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# Assessment of nutritional knowledge and eating behaviors on the weight and obesity of college students

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# Undergraduate Honors Thesis

In fulfillment of the requirements of the Honors Program for the degree of  
Bachelor of Science in Human Environmental Sciences (B.S.H.E.S)  
Major in Food, Human Nutrition and Hospitality Management  
With Emphasis in Hospitality and Restaurant Management.

## Assessment of Nutritional Knowledge and Eating Behaviors on the Weight and Obesity of College Students

Supervisor: Dr. Godwin-Charles Ogbeide

Submitted by: Britta Thielemann

Spring Semester 2012



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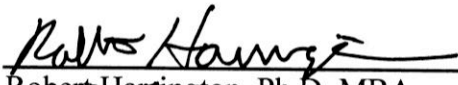
**Assessment of Nutritional Knowledge and  
Eating Behaviors on the Weight and  
Obesity of College Students**

Presented by: Britta Thielemann

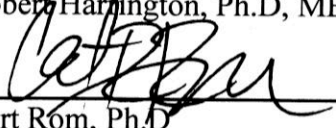
And hereby certify that in their opinion it is worthy of acceptance.



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Godwin-Charles Ogbeide, Ph.D, MBA



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## Abstract

Obesity has become a major nationwide health concern. Negative eating habits and lack of proper nutrition information were highlighted as major aspects of weight gain. This study was conducted in order to understand the relationship between nutritional knowledge and eating behaviors and their impact on the weight and obesity of college students. For this study, an instrument was designed that included survey questions regarding perception of healthy and unhealthy foods, personal consumption, and demographic factors. The instrument was administered to 577 college students. The results indicated a positive relationship between the knowledge of nutrition and eating behavior and the weight of college students.

**Key Words:** Underweight, Normal weight, Overweight, Obesity, Nutritional knowledge, Eating behavior



## Chapter 1

### Introduction

In the past twenty years, child and adolescent obesity has become a major health concern nationwide (Ebbeling, Pawlak, and Ludwig, 2002). Childhood and adolescent obesity cause many health complications and could lead to premature death. A change in the lifestyles of America's youth had been targeted as one of the major factors of this shift of weight gain in children. Eating habits such as the consumption of high sugar and high energy density foods, combined with large portion sizes, and the growing fast food trend in the USA was defined as one of the contributing factors of obesity (Ebbeling, Pawlak, and Ludwig, 2002).

In a cross sectional study done by the Division of Endocrinology in the Children's Hospital of Boston by doctors Ebbeling, Pawlak, and Ludwig (2002), it was found that, "obese children in South Carolina spent less time in moderate and vigorous physical activity than their non-obese counterparts, and that children in the USA spend 75% of their waking hours being inactive, compared with remarkably little time in vigorous physical activity; estimated at only 12 minutes per day" (Ebbeling et al., 2002, pp. 475). The doctors also found that the rising trend of families eating out and the lack of a consistent healthy diet magnified the effects of physical inactivity (Ebbeling et al., 2002).

The US Center for Disease Control had also turned its focus to understanding the causes and prevention of obesity (Dietz and Hunter, 2009). Their studies indicated that lack of physical activity was at the top of the list of contributing factors, followed by bad diets full of high energy density foods and sugar. The study also addressed the recently released U.S. Department of Health and Human Services' *Physical Activity Guidelines* for Americans (Health and Human Services, 2008). The guidelines recommended specific amounts of exercise per age group and

are beginning to be incorporated into many school based education programs and in local community programs (Dietz and Hunter, 2009).

This study investigated the relationship between nutritional knowledge and eating behavior and their impact on college students' weight.

## Chapter 2

### Literature Review

#### 2.1 Impact of college nutrition classes on weight

There have been numerous studies that supported the idea that nutritional knowledge promoted a lower body weight. In a study at Iowa State University, the authors found that college women's participation in a semester long nutrition class at the university was an effective strategy in preventing weight gain (Matvienko, Louis, and Shafer, 2001). They measured body weight, nutrient intake, and nutritional knowledge at the beginning of their study and then measured the same factors one year later. The data suggested that college women who participated and learned from a nutrition class made healthier food choices for themselves during the year (Matvienko, et al., 2001).

Research results from Madrid University showed that through a cross sectional study of university students, those who had nutritional knowledge when trying to lose weight consumed less sugary foods, and their portion control was monitored. They also found that the students showed a great interest in weight loss and were eager to learn more in regard to nutrition (Navia, Requejo, Mena, and Sobaler, 2003).

#### 2.2 Knowledge of nutrition and eating habits

Past studies shows that the “concern about nutrition has grown appreciably in recent years, although the level of knowledge about nutrition has not increased by the same degree” (Navia, Requejo, Mena, and Sobaler, 2003, pp. 90). Participants in this study were 234 university students who were enrolled in a nutrition class but had not taken any classes yet. The students completed a survey in which they recorded demographic features, their weight and height, and answered “yes” or “no” to various questions about their weight, what they enjoy eating on a normal basis and how often they eat those foods. (Navia et al., 2003). The study found that the

women participants generally wanted to lose weight more than the male participants. The authors concluded from this study that there appeared to be a lack of knowledge when it came to what healthy eating really included; thus, revealing that nutrition education among our youth is in disarray (Navia et al., 2003).

### 2.3 Barriers to healthy eating

A study done at Minnesota University indicated that little time, lack of concern for healthy eating, and lack of healthy resources available at school were some of the barriers to healthy eating (Croll, Neumark-Sztainer, and Story, 2001). The Minnesota University Health student's research concluded that while young women were being reached by messages from the Dietary Guidelines for America, they were not taking action. These women need to be further prompted to do so by interventions that helped with the meaning of these messages and provided easy ways on how to apply them in their daily lives (Croll et al., 2001).

Despite many interventions for adolescents regarding weight loss and the changes that they needed to make in order to be healthier, many younger adults continued to eat very unhealthy foods (Croll et al., 2001). A study done by Velazquez et al., (2011), indicated that it was absolutely necessary to understand why adolescents were making behavioral choices that could eventually lead to obesity and ultimately premature death. Over 15,000 people participated in this study, half being female and half being male. Participants completed a *Physical Activity and Nutrition Survey*. Questions about diets included self-reports on what participants ate that day. The study showed that perceived healthiness of eating was associated with consumption of perceived healthier foods. In conclusion, they found that dietary knowledge would not be enough for an intervention, that interventions must create changes in environments (Velazquez et al., 2011).

## 2.4 Interventions using nutritional knowledge to change eating habits

A study of Michigan middle school students on their nutrition knowledge and eating behaviors consisted of three assessments: eating habits, nutritional knowledge, and healthy eating. Each assessment was given pre- and post-experiment (Fahlman, Dake, McCaughtry, and Martin, 2008). Of the participants, 407 students were put into an intervention group and 169 were put into the control group. A trained health teacher taught the intervention group. The control group did not receive any formal nutritional teaching. The results of this study indicated that the intervention group increased their nutritional knowledge, as well as being more likely to eat fruits and vegetables and less likely to eat junk food than their control counterparts. The authors found that not only did the students say they were more likely to eat healthier, they actually did. Upon completion of the survey, students in the intervention group showed a change in their eating habits while those in the control group had no change. The authors believed that the declining eating behaviors of children and adolescents deteriorated over the past twenty years and that children's eating behaviors are directly linked to adult eating patterns. They also stated that "intervention at an early age is an essential aspect of preventions geared toward eliminating or reversing this trend" (Fahlman et al., 2008, p. 219).

## 2.5 Attitudes towards nutrition

A study by Bordi et al., (2005), focused on children's attitudes towards nutrition; specifically, basic eating behaviors, and the number of meals eaten per day. Seventh and Eighth grade students were used in this study with a somewhat small sample size of thirty-eight participants. Children were asked in a survey what their feelings and beliefs were regarding certain foods and their nutritional value. They were also asked what meals they were more likely to skip, and what intentions they had of eating the foods they were asked about. This study

showed that the children had a considerable amount of “nutrition misinformation.” The study indicated that nutrition misinformation affected attitudes toward nutrition and eating behaviors. The students had mixed results about whether certain foods were healthy and in what portion size. The study also showed that most of the middle school children’s nutritional information came from their family. This was in major finding since most people believed that the schools were supplying nutritional information to their children (Bordi et al., 2005). The results of this study showed that student’s beliefs on nutrition impacted their attitude towards it and that their attitude changed their intentions of eating certain foods.

## 2.6 Motivators on food behaviors

According to Worsley (2002), nutrition knowledge is the “knowledge of nutrients and nutrition.” His study highlighted the areas of nutrition of which consumers should have knowledge regarding energy content of food, the role of fats, the sources of vitamins and minerals, and the sources of phytochemicals (Worsley, 2002). In addition, Worsley (2002) asserted that the influences of behavior came from a variety of stimuli. He talked about the perceived consequences’ of the behavior, including the favorable and unfavorable outcomes, the attitudes and beliefs about the behavior, and the skills needed to alter these behaviors, such as eating healthier. He included motivators as a very important influence on food behaviors, and those motivators could range from social to biological needs. Worsley’s (2002) study suggested a possible broad range of influences on nutrition knowledge, and that consumer’s personal food goals were altered by this knowledge. He calls for greater attention to this subject and a “renewed proactive role for the education sector” (Worsley, 2002, p. 584).

## 2.7 External influences on diet, nutrition, and prevention of excess weight gain

A study on diet, nutrition, and the prevention of excess weight gain and obesity explained that the increasing westernization and urbanization of our countries have changed our diets (Swinburn, Caterson, Seidell and James, 2004). This study suggested that this new way of fast paced living and conveniences leaned towards a more sedentary lifestyle and higher consumption of fatty and high energy dense foods. Swinburn et al., pointed out that the life expectancy rate had significantly increased over the years due to the advancement and control of infectious diseases, but those infectious diseases were now being replaced with new threats to health such as obesity, heart disease, and diabetes (Swinburn et al., 2004).

Schools and other educational institutions were “well placed to influence the food environment and learning opportunities around nutrition” (Swinburn et al., 2004, p. 140). According to Swinburn et al. (2004), the promotion of healthy eating guidelines and messages should become a mass media campaign in order to target large groups. In addition, their study indicated that these interventions were necessary and need to be developed immediately in order to be effective and timely.

## 2.8 Education and Nutrition

A similar study was done on college students by Eun-Jeong and Caine-Bish (2009) using college students to examine the effect of nutrition intervention. In this study, a college class used general nutrition guidelines to promote fruit and vegetable consumption. For a period of three days, the eighty college students recorded their food intake before and after the intervention. After receiving the information about the healthier foods, the researchers found that there was a significant increase in the consumption of fresh fruits and vegetables in the participants’ diets. Results varied between the different sexes and showed that females responded more positively to

the intervention than males. The study also showed that a classroom nutrition intervention increasing fruit and vegetable consumption by college students was a “cost effective approach.” (Eun-Jeong and Caine-Bish, 2009, p.106).

In a study by Neumark-Sztainer et al. (2000), whereby 3,832 adults and 459 adolescents from four regions in the United States participated, found that adult men and women seeking a lower body weight had "significantly lower energy intakes, lower percentages of energy from fat, and higher percentages of energy from carbohydrates and protein than adults not trying to control their weight" (Neumark-Sztainer et al., 2000, p. 386). The study also showed that some of the participants, particularly adolescents, were using unhealthy ways to lose weight such as skipping meals or eating less than the recommended caloric intake. In addition, this study indicated the need for interventions designed to teach healthy ways of effectively lowering body weight, which should focus on the national dietary guidelines for healthy eating and nutrient intake, and that people should start incorporating these eating habits into their lifestyle (Neumark-Sztainer et al., 2000).

While previous studies showed that nutritional knowledge impacted food choices and healthy eating, there was room for additions. Most of the studies cited above were about healthy eating intentions, or changes in diet based on the provided knowledge provided. More research needs to be done to explore the relationship between body weight and eating choices. Hence, this study intended to explore the relationship between nutritional knowledge and eating behavior on the weight and obesity of college students.

## 2.9 Validity of self-reporting weight

While there is much controversy as to whether self-reporting of weight was an accurate method of data collection, a study done by Bowman and DeLucia indicated that self-reported



weight was “sufficiently accurate” in epidemiological studies. The purpose of their study was to explore this controversy by analyzing the conflicting data using meta-analysis. The authors found there were discrepancies of self-reporting weight; however, it was concluded that self-reporting was an accurate method for studies involving public health research.

## 2.10 Creating a Valid Instrument

Dr. Cynthia Moore’s dissertation from the University of Alabama on creating a valid and reliable instrument, drew upon a variety of research in the nutrition field. She targeted the use of a panel of experts to evaluate the instrument for validity. Dr. Moore states that a pilot study should be used, “not only to improve the writing of specific items on the survey, but to assess face validity” (Moore, 2006, p.66). Individual feedback was a crucial aspect of creating a valid instrument as well as readability and perceived difficulty. In this study, the researcher intended to follow these guidelines to create a valid instrument.

## 2.11 Theoretical Research

The theoretical basis for this study was Fishbein and Ajzen’s Theory of Reasoned Action. This research is commonly used to study human behavior. This study involves human behavior in regard to eating habits. Fishbein and Ajzen said that, “human behavior is under the voluntary control of the individual.” They also commented on how people can think about the consequences before doing something and then decide whether or not to do it. This theory correlated with this current study because it was found that people’s nutritional knowledge was allowing them to take a step back and realize the consequences of eating unhealthy; thereby allowing them to choose to make a healthier decision.

## 2.12 Purpose and Objectives

The purpose of this study was to investigate the relationship between nutritional knowledge and eating behaviors and their impact on the weight and obesity of college students. The objectives of this study were:

1. To explore the weight of college students.
2. To examine the relationship between knowledge of nutrition and weight of college students.
3. To examine the relationship between eating behaviors and weight of college students.
4. To explore the interaction of nutritional knowledge and eating behavior on the weight and BMI of college students.

## Chapter 3

### Methodology

The previous chapter reviewed numerous studies on the subject of knowledge of nutrition and obesity. This chapter is based on how the research of this study was carried out. The first section is about the target population and the sample section. The next section focuses on the design of the research instrument. The survey instrument was created using several valid surveys and then distributed to the target population (Bordi et al., 2005). The results from the survey were then analyzed to produce the indicated results in the last section of this chapter.

#### 3.1 Population and Sample

The target population for this empirical study was students at a tier-one Upper Mid-South University in the United States. The sample selection for this study was a convenience sample of undergraduate and graduate students of the institution.

#### 3.2 Instrumentation

The survey instrument for this study was based on a review of literature (Bordi et al. 2005). The instrument was tested for validity and reliability. The validity of the instrument was established by a panel of selected nutritional experts within the university. The reliability was based on a Cronbach's Alpha Coefficient. A Cronbach's alpha coefficient of 0.70 was the usual measure of the reliability statistics (Ary, Jacobs, and Razavieh, 2002). The instrument was tested via a pilot study to ensure that the reliability of the instrument attained a reliable Cronbach alpha coefficient.

The instrument was made up of four parts. Part 1 of the instrument consisted of 25 questions regarding the participants' perceptions of different foods and was based on a 5-point Likert scale (1 = very unhealthy 5 = very healthy). Part 2 of the instrument consisted of the same 25 questions as in Part 1 but this part was in regard to the participants' level of consumption of

each food item/type. Part 2 of the instrument was also based on a 5-point Likert scale (0 = rarely or never consume, 1 = consume or use 1-3 times a month, 2 = consume or use 1-3 times a week, 3 = consume or use 4-6 times a week, 4 = consume or use every day). Part 3 of the instrument consisted of 10 questions regarding the participants' diet and how often they consumed breakfast, lunch, and dinner. Part 4 of the instrument consisted of 12 questions regarding participants' demographic profiles. Some of the demographic profiles included gender, age, educational program or major, weight, height, etc.

### 3.3 Data Collection and Analysis

Data collection was based on two methods: web-based survey method and direct data collection method. Surveymonkey.com was used to design and administer the web-based survey. Prior to data collection, implied consent was presented to each participant as needed. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 18.0 for Windows, a product of SPSS, Inc. Descriptive statistics (Mean, Percentage, and Frequencies) were used to analyze the demographic factors. Inferential statistics (T-test, Regression analysis, Multivariate analysis, etc.) were also used to analyze the data for the main objectives of the study.

## Chapter 4

### Results and Discussion

The results of this study are being presented in the order of objectives. The data used in this study were tested for validity and reliability using the Cronbach Alpha reliability test. The data received a 0.7 Cronbach Alpha coefficient, which indicated that the data were reasonably reliable. The first portion of the results, (Section 4.1 below) explored the weight of college students and presented the demographic profiles for the participants. The demographics highlighted in this study included: gender, class standing, age, number of meals consumed per day, where the participants learned the most about nutrition, and the number of nutrition courses taken in college, and height and weight. The second section of results (Section 4.2 below) explored the relationship between knowledge of nutrition and the weight of college students. The results in Section 4.3 examined the relationship between eating behavior and college students' weight. Lastly, Section 4.4 of the results explored the interaction between nutritional knowledge and eating behavior on the weight and BMI of college students.

#### 4.1 Participants' Profile

The instrument was distributed to a total of 577 participants. Table 1 shows the results of the participant profile. Approximately 68% of the students were female and approximately 32% were male. The preponderance of the college participants were sophomores (30%) followed by freshman (25%), and juniors (25%). The mean age was 25 or younger (95%) (Table 1).

Table 1. Gender, Class, and Weight Distribution of College Students

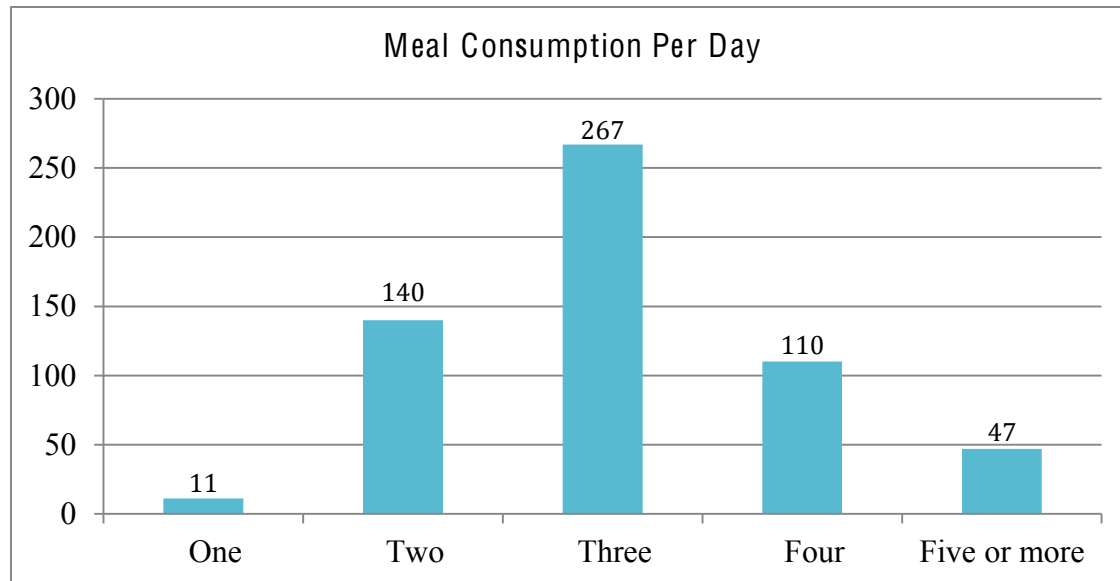
Response	Total (N)	Percentage (%)
<i>Gender distribution</i>		
Female	392	68.3
Male	182	31.7
Total	574	100
<i>Class distribution</i>		
Freshman	144	25.2
Sophomore	170	29.7
Junior	143	25.0
Senior	105	18.4
Graduate Student	10	1.7
Total	572	100
<i>Age</i>		
20 years old or younger	329	57.1
21-25 years old	221	38.4
26-30 years old	12	2.1
31-40 years old	10	1.7
41 and above	4	0.7
Total	576	100

Of the college students who participated in this study, the majority of the students consumed two (24%) or three (46%) meals a day as seen in Table 2. and Figure 1.

Table 2. Meal Consumption Per Day

Response	Total (N)	Percentage (%)
One	11	1.9
Two	140	24.4
Three	267	46.4
Four	110	19.1
Five or more	47	8.2
Total= N	575	100

Figure 1. Meal Consumption Per Day



Participants in this study learned the most about nutrition from school (47%) and family (24%) (Table 3.).

Table 3. Source of Nutrition Knowledge

Response	Total (N)	Percentage (%)
Family	138	24.0
Friends	38	6.6
School	269	46.7
Media	78	13.5
Other	53	9.2
Total= N	576	100

The results were varied when it came to the question of the amount of nutrition courses the students had previously taken. Table 4 shows the majority of students had taken one class (199) and two classes (159).

Table 4. Number of Nutrition Classes Taken in College

Response	Total (N)	Percentage (%)
None	88	15.3
One-Two	358	62.1
Three-Four	79	13.7
Five or more	50	8.7
Total= N	577	100



Tables 5, 6, and Figure 2 showed the weight distribution of college students. Of the 566 respondents, 173 were overweight or obese, 363 were of normal weight, and 30 were in the underweight classification. The classifications were: BMI < 18.5 was underweight, BMI between 18.5-24.9 was normal weight, BMI between 25-29.9 was overweight, and a BMI > 30 was obese. The results regarding the weight of college students showed that approximately 1 in every 3 college students were overweight or obese.

The breakdown between male and female revealed some interesting findings. Both the male and female mean of overweight students showed them at the low end of the overweight category (BMI between 25-29.9). This indicated that there was an opportunity for these students to make some healthy changes to their lives and perhaps fall back into the normal weight category. On the other hand, the students mean in the obese category were well over the dividing line between overweight and obese with a male mean of 34.85 and a female mean of 34.62.

Another interesting finding in the breakdown between male and female weight was that overweight and obesity were more common in male students. This could probably be because female college students were more concerned with their weight than male students.

It was also important to point out that the average revealed that most college students were of normal weight. These tables demonstrated that it is important to go case by case and individually because without doing so the researcher may not see the significant number of overweight or obese college students.

This BMI distribution relates to the surveyed college only and is not a representation of any state in the South as the BMI of the people in the South was found to be higher than that of this study (references). There was a probability that college students were part of a higher socio-economic group. Therefore, the reason for the lower BMI overall could be due to the fact they

were a part of a higher socioeconomic group by just being a college student, allowing them access to more resources such as education or money, that would help control BMI.

Table 5. Mean of Weight Distribution

	Mean			Std. Deviation			N		
	F	M	Total	F	M	Total	F	M	Total
Underweight	106.79	110.00	107.17	21.55	N/A	20.85	28	1	30*
Normal Weight	130.43	161.85	137.87	15.07	16.77	20.45	277	86	363
Overweight	162.10	192.42	178.78	18.62	19.73	24.45	58	73	132*
Obese	195.00	255.19	226.93	32.49	37.89	45.84	19	21	41*
Total	136.72	184.72	152.24	25.71	36.50	37.25	382	181	566

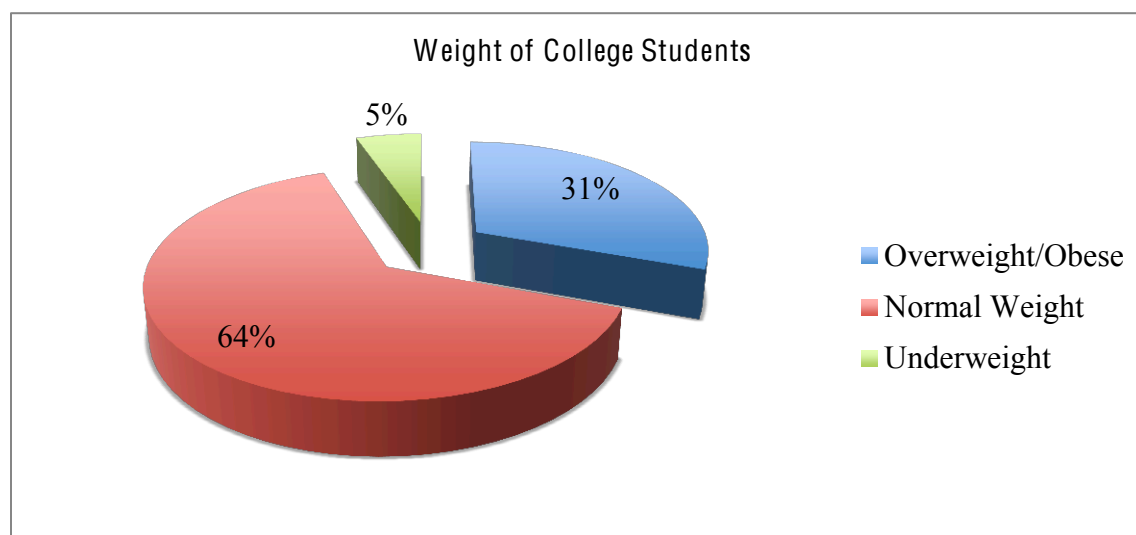
\*F and M did not add up to the total value because of the unidentified gender

Table 6. Mean of BMI Distribution

	Mean			Std. Deviation			N		
	F	M	Total	F	M	Total	F	M	Total
Underweight	17.16	17.20	17.19	2.94	N/A	2.84	28	1	30*
Normal Weight	21.59	22.37	21.77	1.69	1.55	1.69	277	86	363
Overweight	26.50	26.70	26.60	1.44	1.26	1.34	58	73	132*
Obese	34.62	34.85	34.84	5.67	3.80	4.70	19	21	41*
Total	22.66	25.53	23.60	4.12	4.38	4.45	382	181	566

\*F and M did not add up to the total value because of the unidentified gender

Figure 2. Weight Distribution of College Students



#### 4.2 Relationship between knowledge of nutrition and weight of college students

Table 7 and 8 relate to the second objective of this study, which was to examine the relationship between knowledge of nutrition and weight of college students. Each participant's weight status was calculated using a BMI calculator. The BMI and weight of each college student was then compared to the number of nutrition courses that the student had previously taken. The result indicated that students who have not taken any nutrition classes have a significantly higher BMI and weight ( $P < 0.001$ ) than students who have taken at least one nutrition class.

The result shows a positive relationship between nutrition classes and a lower BMI and weight. This study indicated that enrollment in nutrition courses could be effective in helping to control weight gain.

Table 7. *t*-test of the Impact of Nutritional Knowledge on Weight

Nutritional Knowledge	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
No nutrition courses	88	174.41	39.58	6.25	565	.000
One or more nutrition course(s)	479	148.26	35.40			

Table 8. *t*-test of the Impact of Nutritional Knowledge on BMI

Nutritional Knowledge	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
No nutrition courses	88	25.17	4.39	3.64	566	.000
One or more nutrition course(s)	480	23.22	4.65			

#### 4.3 Relationship between eating behavior and weight of college students

The third objective of this study examined the relationship between eating behavior and weight of college students. Participants were asked to answer a series of questions regarding their personal consumption of certain types of foods. The nutritional survey included questions regarding the consumption of healthy foods and foods high in sugar and fat content. The results indicated that students who consumed mostly fast food and high sugar and fat content foods had a significantly higher weight ( $P = 0.010$ ) than students who consumed lean meat, and low sugar and fat content foods.

This result indicated that what people were eating was a crucial aspect to weight fluctuation and was necessary to maintaining a healthy weight. Participants' selections of food were either negatively or positively impacting them; therefore, more attention needed to be focused on promoting healthier food options for youth and college students. This study showed

that people consuming fatty foods compared to people consuming leaner foods were at a higher risk for obesity.

Table 9. *t*-test of the Impact of Fatty and Non-Fatty Food on Weight

Types of Food	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Fast food/Fatty Foods	124	158.36	43.01	2.60	384	.010
Non- Fatty foods	262	147.69	34.78			

#### 4.4 Interaction of nutritional knowledge and eating behavior on weight and BMI

The fourth and final objective of this study was to explore the interaction of nutritional knowledge and eating behavior on the weight and BMI of college students. The result indicated a positive relationship between nutritional knowledge and eating behavior and their impact on the weight and BMI of college students.

Table 10 shows that students with more nutritional knowledge, who consumed lean meat and low sugar and fat content foods, have lower body weight than students with less nutritional knowledge who consumed mostly fast food and food with high fat and sugar content.

Table 10. Interaction of Nutritional Knowledge and Eating Behavior on Weight

Interactions	Mean	Std. Deviation	N
No nutrition courses* Fast food/Fatty foods	178.23	43.10	22
No nutrition courses* Non- fatty foods	167.09	36.38	35
One or more nutrition course(s)* Fast food/Fatty foods	154.08	41.97	102
One or more nutrition course(s)*Non- fatty foods	144.46	33.50	226

Similarly, Table 11 shows that students with more nutritional knowledge, who consumed lean meat and low sugar and fat content foods, have lower BMI than students with less nutritional knowledge who consumed mostly fast food and food with high fat and sugar content.

Table 11. Interaction of Nutritional Knowledge and Eating Behavior on BMI

Interactions	Mean	Std. Deviation	N
No nutrition courses* Fast food/Fatty foods	26.07	5.64	22
No nutrition courses* Non- fatty foods	24.17	3.02	35
One or more nutrition course(s)* Fast food/Fatty foods	24.06	5.51	102
One or more nutrition course(s)*Non- fatty foods	22.91	4.08	226

This result indicated that the combination of great nutritional knowledge and good eating behavior that is based on the consumption of lean meat and low sugar and fat content foods is encouraged for normal body weight. The result also showed that the combination poor nutritional knowledge and bad eating behavior that is based on the consumption fast food and food with high fat and sugar content could lead to overweight. Therefore, more attention needed to be focused on promoting healthier food consumption and nutritional knowledge for youth and college students.

## Chapter 5

### Conclusions, Implications, and Limitations

#### 5.1 Conclusion

The results of this study indicated that there was a positive relationship between nutritional knowledge and proper eating habits on the weight and incidence of obesity. This study, like other similar previous studies, highlighted the importance of a nationwide nutritional education. Therefore, the premise of this study was: If people are educated on proper nutritional behaviors to curtail the epidemic of overweight or obesity, the chance of proper eating habits will be increased and the risk of being overweight will be reduced.

#### 5.2 Implications

The primary implications of this study indicated the potential effects of educating children and adolescents to take nutritional courses and to promote healthier eating habits. The results indicated that nutritional courses had a positive relationship with healthier food choices, and healthier food choices in turn had a positive relationship with lower weight. Thus, the more exposure to nutritional knowledge that children and adolescents has, the healthier the choices they will be more likely to make. The participants of this study were college students whose focus was on education. With this being a key influence at this stage in their lives, perhaps a nutrition course should become a mandatory university core class for graduation in the future.

This study also left room for further research as well. The study mainly focused on school as the main source for nutritional knowledge, and does not go into depth about the impact of various sources of nutritional knowledge. The presence of supplemental nutritional information from other sources than school (such as family, friends, and the media) might also be a factor that could positively or negatively affect participants' overall BMI.

Further research also could be done regarding the difference between working students and non-working students, as well as between male and female participants in regard to food consumption and food perceptions.

### 5.3 Limitations

There were several limitations of this study. The first limitation was the sample size. The reason this sample size was small was due to the timing of this project. There was a time constraint on the data collection, so keeping it relatively small was a necessity.



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# Appendix

## Appendix 1 Implied Consent

### Knowledge of Nutrition, Weight and Obesity Study

#### Introduction/Description:

As part of my school projects, I am conducting a study to investigate the relationship between knowledge of nutrition and eating behaviors on the weight and obesity of college students. I will sincerely appreciate a few minutes of your time to participate in this study.

**Risks and Benefits:** This study is a step towards future studies intended to provide solution (educational and/or behavioral modifications) towards the curtailment of the incident of overweight and obesity in Arkansas State and the nation at large. There are no anticipated risks to participating in the study.

**Voluntary Participation:** Your participation in the research is completely voluntary. If you choose to participate and complete the enclosed questionnaires, you may leave any items blank that you do not want to answer. You may withdraw from the survey at any time without consequence to you. It should take you about ten minutes to complete the questionnaire.

**Confidentiality:** All responses will be anonymous. Only members of the research team and associated support staff will see completed questionnaires. All data will be combined and only group summaries will be included in the survey reports. No data will be reported in a manner that would allow a reader to associate any responses to individual respondents. Results from the research will be reported as aggregate data.

**Right to Withdraw:** You are free to refuse to participate in the research and to withdraw from this study at any time. Your decision to withdraw will bring no negative consequences — no penalty to you.

If you have any questions or concerns about this study you may contact my advisor Dr. Godwin-Charles Ogbeide through any of the means below. For questions or concerns about your rights as a research participant, please contact Ro Windwalker, the University's Compliance Coordinator, at [\(479\) 575-2208](tel:4795752208) or by e-mail at [irb@uark.edu](mailto:irb@uark.edu).

By filling out and submitting the survey you are consenting to participate. You acknowledge that you read the description, including the purpose of the study, the procedures to be used, the potential risks and side effects, the anonymity of all responses, as well as the option to withdraw from the study at any time.

The survey will take you about 10 minutes to complete. Please respond immediately, Click below to access the survey now:

### Knowledge of Nutrition, Weight and Obesity Study

#### Link

Thank you in advance for taking the time to help with this important project.  
This e-mail has been generated in accordance with the UARK E-Mail Policy.

## Appendix 2 Nutritional Survey

**Part 1:** Listed below is various types of foods, indicate your perception about the consumption of the listed foods by using the key below.

Key: 1 = Very Unhealthy    2 = Unhealthy    3 = Okay (in moderation)    4 = Healthy  
5 = Very Healthy

1. \_\_\_\_\_ Alcoholic beverages
2. \_\_\_\_\_ Caffeinated beverages (e.g. coffee, tea, energy drinks)
3. \_\_\_\_\_ Water
4. \_\_\_\_\_ Soda (carbonated beverages such as Coke, Pepsi, Sprite, etc.)
5. \_\_\_\_\_ Sweetened beverages (e.g. Powerade, Gatorade, etc.)
6. \_\_\_\_\_ Whole milk, sour cream, cheese or eggs
7. \_\_\_\_\_ Skim milk and low fat dairy products (e.g., yogurt etc.)
8. \_\_\_\_\_ Margarine, butter, etc.
9. \_\_\_\_\_ Fatty snacks (e.g., chips, candy, etc.)
10. \_\_\_\_\_ Salt
11. \_\_\_\_\_ Sugar
12. \_\_\_\_\_ Artificial sweeteners
13. \_\_\_\_\_ Nuts (such as peanut, cashew nuts, etc.)
14. \_\_\_\_\_ Legumes (peas, beans, lentils, etc.)
15. \_\_\_\_\_ Tofu, soy meats, veggie burger
16. \_\_\_\_\_ Hamburgers, hot dogs, bologna, steaks etc.
17. \_\_\_\_\_ Lean meats, skinless poultry, fish etc.
18. \_\_\_\_\_ Desserts (e.g., ice cream, cakes, pies etc.)
19. \_\_\_\_\_ Unsweetened breakfast cereal
20. \_\_\_\_\_ Sweetened breakfast cereal
21. \_\_\_\_\_ Biscuit, rolls, bread, etc.
22. \_\_\_\_\_ Fast foods (e.g., McDonalds, Hardees, Taco Bell etc.)
23. \_\_\_\_\_ Fried foods
24. \_\_\_\_\_ Pasta
25. \_\_\_\_\_ Fruits and vegetables

**Part 2:** Listed below is various types of foods, indicate how often you consume the listed foods, by using the key below.

Key: 1 = Rarely or never    2 = 1-3x a month    3 = 1-3x a week    4 = 4-6x a week  
5 = Everyday

26. \_\_\_\_\_ Alcoholic beverages
27. \_\_\_\_\_ Caffeinated beverages (e.g., coffee, tea, energy drinks)
28. \_\_\_\_\_ Water
29. \_\_\_\_\_ Soda (carbonated beverages such as Coke, Pepsi, Sprite, etc.)
30. \_\_\_\_\_ Sweetened beverages (e.g., Powerade, Gatorade, etc.)
31. \_\_\_\_\_ Whole milk, sour cream, cheese or eggs
32. \_\_\_\_\_ Skim milk and low fat dairy products (e.g., yogurt etc.)

33. \_\_\_\_\_ Margarine, butter, etc.
34. \_\_\_\_\_ Fatty snacks (e.g., chips, candy, etc.)
35. \_\_\_\_\_ Salt
36. \_\_\_\_\_ Sugar
37. \_\_\_\_\_ Artificial sweeteners
38. \_\_\_\_\_ Nuts (such as peanut, cashew nuts, etc.)
39. \_\_\_\_\_ Legumes (peas, beans, lentils, etc.)
40. \_\_\_\_\_ Tofu, soy meats, veggie burger
41. \_\_\_\_\_ Hamburgers, hot dogs, bologna, steaks etc.
42. \_\_\_\_\_ Lean meats, skinless poultry, fish etc.
43. \_\_\_\_\_ Desserts (e.g., ice cream, cakes, pies etc.)
44. \_\_\_\_\_ Unsweetened breakfast cereal
45. \_\_\_\_\_ Sweetened breakfast cereal
46. \_\_\_\_\_ Biscuit, rolls, bread, etc.
47. \_\_\_\_\_ Fast foods (e.g., McDonalds, Hardees, Taco Bell etc.)
48. \_\_\_\_\_ Fried foods
49. \_\_\_\_\_ Pasta
50. \_\_\_\_\_ Fruits and vegetables

### Part 3

51. Do you diet to lose weight?
  - a. Yes
  - b. No
  
52. How would you describe your current diet?
  - a. Poor
  - b. Fair
  - c. Good
  - d. Very good
  - e. Excellent
  
53. How do you perceive your body weight?
  - a. I am overweight
  - b. I am of normal weight, but am gaining weight
  - c. I am of normal weight
  - d. I am underweight
  - e. I am not sure
  
54. How often do you eat breakfast?
  - a. Rarely or never
  - b. 1-3x a month
  - c. 1-3x a week
  - d. 4-6x a week
  - e. Everyday

55. How often do you eat lunch?

- a. Rarely or never
- b. 1-3x a month
- c. 1-3x a week
- d. 4-6x a week
- e. Everyday

56. How many meals do you eat per day? \_\_\_\_\_

57. How often do you eat dinner?

- a. Rarely or never
- b. 1-3x a month
- c. 1-3x a week
- d. 4-6x a week
- e. Everyday

58. How often do you exercise?

- a. Rarely or never
- b. 1-3x a month
- c. 1-3x a week
- d. 4-6x a week
- e. Everyday

59. Use the classes of food choices (Class A and Class B examples) below to indicate the kind of foods you usually eat, by choosing one of the answers from “a – e” that best represent your behavior in regard to these food choices.

**Class A examples:** hamburgers, hot dogs, bologna, steaks, sour cream, cheese, whole milk, eggs, butter, cake, pastry, ice cream, chocolate, fried foods and many fast foods

**Class B examples:** lean meats, skinless poultry, fish, skim milk, low fat dairy products, fruit desserts, gelatin, vegetables, pasta, and legumes (peas and beans)

- a. Nearly always eat the Class A foods
- b. Eat mostly the Class A foods, some Class B foods
- c. Eat both Class A and B about the same
- d. Eat mostly Class B foods, some Class A
- e. Eat only Class B foods

60. Listed below are some sources of protein (Animal Sources and Vegetable Sources),  
Indicate the kinds of protein foods you usually eat by choosing one of the answers from “a – e” that best represent your behavior in regard to these protein sources.

**Animal Sources:** meats, poultry, fish, cheese, eggs

**Vegetable Sources:** legumes (peas, beans, lentils), tofu, soy meats, nut foods, veggie burger, vegetarian entrees



- a. nearly always eat animal proteins
  - b. eat mostly animal proteins
  - c. eat both about the same
  - d. eat mostly vegetable proteins
  - e. eat only vegetable proteins
61. Are you a Male or Female?
- a. Male
  - b. Female
62. If you currently exercise, how long do your sessions last?
- a. Less than 15 minutes
  - b. 15-30 minutes
  - c. 30-45 minutes
  - d. 45-60 minutes
  - e. Longer than 1 hour
63. What class are you?
- a. Freshman
  - b. Sophomore
  - c. Junior
  - d. Senior
  - e. Graduate Student
64. How old are you?
- a. 20 years old or younger
  - b. 21-25 years old
  - c. 26-30 years old
  - d. 31-40 years old
  - e. 41 and above
65. If you are employed, how do you MOSTLY carry out your tasks?
- a. By standing
  - b. By walking
  - c. By sitting
  - d. By sitting and walking/standing
  - e. Not applicable
66. Where have you learned the most about nutrition?
- a. Family
  - b. Friends
  - c. School
  - d. Media
  - e. Other (please specify) \_\_\_\_\_

67. – (Others from 67 above)

68. Did you take a nutrition class in high school?

- a. Yes
- b. No

69. How many nutritional related courses have you taken in college? \_\_\_\_\_

70. What is your major? \_\_\_\_\_

71. How many hours do you work per week? \_\_\_\_\_

72. What is your current weight (without shoes)? \_\_\_\_\_

73. How tall are you (without shoes)? \_\_\_\_\_