6.5	0.0	0.0	0.000
	normal weight	9.1	28.6	5.2	0.0	
	Overweight	0.0	11.7	10.4	0.0	
	Obese	0.0	2.6	13.0	0.0	

East Indians (33.7%) were inclined to perceive themselves as underweight; those of African descent were least likely to do so (Table 4). Furthermore, African descendants (60.2%) mostly believed their weight to be normal, while the African-East Indian mixed students (5.9%) and those of the remaining races (28.6%) were most likely to perceive themselves as obese and overweight, respectively.

Table 5: A comparison Between BMI and Body Weigh Perceptions Among the Males of Various Races

Population	Weight Based on BMI	Perceived Weight Status				P
		Underweight (%)	Normal Weight (%)	Overweight (%)	Obese (%)	
African Descent (n= 37)	underweight	8.1	0.0	0.0	0.0	0.003
	normal weight	13.5	40.5	2.7	0.0	
	overweight	0.0	13.5	16.2	0.0	
	obese	0.0	2.7	2.7	0.0	
East Indian Descent (n=74)	underweight	21.7	8.1	1.4	0.0	0.000
	normal weight	17.6	28.4	2.7	0.0	
	overweight	1.4	2.7	6.8	1.4	
	obese	0.0	1.4	6.8	0.0	
African-East Indian Mix (n=6)	underweight	33.4	0.0	0.0	0.0	0.481
	normal weight	16.7	16.7	16.7	0.0	
	overweight	0.0	0.0	0.0	0.0	
	obese	0.0	16.7	0.0	0.0	
Other (n=31)	underweight	9.7	3.2	0.0	0.0	0.000
	normal weight	12.9	29.0	9.7	0.0	
	overweight	0.0	19.4	9.7	0.0	
	obese	0.0	0.0	6.5	0.0	

Furthermore, most African-East Indian mixed men (50.1%) see themselves as underweight, while men of African descent (56.7%) are most likely to perceive themselves as normal weight. Overall men had a high propensity to underestimate their weight (Table 5).

African-East Indian mixed females had the highest (90.9%) accuracy in perceiving their body

weight among all other females of the various ethnic groups (Table 6). On the other hand, females, especially those of East Indian descent had the greatest percentages of weight overestimation (22.4%).

Table 6: A comparison Between BMI and Body Weigh Perceptions Among the Females of Various Races

Population	Weight Based on BMI	Perceived Weight Status				P
		Underweight (%)	Normal Weight (%)	Overweight (%)	Obese (%)	
African Descent (n=56)	underweight	12.5	1.8	0.0	0.0	0.000
	normal weight	3.6	56.3	7.2	0.0	
	overweight	0.0	3.6	5.4	0.0	
	obese	0.0	3.6	9.0	0.0	
East Indian Descent (n=107)	underweight	24.3	10.3	0.0	0.0	0.000
	normal weight	3.7	40.2	12.1	0.0	
	overweight	0.9	0.9	2.8	0.0	
	obese	0.0	0.0	3.7	0.9	
African-East Indian Mix (n=11)	underweight	18.2	0.0	0.0	0.0	0.001
	normal weight	0.0	63.6	0.0	0.0	
	overweight	0.0	0.0	9.1	9.1	
	obese	0.0	0.0	0.0	0.0	
Other (n=46)	underweight	15.2	8.7	0.0	0.0	0.000
	normal weight	6.5	28.3	2.2	0.0	
	overweight	0.0	6.5	10.9	0.0	
	Obese	0.0	4.3	17.4	0.0	

Additionally, one-way ANOVA test revealed associations between weight perceptions and weight control practices, some of which demonstrated statistical significance. For instance, limiting snacks consumed between meals ($p=0.003$) and reducing the amount of food eaten at meal time ($p=0.001$) were statistically significant weight loss behaviours associated with weight perceptions. Other statistically significant weight control practices included increasing fat

($p=0.007$) and sugar consumption ($p=0.036$) increasing between meal snacking ($p=0.011$) in order to gain weight.

Weight Control Practices

One way ANOVA test revealed no statistically significant differences between BMI and physical activity level ($p>0.05$). However, chi-square tests showed a statistically significant relationship between BMI and type of weight control attempted ($p<0.0001$) (Table 7).

Overall, 39.6%, 33.3% and 27.1% were interested in losing, gaining and maintaining weight, respectively. Normal weight students (58.3%) were most interested in weight loss, which amounted to more than that of overweight and obese students combined (39.4%). Most (43.0%) of underweight students were interested in weight gain.

Table 7: Relationship Between BMI and Weight Control Attempted

BMI Classification	Weight Control Attempted		
	Lose (n=127)	Gain (n=107)	Maintain (n=87)
Underweight (%)	2.3	43.0	18.4
Normal weight (%)	58.3	46.7	60.9
Overweight (%)	19.7	6.6	17.3
Obese (%)	19.7	3.7	3.4

Additionally, Pearson correlation tests revealed statistical significance between BMI and some weight control practices. Weight loss practices showing statistical significance included reducing the amount of food eaten at meal time ($p=0.037$) and using low fat and diet versions of food ($p=0.046$). On the other hand the following weight gaining practices were shown to be statistically and significantly related to BMI at the $p=0.05$ and $p=0.01$ levels: increasing physical

activity ($p=0.005$), fat consumption ($p=0.035$), snack consumption between meals ($p=0.019$), and sugar consumption ($p=0.011$); as well as the use of weight gaining pills, powders and liquids ($p=0.010$) were all significantly associated.

Furthermore, weight perception was shown to be strongly associated with weight control practices [$\chi^2(12) = 152.260, p < 0.001$]. Students, who wanted to lose weight, described themselves as normal weight (15.9%) and overweight (20.0%). All persons who perceived themselves as obese were attempting to lose weight also. Weight gainers were the second largest group that tried to control their weight (32.9%) largely divided between persons who described themselves as underweight (17.1%) and normal weight (15.6%). Most of the students who wanted to maintain their weight (27.9%) thought that they were weight proportionate (20.6%).

Types of Weight Control Practices

Healthy weight loss was common among most students. Other students engaged in unhealthy weight loss behaviour: 56.9% skipped meals, majority (16.1%) of who did so least once per week. Furthermore, 60.2% admitted to skipping breakfast, 13.5% of who did so more than 6 times per week. Another 15.3% used diet and weight loss pills and 34.8% and 25.5% participated in water only and citrus only diets, respectively. Only 10.3% students practiced vomiting.

On the other hand a total of 87.1% of students increased physical activity, 30.9% of who did so 3-4 times per week. Majority (53.5% and 20.1%) of students decreased fat and snack consumption 1-4 and 3-4 times per week, respectively, to lose weight.

Majority (85.2%) of students increased fat consumption, 21.3% of who did so 3-4 times per week to gain weight. Students (78.9%) increased snack consumption between meals to gain

weight. Only 21.1% and 8.4% of students did not use supplements and increased fast food consumption, respectively, to gain weight over the past year. Eighty-seven percent of students increased their caloric consumption, by increasing the quantity of food eaten at meal time in order to gain weight while 72% of students increased sugar consumption to achieve the same goal. A whopping 70.1% of students never used weight gaining pills, powders, or liquids over the past 12 months. Students (69.2% and 65.1%) generally never stopped or reduced physical activity and never decreased fruit and vegetable consumption, respectively, to gain weight. Most students (77.4% and 81.5%) ate any and all types of foods and increased protein consumption, respectively, to gain weight.

Trends in Physical Activity

Most students (75.2%) reported participating in physical activity to control their weight. Of these, 37.1% participated in physical activity 30-45 minutes and another 33.0% over 60 minutes per session for 2-3 times per week (44.5%). Students were most motivated by health reasons (70.4%) and appearance (58.3%) to exercise while majority of students placed least importance on parents (25.3%) and peer pressure (19.7%) in the same respect. Of the persons who wanted to gain weight, 85.2% increased their physical activity, most (18.5%) of who did so 3-4 times per week.

CHAPTER V: DISCUSSION

The study's primary intention was to investigate body weight perception and weight control practices among university students. BMI was randomly distributed among students. A p-value of 0.000002 in the Shapiro-Wilk's test along with skewness and kurtosis z-values falling outside ± 1.96 demonstrated that BMI was not approximately normally distributed. Furthermore, histograms for males and females were negatively skewed showing an asymmetrical distribution with the long tail on the left side. Therefore the null hypothesis (H_0 : BMI is normally distributed among university students) was failed to be accepted and the alternate hypothesis (H_1 : BMI is randomly distributed among university students) was held.

BMI associations were not as expected. There were no significant differences observed between BMI and gender ($p=0.825$), relationship status ($p=0.590$), residential status ($p=0.872$) or physical activity level ($p=0.133$), hence the null hypothesis (H_0 : BMI is not associated with gender, relationship status, residential status and physical activity level) was held. However, as predicted, BMI and race and weight control attempted were significantly associated ($p=0.0000$), therefore the alternate hypothesis (H_0 : BMI is associated with race and weight control method) is accepted and the null rejected. It was observed that students of East Indian descent were generally lighter than all other racial groups; however, this was unfavourable since 66.7% of these East Indian students were underweight. Persons of this racial group also had a greater propensity to be obese than African students.

Weight Perceptions

Chi square test revealed statistically significant relationship between BMI and weight perceptions between genders and among races. The survey found that majority (63.1%) of

students correctly perceived their weight, which is the opposite of the trend in other literature. Overall, more females (65.5%) than males (56.8%) correctly perceived their weight which also deviated from findings in other global studies. Students showed a great propensity to underestimate their weight (23.2%) with an increased likelihood among males (32.6%) than females (16.9%). Such findings could be used to explain the higher percentage of overweight status among males (19.7%) than females (7.3%). Conducive to previous findings, females (16.0%) were more likely to overestimate their weight than males (10.8%).

Additionally, persons mixed with African and East Indian were the most accurate perceivers of their weight (76.5%). Among the named racial groups, East Indians had the greatest tendency to overestimate their weight (18.3%), which can help to explain their high underweight status (33.2%). Those of African descent (24.7%) were the most probable to underestimate their weight. The effects of their underestimation could explain the high level of overweight (17.2%) and obesity (9.7%) observed among this population. Furthermore, it was observed that males of African-East Indian mix were most likely to consider themselves as underweight, while African males were more inclined to think of themselves as overweight. East Indian males were the only masculine group perceive themselves as obese, although such perceptions were exaggerated.

African (74.2%) and African East Indian mix (67.9%) females were most likely to correctly perceive their weights. As a result, these groups of females had the highest percentages of normal weight female students.

Weight Control Practices

One-way ANOVA test revealed some associations between weight perceptions and weight control practices, some of which demonstrated statistical significance, thereby holding the alternate hypothesis which states that weight perceptions influence weight control practices.

Although further one way ANOVA test revealed no statistically significant differences between BMI and physical activity level ($p>0.05$), chi-square tests showed a statistically significant relationship between BMI and type of weight control attempted ($p<0.0001$). Overall, students were most interested in losing weight (39.6%) despite their normal weight (58.3%).

A majority of 39.3% of students reported trying to lose weight, of which a huge proportion was females (27.3%), a trend that has been observed in previous studies (Malinauskas, et al. 2006). Fifty-two percent of students who engaged in weight reduction activities perceived themselves as overweight although only 7.1% of them actually had a BMI value above 25.0 kg/m^2 . The findings of this study corroborated with previous reports that body weight perception served as a better predictor to weight control than actual BMI (Bhurtun and Jeewon 2013)(Cheung, et al. 2007).

In the current study, although a substantial amount of male and female university students engaged in unhealthy methods for weight control, this was more evident in males (39.4%) than females (31.2%). such findings deviated from other research which found that females are more likely to diet and engage in unhealthy weight-loss behaviours more frequently than males (Boutelle, et al. 2002).

In this study students mostly used 5 behaviours to lose weight: increased fruit and vegetable consumption (94.9%), reduced sugar intake (94.0%), consumption of a balanced meal (93.5%), decreased fat intake (93.4%) and exercise (93.0%). Regarding unhealthy weight loss behaviours, more than half the number of males (62.8%) and females (54.3%) skipped meals and fasted to

lose weight. Skipping breakfast was almost equally reported by males (60.0%) and females (60.2%). This study coincided with findings of other research that university students exercise, decrease fat consumption and increase fruit and vegetable intake to lose weight (Malinauskas, et al. 2006) (Wardle, Griffith, et al. 2000).

Survey results indicated an overall response rate of 75.2% for students who participated in physical activity. No marked differences were observed in physical activity frequency and duration between weight losers and non-weight losers; most students participated in physical activity 2-5 times per week for at least 30-45 minutes per session. This shows that the students attending the University of the West Indies are less susceptible to reported global decline in physical activity among university students (Sinclair, Hamlin and Steel 2005).

CHAPTER VI: CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

Conclusion

The findings of the study demonstrated that body weight perception was positively associated with BMI among students attending the University of the West Indies, St. Augustine. Gender differences were evident regarding body weight perceptions such that females had a greater tendency to overestimate their weight while their male counterparts were more likely to underestimate their body size. Students who perceived themselves as overweight or who were dissatisfied with their weight engaged in weight loss behaviour such as increasing fruit and vegetable intake, reducing sugary food consumption, eating a balanced meal, reducing fat intake and exercising. Students attending the involved university were generally healthy students, practicing better weight loss behaviours than expected and in comparison to other students in previous studies.

Limitations

One major limitation to this study was the use of self-reported weight instead of actual weight which could greatly reduce the pronouncement of relationships due to underestimation of estimated BMIs. It was also limiting since most students of the Medical Sciences Faculty, which is in another location, were excluded. Additionally, some questions in the survey (B.8., C.1.5., C.4.3.) posed challenges to students. Students generally misinterpreted these questions and ticked responses rather than rate the responses. Such questions would have been more effectively delivered in a table rating format. However, this was counteracted by measuring the frequency of students' responses. Furthermore, it was assumed that students placed greatest important on ticked options. Another limitation to the study was the high number of incomplete questionnaires

used in the data entry and analysis, which could possibly affect the strength and reliability of results. Students' socioeconomic status was not considered which would have enhanced interpretation of weight perceptions.

Recommendations

Future studies should include socioeconomic parameters as it influences one's weight and weight control behaviours by extension. Although students seem to perceive their weights correctly and use appropriate weight control methods, there is still need for improvement on the high prevalence of underweight among students. Students should be educated on what a healthy weight really is and on healthy and appropriate ways to maintain weight, and since doctors and health care professionals have the highest influence on students perceptions and weight control practices, these individuals should be the vehicle delivering these healthful messages.

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APPENDIX



**THE UNIVERSITY OF THE WEST INDIES
ST. AUGUSTINE, TRINIDAD AND TOBAGO
Department of Agricultural Economics and Extension
Faculty of Food and Agriculture**

BODY IMAGE PERCEPTION AND DIETARY AND PHYSICAL ACTIVITY PRACTICES QUESTIONNAIRE

Dear Student:

The following questionnaire was designed to find out information about body image perception and diet and physical activity practices in university students. Dietary and physical activity practices questions relate to those activities over a 12-month period. You are asked to answer all questions honestly.

Please do not write your names anywhere on the questionnaire. Your information will be kept privately.

Thank you for your help in completing this questionnaire.

Yours Respectfully,

N'yasha Cabrera

Human Nutrition and Dietetic Student

A. DEMOGRAPHIC INFORMATION

Age: _____ years

Race: African/Black East Indian African- East Indian Mix Other

Relationship status: Single In a relationship Engaged
 Married Divorced Widowed

A.1. Gender: Male Female

A.2. Place of habitual residence: Trinidad Other

A.3. Give an estimation of your

A.3.1. Weight: _____ (lb/kg)

A.3.2. Height: _____ (cm/m/in)

B. BODY WEIGHT PERCEPTION

B.1. Do you think that body weight is important for health?

Yes

No

B.2. How would you define/ classify underweight?

Having excess body fat

Having too little body fat

Having a physical appearance that is too thin

I don't know

B.3. How would you define overweight or obesity?

Having excess body fat

Having too little body fat

Having right amount of body fat

Having a physical appearance that is too fat

I don't know

B.4. How do you describe yourself?

- Extremely underweight
- Underweight
- Moderately underweight
- Weight proportionate
- Moderately overweight
- Overweight
- Extremely overweight

B.5. Are you satisfied with your current weight?

- Yes
- No
- I don't know

B.6. Do you think that you have a healthy weight?

- Yes
- No
- I don't know

B.7. How concerned are you about your weight?

- Very concerned
- Concerned
- Moderately concerned
- Neutral
- Unconcerned

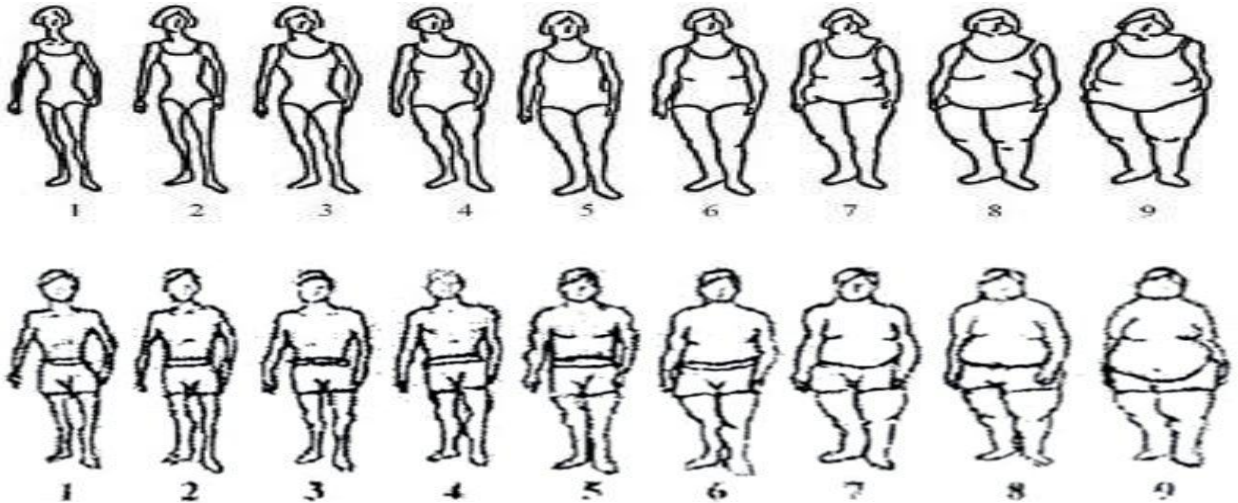
B.8. Who/what influences you in your bodyweight perceptions? (Rate in order of importance: 1= not important 2= slightly important 3= important 4= very important, 5= extremely important)

- My parents
- Media (Models, actors, sportsmen, advertisement)
- My friends (peer pressure)

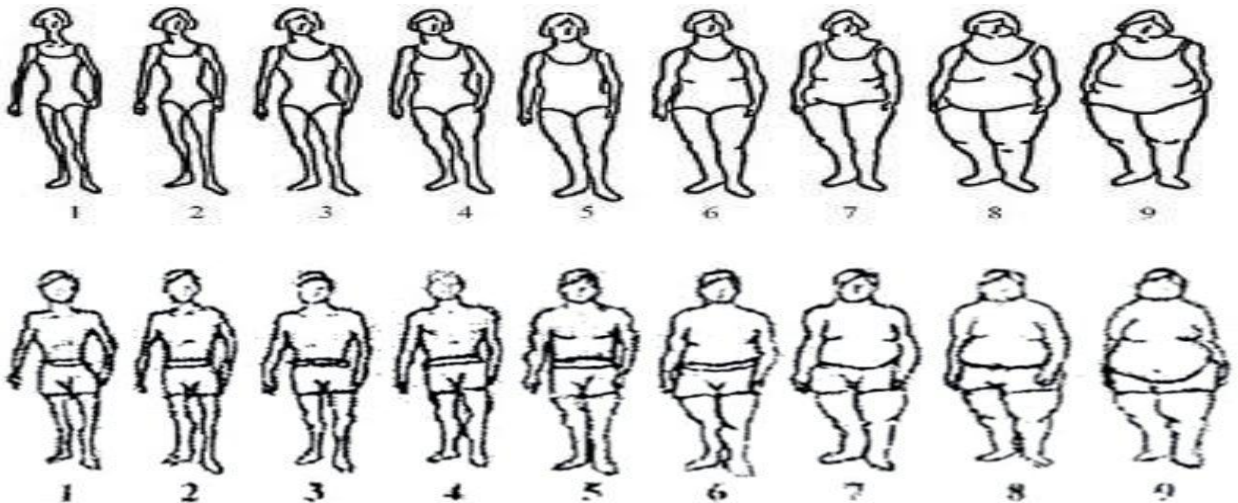
My doctor etc (health reasons)

Appearance (fashion)

B.9. Choose the image that represents your current figure.



B.10. Choose the image that best represents your ideal size



C. WEIGHT CONTROL BEHAVIOURS

***Weight control** refers to any change(s) made during the past 12 months to eating habits, physical activity, or any other behaviour in an attempt to lose, gain or maintain weight.*

C.1. Are you currently trying to control your weight?

Yes

No

If you answered NO to QUESTION C.1. proceed to QUESTION C.1.2.

C.1.1. How are you trying to control your weight?

Lose

Gain

Maintain

C.1.2. How many times previously have you attempted to control your weight?

1-3

4-5

> 5

C.1.3. What was/is your desired duration to lose/gain weight?

1- 2 weeks

3 weeks

1-2 months

3-4 months

5- 6 months

More than 6 months

C.1.4. How much weight did you want to lose/gain in the duration mentioned above?

1-5 pounds

6-10 pounds

11- 20 pounds

21-30 pounds

More than 30 pounds

Skip to QUESTION C.4. if you are trying to maintain weight.

C.1.5. If you answered YES to Question C.1., who/what influences you to control your weight? (Rate in order of importance: 1= not important, 2= slightly important, 3= important, 4= very important)

- Peer Pressure (All my friends are trying to control their weight)
- Appearance (To wear trendy clothes, fashion...)
- Health reasons
- Parents (Parents are conscious about their weight)

Complete Question C.2. OR C.3.

C.2. Complete the frequency table below regarding WEIGHT LOSS practices over the past 12 months.

Food Consumed	Frequency							
	Never or less than once per month	Once per month	2-3 times per month	Once per week	2 times per week	3-4 times per week	5-6 times per week	6+ times per week
Increase physical activity (e.g. Play a sport, exercise etc)								
Reduce fat consumption (including consumption of fried foods, butter etc)								
Avoid or limit snacks consumed between meals								
Increase fresh fruit and vegetable consumption								
Consume a balanced diet (contains peas, staples, food from animals, fruits, vegetables, fats and oils)								
Reduce food eaten at meal time								
Limit the amount sweets, sugar and sugary foods and drinks that you eat								
Skip meals and fast								
Skip breakfast								
Use diet or weight loss pills, powders, liquids, herbs; (e.g. Hydroxycat, diuretics, laxatives etc)								
Exercise								

Choose low fat or diet versions of foods where possible								
Reduce salt consumption								
Partake in water only diet								
Partake in citrus only diet								
Vomit								

C.3. Complete the frequency table below regarding WEIGHT GAIN practices over the past 12 months.

Food Consumed	Frequency							
	Never or less than once per month	Once per month	2-3 times per month	Once per week	2 times per week	3-4 times per week	5-6 times per week	6+ times per week
Increase physical activity (e.g. Play a sport, exercise etc)								
Increase fat consumption (e.g. fried foods, butter etc)								
Increase snacks consumed between meals								
Consume food supplements (vitamins, minerals, herbs, protein shakes etc)								
Eat fast foods (KFC, pizza, Chinese, fries etc)								
Increase food eaten at meal time								
Increase the amount of sweets, sugar and sugary foods and drinks consumed								
Use weight-gaining pills, powders, liquids; laxatives or purges								
Stop or reduce physical activity								
Decreased the consumption of fruits and vegetables								
Eat any and all types of food								
Increase protein intake								

C.3.1. Do you consider the methods you selected in Questions C.2. OR C.3. above appropriate for controlling weight?

Yes

No

I don't know

Physical Activity is any activity that makes you sweat, increases your breathing and your heart beat. It includes exercising, dancing, yoga, jogging, football, badminton or any other sports; gardening or any other household activities.

C.4. Do you participate in any type of physical activity to control your weight?

Yes

No

C.4.1. If YES, how often do you participate in physical activity?

Never or less than once per week

Once per week

2-3 times per week

4-5 times per week

6+ times per week

C.4.2. How many minutes per session do you participate in physical activity?

Less than 30 minutes

30 – 45 minutes

46 – 59 minutes

60 + minutes

C.4.3. What/ who motivates you to exercise? (Rate in order of importance: 1= not important, 2= slightly important, 3= important, 4= very important)

Peer Pressure (All my friends exercise to control their weights)

Appearance (To wear trendy clothes, fashion...)

Health reasons

Parents (My parents exercise because they are conscious about their weight)

☺ Fantastic, you have finished! THANK YOU! ☺