CHANGES IN STUDENT RESPONSES AFTER AN INTERDISCIPLINARY GRADUATE COURSE IN NUTRITION AND OBESITY

by

KELLYN WRIGHT SHOLLENBERGER

(Under the Direction of Mary Ann Johnson)

ABSTRACT

The purpose of this study was to explore changes in responses by graduate students (n = 19) enrolled in the graduate interdisciplinary course FDNS 6240 Nutrition and Obesity across the Lifespan. Both at the start and end of the course, student knowledge was evaluated by assessments which included the question “write down everything that comes to mind when you think of nutrition and obesity across the lifespan.” Responses were analyzed using qualitative content analysis. The post course assessment had an increased discussion about physiological and environmental influences, balance between personal choice and outside factors, complexity of the obesity issue, the need for multidisciplinary treatment, and the role of the food industry to address obesity. Mental health was mentioned in the pre course assessment but nearly disappeared in the post course assessment responses. This study shows areas for ongoing course development and demonstrates that students can work together to address obesity.

INDEX WORDS: obesity; course evaluation; graduate education; interdisciplinary

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BSFCS, University of Georgia, 2014

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

ATHENS, GEORGIA

2016

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May 2016

DEDICATION

This work is dedicated to my wonderful family. Mama and Daddy, thank you for always supporting me and encouraging me. You have walked with me through Westfield, to the University of Georgia, soon to Bay Pines, and on to the future. Your support has never wavered, and I know it never will. When I changed to nutrition, you made sure that I had done my homework, and then you jumped in with me on this new journey.

Griffin, you have calmed me, motivated me, and overall been there for me. You have pushed me when I didn't want to keep going, and you've made me sleep when I've been exhausted and tried to keep going. I love you, and I am excited for this next chapter of our lives together in Florida.

ACKNOWLEDGEMENTS

I would like to acknowledge my committee members, Drs. Mary Ann Johnson, Janani Thapa, and Alison Berg. Thank you all for your comments and contributions to my thesis and presentation of results.

To Dr. Thapa, your interest in my thesis and presentation was a great encouragement. I want this work to fulfill a purpose. I know Dr. Johnson will use it, but to see your enthusiasm to apply it to your own work reinforced all the work that I have put into this.

To Dr. Mary Ann Johnson, thank you for working with me and getting to know me back when I took your course as a junior. You helped to show me options when I decided to pursue nutrition as an undergraduate. As a graduate student, you have mentored me and provided me with numerous opportunities to grow as a student and future professional.

To Ali, I do not know how to thank you for your mentorship over the past 3 years. You have taught me the little things and kept me on track for the big ones. It has been the subtleties during nutrition counseling and education to conquering qualitative analysis. You have been both a mentor and a friend, and my graduate experience would have been lacking if I had not worked with you.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

Obesity is a problem on a local, state, national, and international level. In the United States the prevalence of obesity in adults is 34.9% (1). The prevalence has dramatically increased over the past four decades, rising from 14.6% according to NHANES I 1971 – 1974 (2) to its current level of 34.9% of US adults in NHANES 2011 – 2012 (1). Obesity puts an individual at increased risk for cardiovascular disease, Type II diabetes, and some cancers (3, 4).

To combat this problem, experts in numerous fields including healthcare, nutrition, exercise, policy, education, public health, journalism, food science, agriculture, and more must collaborate to form potential solutions to this problem. In order to form solutions, everyone from experts to students in these professions must be educated on obesity, and universities should offer favorable environments for students and professionals to learn not only their profession's role in fighting obesity but also the role that other disciplines have. At the University of Illinois, Sharon Donovan, PhD has promoted a transdisciplinary approach to address obesity through the Illinois Transdisciplinary Obesity Prevention Program (I-TOPP). In this program, a master's of public health is combined with a doctoral degree in childhood obesity in order to develop methods, theories, and conceptual models that integrate disciplines to address complex public health issues (5). The University of Georgia also has recently created a program to address obesity called the Obesity Initiative, which has a multidisciplinary approach. Its purpose is to use the aspects of a land-grant university—teaching, research, and outreach—to develop obesity

prevention and treatment programs across the state of Georgia. A project under the Obesity Initiative is the Certificate in Obesity and Weight Management. This certificate combines courses in nutrition, physical activity, policy, and a survey course along with electives including additional coursework, research, and outreach to prepare students to address the obesity epidemic in “clinical, community, school, workplace, and research settings” (6).

This study is centered upon one of the courses that fulfills the nutrition class requirement for the certificate: FDNS 6240 Nutrition and Obesity across the Lifespan. The course was initiated in the fall semester of 2014 and included a wide variety of students. This study focuses on the change in responses to an open-ended question presented to students twice during the course. Students were asked the question within the first week of the start of the course and again after course completion. Analyzing the changes allows for an overall assessment of how student knowledge and attitudes may have changed during the course. Additionally, analyzing the changes will provide instructors with insight for further course development in order to address the purpose of the certificate and prepare students to address obesity in any field. The methods from this study can be used for any course and its development to help ensure that it continues to fulfill its purpose for a certificate, minor, major, or other degree.

Chapter 2 is a review of the literature on the need for interdisciplinary graduate-level education covering obesity along with a statement of subjectivity. Chapter 3 is a manuscript to be submitted to a journal and includes the methods, results, and discussion of changes seen in student responses. Chapter 4 presents a summary of major findings, suggestions for further course development, and conclusions of the study.

CHAPTER 2

LITERATURE REVIEW

OBESITY

In the United States, obesity is an epidemic. As of 2014, no state has an adult obesity prevalence of less than 20%, and three states (Mississippi, Louisiana, and West Virginia) have prevalence greater than 35% (7). Excessive body weight is a problem not only across the country but also across the lifespan.

From birth to 2 years of age, excessive weight is based on weight for recumbent length. Based on data from the National Health and Nutrition Examination Survey (NHANES) 2011-2012, 8.1% of infants and toddlers birth to 2 y have high weight for recumbent length according to CDC growth charts and 7.1% according to WHO growth charts (1). High weight for recumbent length is defined greater than the 95^{th} percentile of CDC 2000 Growth Charts or greater than the 97.7^{th} percentile of the WHO 2006 Growth Charts. There is a statistically significant difference in prevalence between boys (5.0%) and girls (11.4%) of this age group (1).

After 2 y until 19 y, obesity is defined as body mass index (BMI, kg/m^2) of greater than the 95^{th} percentile of CDC growth charts. According to NHANES, childhood obesity prevalence is 16.9% (1). At this stage there is no statistical difference between genders; however, there is significant difference regarding age (1). Those from 2 – 5 y had a significantly lower prevalence of obesity (8.4%) compared to 6 – 11 y (17.7%) and 12 – 19 y (20.5%) though there was no significant difference between the two older groups (1).

Finally, obesity is most prevalent in adults compared to other age groups in the United States. Obesity for adults 20 y and older is defined by a BMI of ≥ 30. Based on NHANES 2011 – 2012, age-adjusted prevalence is 35.1% with a significant difference between men (33.5%) and women (36.1%) (1). Significant differences also occurred when adults were divided by age into young adults (20 – 39 y, 30.3%), middle-age adults (40 – 59 y, 39.5%) and older adults (60+ y, 35.4%) (1).

Obesity is present at every stage of life, and it is also affecting every stage of life. In a California study, mothers of babies born with neural tube defects (NTD) were matched with mothers of non-malformed controls. Women who were obese had nearly twice the chance of being mothers of an NTD case than women who had a BMI ≤ 29 (odds ratio, 1.9; 95% CI 1.3 – 2.9) even after adjustment for age, education, use of vitamins, and alcohol usage (8). It also was not due to maternal nonuse of a folic acid-containing vitamin, diabetes, low dietary folic acid consumption, or a history of an NTD case (8). Obesity is also affecting the health of children. Childhood obesity increases the risk of being an obese adult, and adult obesity raises the risk for comorbidities including diabetes and cardiovascular disease (9). Risk for these diseases are determined by several factors including low high density lipoprotein (HDL), elevated low density lipoprotein (LDL), elevated systolic and diastolic pressure, elevated triglycerides, and elevated glycated hemoglobin (9). Moreover, a study by Skinner et al. in the New England Journal of Medicine demonstrates that obese children already have many of these risk factors (9).

Even into adulthood, obesity increases the risk for the conditions previously mentioned and have a detrimental effect on life expectancy. From the Framingham Heart Study, nonsmoking obese males and females lost 5.8 y and 7.1 y, respectively, of life expectancy at age 40 when compared to a normal weight nonsmoker (10). Even for smokers, the loss was

comparable with a 40 y female smoker losing 7.2 y of life expectancy and a 40 y male smoker losing 6.7 y compared to a normal weight smoker (10). Finally, obesity continues to affect the lifespan even to older adults. An obese older adult is twice as likely to be admitted to a nursing home facility (11). Unfortunately, not all nursing homes are prepared with sufficient staff, supplies, and equipment to handle the needs of obese and extremely obese patients (11).

With each of these problems brought on by obesity, there is a corresponding healthcare cost. This cost can come in the form of spina bifida care (8), statin use by high schoolers (9), treatment of type 2 diabetes and its complications (12), increased nursing home care (11), and many others. By identifying obesity related comorbidities and using electronic medical records of approximately 100,000 patients, Li et al. were able to analyze comorbidities including their cost. Gastroesophageal reflux disease (GERD), chronic lower back pain, depression, osteoarthritis, dyslipidemia, and hypertensive diseases are the six most expensive conditions for both obese and non-obese populations (12). In each of these conditions, obese patients had a statistically higher prevalence than non-obese (12). In this study, the healthcare cost per person with no comorbidities was $1578 (12). However, with the addition of one of the six previous conditions, healthcare costs increased $486 – $1065 per person per condition per year (12). Because of the higher rates of these six conditions in obese populations, Li et al. calculated that obesity adds $35 million per 100,000 persons per year (12). If all 21 obesity comorbidities diseases are included, the economic burden of obesity solely from the medical costs of these conditions rises to $58 million per 100,000 persons per year (12).

NUTRITION'S ROLE IN OBESITY

Due to the increased research related to the rise in obesity prevalence, the cause of obesity has been recognized as related to a "genetic predisposition and an environmental susceptibility to gain weight due to increased energy intake and reduced energy expenditures" (13). Nutritional habits contribute to the development of obesity, but they also have a large role in treating obesity and its comorbidities.

Beginning in the gestational period, maternal obesity and excess maternal weight gain has been associated with poor pregnancy outcomes as well as the child's future adiposity, cardiovascular disease, and respiratory disease risk (14). In childhood, poor dietary habits including excess energy intake, excess saturated fat intake, excess sodium intake, low potassium intake, and low calcium intake may contribute to cardiovascular disease, low peak bone mass, and other nutrition-related diseases in adulthood (15). Continuation of these poor dietary habits into adulthood contributes towards many of the leading causes of death in the United States including cardiovascular disease, diabetes, and some cancers (16, 17).

Proper nutrition has been shown to help manage and treat obesity and its comorbidities. For example, medical nutrition therapy has been shown and is recommended for "preventing diabetes, managing existing diabetes, and preventing, or at least slowing, the rate of development of diabetes complications" (18) according to the American Diabetes Association. For cancer prevention, the American Cancer Society recommends an overall healthy diet pattern with an emphasis on plant-based foods which is in line with 2010 Dietary Guidelines for Americans and the 2008 Physical Activity Guidelines for Americans (19). Finally, the American Heart Association recommends a healthy eating pattern of high fruit, vegetable, and whole grain intake with low intakes of trans fat, saturated fat, and added sugars. Following these guidelines while

maintaining a healthy weight, losing weight if needed, and staying active will help control cardiovascular disease and its risk factors (20).

OBESITY EDUCATION IN MEDICAL SCHOOL CURRICULA

With the high prevalence and high cost of obesity, researchers, medical personnel, government agencies, and many other change agents are focusing on how to treat and prevent obesity. Medical professionals, especially physicians and nurses, encounter both non-obese and obese patients on a regular basis. However, historically, these professions have managed the comorbidities of obesity rather than obesity, and although the medical field acknowledges the presence of an "obesity epidemic", there are few published studies that reflect a change in the curriculum of medical schools (21). Obesity education is a need in the medical profession today due to the increased prevalence, but medical schools have large gaps regarding this topic (21). Though some medical schools do teach this topic, very few studies have been published about these courses and even fewer with outcomes and evaluations (22). A topic that has been covered in the literature that could also be included in obesity-related courses is weight bias (22). Medical professionals have a documented obesity bias, and this has also been studied in medical students. From the first year to the fourth year of medical school, students increased their explicit bias of obese people (22). This increased bias was associated with negative encounters with obese patients and derogatory comments made by faculty (22). Despite this result, this study also shows that removing negative comments and deprecating humor about obesity by faculty and including more positive contact with obese patients could result in less bias. Less bias toward obese patients could lead to reduced health disparities since obesity has a higher prevalence among minority populations (22).

Other studies have found that obesity education can improve obesity knowledge and empathy. Third year medical students were given an extra credit project to plan to lose or maintain weight for at least four weeks followed by a reflection (23). From the reflection statements, over 40% of students mentioned that they felt that they were better prepared to help a patient address their weight and provide resources for weight management (23). Students also reflected how they found barriers to their goals from free lunches at conferences and time restraints (23). This extra credit project was also beneficial as it required little additional work for faculty and required a minimal time commitment from faculty (23).

NUTRITION EDUCATION IN ACADEMIA

The study on medical students attempting to maintain or lose weight (23) included recommendations for physical activity and dietary habits. Students who wanted to lose weight were encouraged to increase physical activity and reduce dietary intake by 250 – 500 kcal/d (23). In order to keep track of dietary intake, the students documented a variety of methods used including the Plate Method, DASH diet, Weight Watchers points, and the Dietary Guidelines for Americans (23). This was very important in relation to another study that found that the perceived importance of nutrition counseling by physicians declined from freshman orientation (72% highly relevant) to ward orientation (61%) to senior year (46%, p for trend = 0.0003) (24). Having the experience in the third year may maintain a future physician's recognition for a patient to have nutrition counseling and education.

Working with nutrition is also important for physicians in order to improve knowledge. In one study of fourth year medical students entering a pediatric residency, medical students completed a basic nutrition knowledge test and answered only 52% of questions correctly (25).

Graduates of medical schools are not competent in nutrition though it is required for medical practice (26). This may be contributing to physicians feeling inadequate or uncomfortable discussing nutrition topics and its relevance to diseases such as obesity, diabetes, and cancer (27, 28).

This lack of nutrition knowledge by medical students is being acknowledged by students with 68.4% of student rating the amount of nutrition taught in medical school inadequate (26). When nutrition is integrated into the curriculum, nutrition scores on the Objective Structured Clinical Examination significantly increase, and the number of students reporting inadequate nutrition education decreased to 11.5% (26). This same effect is also seen in undergraduate nursing students. Those who have received no nutrition classes scored an average of 52.5% on a nutrition knowledge test; however, those with previous nutrition classes or education scored significantly higher (60.5%) (29).

GRADUATE INTERDISCIPLINARY EDUCATION

While physicians and nurses have high contact with obesity and its comorbidities, graduates in other disciplines will also become stakeholders in the obesity epidemic. In order to educate these future stakeholders, universities will need to offer education that covers obesity but without excluding students who may not have a scientific or medical background. This can be accomplished by interdisciplinary classes and coursework designed for any student. In a joint effort by the Council of Graduate Schools and Educational Testing Service, the Commission on the Future of Graduate Education published a report that includes a call for interdisciplinary courses in graduate education (30). Creation of interdisciplinary programs and courses can attract

qualified undergraduates to further their education and increase skills such as critical thinking and innovation (30).

Interdisciplinary courses can enroll several students who are highly specialized at their area of expertise and allow them to work collaboratively together. In an interdisciplinary laboratory course, instructors noted how students initially struggled with “tunnel” thinking (31). This type of thinking was characterized by only being able to view through their area of expertise and communicate effectively only to others with the same background (31). Students then progress to “funnel” thinking or being able to integrate knowledge from several disciplines but still unable to communicate effectively (31). Finally, success in the course was achieved when teams began to be truly interdisciplinary. In an interdisciplinary team, students are still an expert in their field, but they are able to communicate effectively (31). Additionally, interdisciplinary students are able to take advantage from another field’s success and benefit their own field (31).

At University of California, Berkley, an interdisciplinary course in public health innovations has been offered since 2011 (32). In this course, students have a variety of backgrounds and are pursuing various degrees. Since there is such diversity, the course somewhat adapts each time it is taught in order to cater to the makeup of the specific class. The focus of the course is the development of a team project in groups of three to help solve a designated problem. Teams pitch their ideas and compete for funding given by some of the course sponsors. Most of the teams treat the funding as a grant to use to solve a problem; however, in the 2014 course, one team used its funding as seed capital to begin a pop up restaurant serving and discussing healthy Filipino cuisine (32). For the teaching aspect of the course, speakers come from many aspects of work including corporations, government agencies, media, and entrepreneurship. Demand for this course has steadily increased each year. In 2014,

60 students applied for the 25 available seats (32). Overall, 90 students from 26 academic programs have completed the course, and over half the programs are outside the School of Public Health (32). Based on surveys, this course has been one of the highest satisfaction courses offered by the School of Public Health, and it was reported in the top 10 courses of graduating students though only a handful had completed the course (32).

According to Sharon Donovan, PhD, at the University of Illinois, there is even one step further than interdisciplinary work. In interdisciplinary work, researchers work "jointly, but from each of their respective disciplinary perspectives, to address a common problem" (5) The next step is transdisciplinary work in which researchers have a shared conceptual framework that brings the different disciplines together to address the common problem (5). Instead of understanding one part of problem well by someone in that area, the entire problem is understood. Dr. Donovan has used this transdisciplinary approach to establish a research program combining a master's in public health and a PhD in childhood obesity called Illinois Transdisciplinary Obesity Prevention Program (I-TOPP) (5).

UGA GRADUATE CERTIFICATE IN OBESITY AND WEIGHT MANAGEMENT

Being a land-grant university in a state with over 30% prevalence of adult obesity (7), the University of Georgia unveiled a program to address the obesity problems in the state. The Obesity Initiative uses the aspects of a land grant university—teaching, research, and outreach—to develop obesity prevention and treatment programs across the state (33). Working with the College of Education, College of Family and Consumer Sciences, and College of Public Health, the Obesity Initiative launched in fall of 2014 a graduate interdisciplinary certificate program to

address the obesity epidemic in “clinical, community, school, workplace, and research settings” (33).

The Certificate in Obesity and Weight Management requires courses in nutrition, physical activity, policy, and survey of obesity (6). For the electives, students can choose 6 credits from a wide variety of options include other courses in nutrition, physical activity, policy, counseling, and food science and obesity-related research, internships, practicums, and service-learning (6).

One of the options for the required nutrition course is FDNS 6240 Nutrition and Obesity across the Lifespan.

QUALITATIVE DATA ANALYSIS

In order to discuss the changes in student responses, researchers employed qualitative analysis techniques. Analysis of qualitative data differs from quantitative data analysis in that there are no variables and hypotheses (34). Elimination of the initial hypotheses allows researchers to reduce subjectivity while analyzing because there is no stated desired outcome (34).

When performing qualitative analysis, there are many options but no singular, correct method. While researchers try to reduce subjectivity, completely objective analysis is nearly impossible. Each researcher has an interpretation of the text influenced by personal background. One step to reduce this subjectivity is to inductively create categories instead of beginning analysis with a pre-made list of themes (34). To further reduce subjectivity, researchers should follow basic guidelines which include being flexible, understanding prior biases, searching for other interpretations, and avoiding working alone (34).

One of the specific techniques of qualitative analysis is grounded theory. Interviews, responses, or other sources of qualitative data are read repeatedly until the researcher is able to understand the concepts and themes in the text. These themes are then categorized and coded. The construction of the code allows the researcher to link and better understand the patterns with the data (35). Increased time with the data and with participants leads to an increased credibility of the data (35), and it also allows for the categories to be linked and refined as to best represent the data (34). The refining and inductive building of categories leads to grounded theory providing perspective from the research participants' perspectives (36) rather than the perspective of the researcher.

Grounded theory is frequently used in health care settings and the social sciences due to its inductive nature and the building of theories from the participants' perspectives (37). In one study using grounded theory, osteopaths in the United Kingdom demonstrated that they had a focus on being patient-centered (35). The use of grounded theory led to the development of three categories of osteopath practitioners. The first group, "treaters", has the lowest amount of patient involvement and is practitioner-led (35). One the other end of the spectrum is the group "educators" that are patient-led with a high patient involvement (35). In between these two groups is one called "communicators" that have medium levels of patient involvement and there is an equal partnership of practitioner and patient (35). The use of grounded theory allowed the development of an explanatory theory of osteopaths' clinical decision-making process and therapeutic approaches (35).

STATEMENT OF SUBJECTIVITY

In the fall semester of 2014, I was a student of FDNS 6240 Nutrition and Obesity across the Lifespan, the course and semester analyzed in this project. Therefore, I was present for each lecture and completed the surveys at the beginning and end of the course in August and December 2014, respectively. However, coding of the open-ended response questions was not initiated until mid to late January 2015 and completed in October 2015. Identifying information had been removed at time of coding. As an additional safeguard to bias, a co-instructor of the course (Alison C. Berg, ACB) and I (Kellyn W Shollenberger, KWS) coded each response separately followed by a discussion and consensus for the final coding.

CHAPTER 3

CHANGES IN STUDENT RESPONSES AFTER AN INTERDISCIPLINARY GRADUATE COURSE IN NUTRITION AND OBESITY[1]

[1]Shollenberger, K.W., Berg, A.C., and Johnson, M.A. To be submitted to *Journal of the Scholarship of Teaching and Learning*

ABSTRACT

This study aimed to explore changes in knowledge and attitudes among students (n = 19) enrolled in the graduate course, Nutrition and Obesity across the Lifespan. The course is part of an academic graduate certificate in obesity and weight management designed for students pursuing careers as practitioners in agriculture, extension, food science, journalism, nutrition, public health, teaching, and related areas. The goal of this certificate is to improve the capacity of the workforce to address the obesity epidemic from an interdisciplinary perspective. Both at the start and end of the course, student knowledge was evaluated by assessments which included the question "write down everything that comes to mind when you think of nutrition and obesity across the lifespan." Responses were analyzed using qualitative content analysis. The post course assessment had an increased discussion about physiological and environmental influences, balance between personal choice and outside factors, complexity of the obesity issue, the need for multidisciplinary treatment, and the role of the food industry to address obesity. Mental health was mentioned in the pre course assessment but nearly disappeared in the post course assessment responses. This study demonstrates that graduate students from diverse disciplines can change their knowledge and attitudes about nutrition and obesity in ways that may benefit them as future professionals who will need to work as part of interdisciplinary teams to address the complex area of obesity prevention, understanding, and treatment. Additionally, this study demonstrates the need for ongoing course development to ensure that topics relevant to nutrition and obesity are included in this course in order to facilitate students meeting the course's and certificate's goals.

INTRODUCTION

Over the past four decades, adult obesity prevalence has more than doubled rising from a prevalence of 14.6% in 1971 – 1974 to 34.9% in 2011 – 2012 (1, 2), and obesity has become a primary public health concern (7). To address this problem, professionals from a variety of disciplines need to come together; however, working as interdisciplinary teams can be a challenge (31). A recent report from the Commission on the Future of Graduate Education has called for increased interdisciplinary environment in graduate studies (30) in order to increase enrollment of qualified undergraduates and to develop innovative professionals who have high levels of critical thinking skills. Universities that follow this call can provide environments that support interdisciplinary training for students so that they are prepared to work as part of an interdisciplinary team as professionals.

The University of Georgia has followed this call and followed the principles of a land-grant university in their teaching, research, and outreach missions to form the Obesity Initiative to address the multi-faceted problem of the growing epidemic of childhood and adult obesity (33). The need for obesity education and instruction led to the development of the graduate Certificate in Obesity and Weight Management, a 16 credit certificate requiring courses in nutrition, physical activity, and policy.

This study centers on one of the courses that fulfills the nutrition requirement to the certificate: FDNS 6240 Nutrition and Obesity across the Lifespan. It was initiated in fall semester of 2014 and included a variety of teaching methods. Student knowledge and attitudes were assessed using an open-ended question at the beginning and again at the end of the course. This study provides insight into course development and content based on changes in student

responses. Results will aid in justification for topics covered and implications for further course development.

METHODS

Study Design

This study recruited students participating in the course FDNS 6240 Nutrition and Obesity across the Lifespan, a course that fulfills the nutrition requirement for the Certificate in Obesity and Weight Management. The University of Georgia Institutional Review Board on Human Subject approved all methods, procedures, and questionnaires. Procedures were explained the first week of class after all students had enrolled in the course. Online pre and post course assessments were completed by each student for class credit. Before any questions were asked, consent was requested for release of the information for analysis. The rest of the survey contained questions regarding demographics, areas of study, and an open-ended question of thoughts of obesity and nutrition throughout the lifespan. Course credit was given for completion of survey only with no regard for whether consent was given or not. All students (n = 19) gave consent for survey responses to be released for analysis.

Class Format

Class met every Tuesday and Thursday from 2:00 – 3:15 from August 19 through December 4, 2014, and was co-taught by a tenured faculty member, Mary Ann Johnson, PhD, and a doctoral candidate, Alison Berg (ACB), MS, RDN, LD. Course material was divided into nine modules; each module contained objectives, required readings, questions for class discussions, and assignments. Class time was spent with instructor-led lecture, guest speakers, tours of other departments, interdisciplinary discussion among students, and detailed student

responses to modular questions. Modules titles, guest speakers and objectives are listed in Table 3.1.

Table 3.1 Module Titles and Objectives

1. Introduction and Overview of Obesity	• Know the definitions, assessment, risk factors, consequences, and prevalence of obesity • Understand age-differences in definitions, assessment, risk factors, consequences, and prevalence of obesity • Recognize the complexity of obesity through an ecological model of diet, physical activity, and obesity • Recognize systems-oriented multi-level framework for addressing obesity
2. Energy Balance and Energy in Foods Guest speaker: Rachelle Acitelli, MS, Department of Kinesiology, College of Education, UGA – Energy Expenditure	• Know the definitions of energy and calories • Understand the relationships of energy expenditure, energy intake, and energy balance • Understand how food intake is measured • Know the major sources of energy in food, including carbohydrates, fat, protein, and alcohol • Explore the effectiveness of different ways to decrease energy intake, such as "eat this instead of that," portion control, energy density, meal timing, macronutrient composition of foods, low- or non-caloric food ingredients • Consumer products for tracking energy intake and energy expenditure
3. Physiological Regulation of Food Intake Guest Speaker: Colette Miller, PhD, Department of Foods and Nutrition, College of Family and Consumer Sciences, UGA – Physiology and Metabolism	• Be able to define hunger, appetite, and satiety • Know the primary organs and hormones in the body that regulate food intake • Understand short-term regulation of food intake and energy balance • Understand long-term regulation of energy balance and fat storage • Recognize why people "get fat" from a physiological perspective
4. Where and What People Buy and Eat	• Know the foods and purchase locations

	that contribute to energy intakes of children and adults • Understand how out-of-home eating contributes to changes in body weight and risk for obesity over time • Explore how the "family dinner" influences body weight • Examine the controversies surrounding obesity and sugar-sweetened beverages (SSBs) • Explore whether nutrition education and mass media can change dietary choices regarding vending machines and SSBs
5. How Food Environment Influences Food Choices Guest Speaker: Representative of Athens Homeless Ministry	• Public health approaches to changing the food environment (e.g., NYC) • Apply information about the food environment to improve food choices in a particular setting
6. Role of Food Industry in Obesity Guest Speaker: Louise Wicker, PhD, Food Science and Technology, College of Agricultural and Environmental Sciences, UGA – Food Industry Perspectives	• Understand food production in the US • Know what makes food taste good • Recognize how food is processed, marketed and advertised • Explore ways to help consumers understand food processing and marketing strategies of food companies • Explore policies that might improve the food industry's role in positively influencing the obesity epidemic
7. Food-Related Public Policies and Obesity Guest Speaker: Leann Birch, PhD, Department of Foods and Nutrition, College of Family and Consumer Sciences, UGA – IOM and obesity prevention Guest Speaker: Caree Cotwright, PhD, Department of Foods and Nutrition, College of Family and Consumer Sciences, UGA – Child Care Policies	• Know the purpose and application of the Dietary Guidelines for Americans • Understand food-related policies from IOM, federal agencies, and professional societies for children and adults, as well as for populations served by WIC, SNAP, School Nutrition, and Administration on Aging • Explore how these policies could be improved to help prevent and manage obesity
8. Treatment of Obesity: Foods, Medications, Supplements, Surgery Guest Speaker: RDN – Bariatric Surgery	• Understand principals of behavioral modification for weight loss • Learn how to identify "diets" that work and don't work for weight loss • Recognize the risks and benefits of over-

	the-counter and prescription medications • Develop a general understanding of bariatric surgery, including control of food intake, and role of registered dietitian • Apply information about the treatment of obesity to different populations that vary in their degree of obesity, comorbidities, age, or other characteristics
9. Focus on Health and Wellbeing	• Understand obesity and obesity-related disorders in the broader context of overall health • Recognize risk factors for anorexia, binge eating disorder, and bulimia and how to refer for evaluation and treatment • Recognize ways to overcome obesity-related discrimination in the workplace and other venues • Know how to foster a healthy body image throughout life • Explain one or more goals you have for addressing obesity and weight-related concerns at the policy, institutional, community, interpersonal, and/or individual level

Students were graded on class attendance, participation, answering questions online for each module, an online mid-term and final completed individually, one student-developed project, and completion of pre and post course assessments regardless of consent to release responses.

Course Assessments

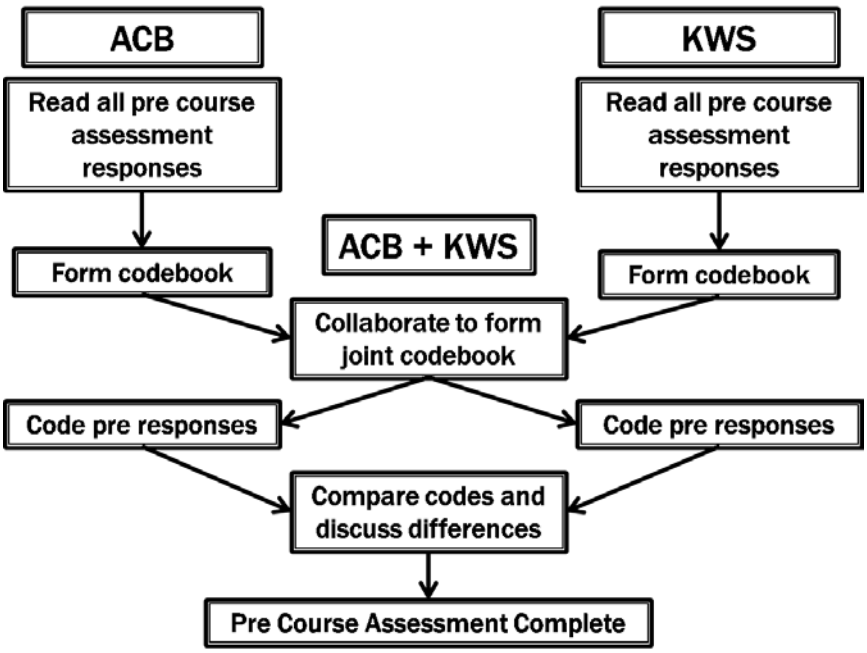
In both the pre and post course assessment, questions were used to collect demographics of students, assess change in awareness and knowledge, and guide course revisions and development to meet student needs and goals of the certificate. These questions were administered online (Qualtrics) and were completed at the students' leisure outside of course time. The pre-course assessment was completed within 2 days of the first class attended. The post-course assessment was completed by the day following the last day of the semester.

Demographic questions included gender, race/ethnicity, age, year in college, degree sought, major, and whether student was planning on completing Certificate in Obesity and Weight Management. The change in awareness was measured by the question, “Write down everything that comes to mind when you think of Nutrition and Obesity across the Lifespan.” Additionally, in the post-course assessment, students indicated whether or not they enjoyed the course and why.

Data Analysis

Assessment responses were recorded using Qualtrics. In January 2015, analysis of the pre-course assessment began by one of the co-instructors (ACB) and a graduate student who was also a member of the class (Kellyn Shollenberger, KWS). All names had been replaced by numerical codes so as to protect student privacy. For analysis, using grounded theory techniques, the researchers independently created a coding scheme and codebook based on the pre course assessment. Next, researchers collaborated to create a joint codebook containing sufficient categories and sub-categories to fit the nature of the responses along with a numerical system to be used in analysis. Then, using the joint codebook, each researcher re-coded the pre course assessment responses independently, and results were compared. Most codes matched, and any discrepancies were discussed until a consensus was reached. (See Figure 3.1 for flow chart of coding methods).

Figure 3.1 Formation of Codebook and Pre-Course Assessment Coding



Analysis of post-course assessment began in July 2015. The same two researchers (ACB, KWS) followed the same procedure as with the pre-course analysis. During collaboration, four new codes were created and used due to new themes appearing in the responses that were not sufficiently satisfied with categories from the original codebook alone (See Appendix C for full codebook). Once all responses were coded, the data were moved into Microsoft Excel 2010 for analysis.

In order to analyze student learning based on the course modules, each theme was linked to the module that most covered the topic. For example, the theme *18300 – Hormone Imbalance* was categorized as a topic covered under Module 3 "Physiological Regulation of Food Intake". Categories do not necessarily have the same module number as all of its sub-categories. For example, the category *22000 – Attitudes toward obesity* is under Module 9 "Focus on Health and Wellbeing" while one of its sub-categories *22700 – out of individual's control* was more covered in Module 5 "How Food Environment Influences Food Choices." Four themes were covered

throughout the entirety of the course and could not be put into one module: *10000 – Role of eating/nutrition/food, 21700 – No quick fix for obesity, 22100 – Perceived complexity of obesity,* and *23200 – Student knowledge is inadequate*.

Students were classified into one of two groups, nutrition or non-nutrition, based on their major for analysis. This division of students provided insight into the changes that occurred in students based on their educational pursuits. Since this course was established out of the Department of Foods and Nutrition, students were grouped based on major, either nutrition or non-nutrition students. Further division of non-nutrition students was not possible due to small sample size.

Finally, results of this study can be attributed to FDNS 6240 Nutrition and Obesity across the Lifespan as no other required courses in the Certificate of Weight Management and Obesity were offered before or during the fall semester of 2014 including those covering kinesiology and policy.

RESULTS

Participants

Characteristics of the students (total, n = 19) are listed in Table 3.2. All students were enrolled as graduate students and were mostly female (84%), non-Hispanic white (68%), pursuing a master's degree (94.7%), and seeking credit toward the Certificate in Obesity and Weight Management (57.9%). Demographics of students in the Department of Food and Nutrition (nutrition students) were similar to those of students from other departments (non-nutrition students) (χ^2 test $p > 0.05$ for gender, race/ethnicity, seeking master's degree, enrolled for certificate requirement, t test $p > 0.05$ for age). Nutrition students were 100% female, while

non-nutrition students were only 70% female. For the certificate, 88.9% of nutrition students were pursuing credit for the obesity certificate compared to only 30% of non-nutrition students.

Table 3.2 Graduate Student Characteristics

Characteristic	Total (n = 19)	Nutrition Students (n = 9)	Non-Nutrition Students* (n = 10)
Race/Ethnicity	68% non-Hispanic white 10% non-Hispanic black 10% Hispanic 10% Asian	78% non-Hispanic white 11% non-Hispanic black 11% Hispanic	60% non-Hispanic white 10% non-Hispanic black 10% Hispanic 20% Asian
Female	84%	100%	70%
Age	23.8 ± 2.0 y	23.4 ± 1.8 y	24.2 ± 2.1 y
Seeking Master's degree	95%	100%	90%
Enrolled to meet certificate requirement	58%	89%	30%

*Non-nutrition student majors included food science and technology (3), kinesiology (2), workforce development (2), health and medical journalism (1), health promotion and behavior (1), and horticulture (1).
**Percentages may not add to 100% due to rounding.

Theme and Module Counts

Table 3.3 shows the total number of words, themes, and modules covered in each response of each assessment.

Table 3.3 Changes in Word, Theme, and Module Counts

	Pre Course Assessment, mean ± SD (range)	Post Course Assessment, mean ± SD (range)
Word Count	204 ± 131 (26 – 432)	210 ± 147 (21 – 496)
Number of Themes	13.7 ± 9.9 (3 – 35)	12.7 ± 7.0 (2 – 27)
Number of Modules	5.5 ± 2.5 (2 – 10)	5.8 ± 2.0 (2 – 10)

A total of 105 theme codes were used for the pre and post assessments, and a list of all codes with their uses can be found in Appendix D. In the pre assessment, 95 unique codes were

used an average of 2.7 times. For the post assessment, only 68 codes were used an average of 3.5 times each. In order to determine topics that would be deemed "prevalent" or mentioned higher than the average, a value of 2.5 times the average number of mentions in an assessment was used for the "prevalent" distinction which corresponded to ≥ 7 mentions for pre assessment, ≥ 10 mentions for post, and ≥ 12 mentions when combining the pre and post assessments. There were 7 prevalent topics in the pre assessment (Table 3.4).

Table 3.4 Prevalent Theme Codes, Pre Course Assessment

Code	Times Used in Pre Course Assessment
10000 – Role of eating/nutrition/food	10
14000 – Life course obesity risk	13
15000 – Psychosocial correlates	7
15100 – Depression, anxiety, stress (negative)	7
19100 – Co-morbid diseases	9
22100 – Perceived complex	9
22500 – Obesity is a "problem" that needs solving	9

Only 2 codes were prevalent in the post assessment (Table 3.5).

Table 3.5 Prevalent Theme Codes, Post Course Assessment

Code	Times Used in Post Course Assessment
21100 – Multidisciplinary (referring to obesity treatment)	12
22100 – Perceived complex	19

Overall, there were 9 codes that were prevalent when combining both assessments (502 themes, 105 codes, Table 3.6).

Table 3.6 Prevalent Theme Codes, Combined Assessments

Code	Times Used in Both Assessments
10000 – Role of eating/nutrition/food	18
12000 – Genetics	14
13000 – Environment	13
14000 – Life course obesity risk	16
19100 – Co-morbid diseases	14
21100 – Multidisciplinary (referring to obesity treatment)	17
21200 – Addresses lifestyle/behavior modification (referring to treatment)	15
22100 – Perceived complex	28
22500 – Obesity is a "problem" that needs solving	12

In contrast to these prevalent codes, there were several codes that were only used in the pre or post assessment. Thirty-seven codes used in the pre assessment were not mentioned in the post assessment (Table 3.7). Ten codes were only used in the post assessment; four of which were created during post assessment analysis (Table 3.8).

Table 3.7 Themes Only Used in Pre Course Assessment

Codes	Times Used in Pre Course Assessment
10110 – Portion sizes	3
10230 – Suboptimal (nutrition)	2
11100 – Sedentary lifestyle	2
11110 – Screen time	2
11300 – Time restraints	2
13120 – Portion sizes in restaurants	1
13150 – Easy access to energy dense foods	2
13181 – Advertising (of the food industry)	3
13230 – "American lifestyle"	1
13310 – Transportation	1
13320 – Public spaces, accommodating obese (i.e. planes, automobiles)	1
13410 – Agricultural policy	1
14300 – Pregnancy/Having children (mother)	3
14500 – Menopause	1
15000 – Psychosocial correlates	7
15300 – Social stigma	3

Codes	Times Used in Pre Course Assessment
15500 – Quality of life	2
15600 – Social support	2
16000 – Economics	2
16100 – Poverty	3
16200 – Increased health care costs	3
17100 – Body composition	2
19110 – Earlier chronic illness for obese children	2
19200 – Inflammation effect	2
19500 – Bone, lean mass	1
20000 – Demographics	1
20120 – Child prevalence (17%)	2
20121 – School children	1
20122 – Younger children	1
20130 – Clinical	2
20140 – Regional/State (i.e. higher in southern US)	2
20170 – Within income categories (SES)	1
21400 – Life course intervention	4
21900 – Specific diets (i.e. low fat, low carb, paleo, etc.)	2
22000 – Attitudes towards obesity	1
27110 – Uneducated in food prep and cooking skills	2

Table 3.8 Themes Only Used in Post Course Assessment

Codes	Times Used in Post Course Assessment
13170 – Price (of food)	1
13300 – Built environment	4
**17200 – Obesity is a disease*	2
21000 – Obesity treatment	3
21220 – Lifestyle – exercise (in relation to obesity treatment)	3
21960 – Emotional	1
**21970 – Food Industry has a role in obesity treatment*	5
22300 – Shared burden by all/pervasive	2
**22700 – Out of individual's control*	1
**24000 - Prevention*	3

*codes created during post course assessment analysis

Four new codes were necessary to adequately describe the post assessment responses that had not previously appeared. These codes were used a total of 11 times in the post assessment

and are listed in Table 3.9 with the phrase it describes and the group of the student who gave the response.

Table 3.9 New Codes and Their Uses

New Code	Response	Student Group
17200 – Obesity is a disease	Obesity is now consider[ed] a disease,	Nutrition
17200 – Obesity is a disease	Because there are so many serious complications of obesity, it is necessary to treat it like a medical condition	Nutrition
21970 – Food industry has a role in obesity treatment	I feel like I have also thought more about the alternate methods of reducing obesity through the help of the food industry and other practices.	Nutrition
21970 – Food industry has a role in obesity treatment	[Addressing the issue will require action by]… food companies,	Nutrition
21970 – Food industry has a role in obesity treatment	While there is truth to that, the food science field is also known for making products that are less fattening and still palatable and acceptable to the public.	Nutrition
21970 – Food industry has a role in obesity treatment	…processed foods also provide the greatest consumed sources of vitamins and minerals through fortification. While the food industry and the beverage industry may have a huge impact on obesity, some companies are exploring processes for developing healthier food options.	Nutrition
21970 – Food Industry has a role in obesity treatment	Food industry also play an important role in here as food-related public policies and processed food formulations can either help to address the problem or make it worse.	Non-nutrition
22700 – Out of individual's control	there are also a great many that are outside of their control that affect their nutrition and obesity.	Nutrition
24000 – Prevention	[Obesity] prevention is better [than treating obesity].	Nutrition
24000 – Prevention	[I think of the] requirements to prevent obesity,	Non nutrition
24000 – Prevention	Addressing these factors in terms of prevention can reduce the development of obesity.	Nutrition

Module Change Overviews

In the count of modules covered, the overall averages are similar, but over half of students increased the number of topics within modules mentioned from pre to post. For nutrition students, 33% increased the number of modules mentioned as did 80% of non-nutrition students ($p > 0.05$) possibly demonstrating an increase in the breadth of knowledge about nutrition and obesity.

Some modules appeared in only one of the assessments. Module 9 was mentioned by 42% of students in only the pre assessment. Most of these were *15000 – Psychosocial correlates* and *15100 – Depression, anxiety, stress (negative)*. For example, "[obesity is]…. influenced by many factors … [including] mental or emotional health," and "[c]ertain stages of life are associated with higher risk of gaining weight usually associated with times of … stress." Modules 3, 4, and 8 were mentioned by at least 36% of students in only the post assessment. Finally, one module in the course was mentioned by over 60% of students in both the pre and post course assessments – Module 2: Energy Balance and Energy in Foods. Specific topics from these modules will be discussed below.

Four themes were covered throughout the course and were designated as Module 0. Fourteen students (74%) mentioned at least one of the four themes in an assessment. Of these four themes, three were mentioned a similar number of times. Since it was a broad category, *10000 – Role of eating/nutrition/food* received general acknowledgement of both contributing to and treating obesity. In the pre assessment, *21700 – No quick fix/difficult* as related to obesity treatment was mentioned only by nutrition students and without listed solutions. One student wrote that "losing weight is a seemingly impossible task." However, by the post assessment, the difficulty is mentioned within context of the treatments or solutions to obesity by both nutrition

and non-nutrition students: “it is really difficult to point at exactly one solution to the problem” or “there is no single solution” to obesity. *23200 – Student knowledge inadequate* was also mentioned similar number of times in the pre and post course assessment. In the pre assessment, both nutrition and non-nutrition students mentioned their need for further obesity education: “[c]urrently, however, my understanding of it is not as extensive as I would like it to be,” (nutrition) and “[o]ne of my goals for this course is obtain a more thorough understanding of nutrition so I can effectively explain to others why it is so essential for obesity prevention, as well as overall mental and physical health,” (non-nutrition).

The fourth Module 0 theme, *22100 – Perceived complexity*, was acknowledged by both nutrition and non-nutrition students. Eight students, nutrition (n = 5) and non-nutrition (3), mentioned the complexity of obesity in the pre assessment, but that number increased to 13 in the post assessment. In total, 16 of the 19 students mentioned the complexity in either assessment (all nutrition, 70% non-nutrition)

While the above modules were mentioned by a high portion of students, two modules, Modules 5 (How Food Environment Influences Food Choices) and 6 (Role of Food Industry in Obesity), were not mentioned in either assessment by 47% and 53% of students, respectively. Two-thirds of nutrition students mentioned Modules 5 and 6, but for non-nutrition students only 40% mentioned Module 5 and 30% mentioned Module 6.

Theme Changes within Modules and Interpretations

MODULE 1: INTRODUCTION AND OVERVIEW OF OBESITY

All students mentioned themes from Module 1 at least once in the assessments. All but one nutrition student mentioned a theme in both assessments while only 40% of non-nutrition students mentioned a theme in both. In the pre assessment, 11 students mentioned *14000 – Life*

Course Obesity Risk in relation to breaking down the title of the course. By the post assessment, only 2 students briefly mention this theme.

Interpretation: Many themes from Module 1 coincided with words from the title which is what many students used in their pre course assessment to answer the open-ended question. This module also covered many obesity facts such as prevalence and physiological consequences that are thoroughly covered in dietetic coursework which may explain the high number of counts from nutrition students. The decrease in *14000 – Life Course Obesity Risk* is most likely due to students discussing specific topics from the course rather than basing their responses on the breakdown of the course title.

MODULE 2: ENERGY BALANCE AND ENERGY IN FOODS

Most of Module 2's themes were mentioned a similar number of times in both the pre and post assessment. However, one theme, *11300 – Time Restraints* (for exercise) was mentioned twice in the pre assessment and not in the post. Another theme was mentioned only once in the pre but 8 times in the post assessment: *22200 – Personal choice to engage in obesity promoting behavior*. This sole mention in the pre course assessment was by a nutrition student stating that "on a personal level, obesity can be related to choices". However, in the post assessment, students referenced not only the need of individuals to make better choices but also the need of better environments and acknowledgement of the other factors of obesity.

Interpretation: Due to the nature and description of the course, exercise, its barriers, and its benefits were only briefly mentioned which may explain the disappearance of *11300 – Time restraints*. However, because this module focused on personal choices of amount of energy intake and energy expenditure, students appeared to remember this discussion with the dramatic increase in *22200 – Personal choice to engage in obesity promoting behavior*.

MODULE 3: PHYSIOLOGICAL REGULATION OF FOOD INTAKE

Module 3 covered biological and other physiological factors related to food intake. Two themes from this module greatly increased from the pre to post assessment: *18000 – Physiological/Biological Causes* and *18300 – Hormone Imbalance*. *18000 – Physiological/Biological Causes* was only referenced once in the pre assessment by a nutrition student mentioning appetite as one of many factors influencing obesity. By the post assessment, this general theme (*18000 – Physiological/Biological Causes*) had remained in the minds of students of both groups. One-third of nutrition students mentioned this theme as did one-half of non-nutrition students. For *18300 – Hormone Imbalance,* one student of each group mentioned it in the pre assessment, but in the post assessment, 3 of each group referenced that hormone imbalance or hormone deficiencies (i.e. leptin) can be a cause of obesity.

Interpretation: In this module, a guest speaker discussed biological dysregulation that can lead to and/or be caused by obesity. This seemed to remain with students of both groups by the post course assessment and may be a good contrast to have been taught immediately after the previous module which included many personal choice factors. This may also have been a novel topic for students in the course especially those without an extensive biological science educational background

MODULES 4: WHERE AND WHAT PEOPLE BUY AND EAT and MODULE 5: HOW FOOD ENVIRONMENT INFLUENCES FOOD CHOICES

Since Modules 4 and 5 covered portions of the environment, they are analyzed together in order to properly represent the changes in student knowledge and attitudes toward the environment.

Two themes in these modules increased from pre to post assessment. First, the theme *13000 – Environment* was mentioned a four times in the pre assessment increasing to 9 in the post. However, overall, students acknowledged the influence of the environment through the themes of *13000 – Environment*, *13100 – Food Environment/Obesogenic*, *13200 – Sociocultural environment*, and *13300 – Built environment.* (The theme *13400 – Political Environment* was covered and is discussed as Module 7.) Seven nutrition students (78%) and 9 non-nutrition students (90%) mentioned at least one of these themes in an assessment.

The second theme to greatly increase from this module was *23000 – Knowledge/Education Contributors*. One objective in Module 4 discussed whether or not nutrition education could change dietary choices. In the pre course assessment, only one student (nutrition) referred to education saying that obesity "is a result of … lack of education." By the post assessment, the theme was mentioned by 3 nutrition and 3 non-nutrition students. Listed in Table 3.10 are the phrases in the post assessment that were coded as *23000 – Knowledge/Education Contributors*

Table 3.10 Phrases Coded as *23000 – Knowledge/Education Contributors*

Student Group	Response
Non-Nutrition	Understanding of nutrition
Nutrition	Addressing the issue will require action by…educators
Nutrition	(a reference for how education helped choices) In regards to food environment, studies have shown that using systems such as the traffic light system for rating foods in terms of health have proven successful for healthful food purchases.
Nutrition	The epidemic of obesity is influenced vastly via numerous aspects including … educational … factors
Non-Nutrition	It is a lot more valuable if we go to the roots and understand the habits, consumption, people´s ideas of nutrition and consequences of gaining weight and accumulate[ing] fat across the life span.
Non-Nutrition	What comes to mind is lack of education. There are a lot of things about obesity I did not know until I took this course. I don't think America realizes how big of problem obesity has become.
Non-Nutrition	Education has to happen. Awareness has to happen.

Interpretation: These two modules gave students yet another perspective to consider in regards to obesity. Module 2 discussed personal choices; Module 3 discussed some internal, uncontrollable factors. These modules refer to the environment and how it affects the person, but they also provided examples on how to change the environment to combat obesity which seemed to remain with students by the end of the course. Since most of the non-nutrition students had a major that affects the environment (i.e. horticulture), it was encouraging to see that 90% of students acknowledged a form of environment in an assessment. For the nutrition group, discussion of the environment was also beneficial so that it is acknowledged in addition to personal choice and biological factors.

MODULE 6: ROLE OF FOOD INDUSTRY IN OBESITY

Nutrition students mentioned the food industry more frequently than non-nutrition students in both assessments. From pre to post assessment, nutrition students discussed more positive aspects of the food industry such as fortification and palatability of foods with less fat compared to the higher mentions of "shrewd" advertising by the food industry in the pre course assessment (Table 3.11). In the post assessment, in all but one instance, every time negative aspects of the food industry were mentioned, the student also mentioned a role of the food industry in combating obesity (Table 3.12).

Table 3.11 Food Industry in the Pre Course Assessment according to Nutrition Students

Theme Code	Response
13181 – Advertising	Other contributing factors I am aware of include shrewd marketing plans that make consumers want to buy energy dense foods because it's a good deal
13181 – Advertising	Until more recently, healthy food was not commonly advertised as tasty, which lead many people to perceive nutritious food to taste unpleasant.
13180 – Food Industry	[obesity is]…. influenced by many factors ….[including] food industry
13181 – Advertising	Advertisement for energy dense foods

Table 3.12 Food Industry in the Post Course Assessment according to Nutrition Students

Student	Theme Code	Response
Student 1	*21970 – Food Industry has role in obesity treatment*	I feel like I have also thought more about the alternate methods of reducing obesity through the help of the food industry and other practices.
Student 2	*13180 – Food Industry*	Food scientists have long been blamed for the production of high-fat, high-sugar foods.
	21970 – Food Industry has role in obesity treatment	[Addressing the issue will require action by]… food companies,
	21970 – Food Industry has role in obesity treatment	While there is truth to that, the food science field is also known for making products that are less fattening and still palatable and acceptable to the public.
Student 3	*13180 – Food Industry*	Another major factor playing a role in obesity is the food industry. The food industry holds a lot of power in what consumers purchase. Despite the fact that the food industry provides foods making up consumers greatest intakes of saturated fats, added sugars, and sodium,
	21970 – Food Industry has role in obesity treatment	processed foods also provide the greatest consumed sources of vitamins and minerals through fortification. While the food industry and the beverage industry may have a huge impact on obesity, some companies are exploring processes for developing healthier food options.

Interpretation: Due to increased coursework related to food, increased counts related to Module 6 and the food industry by nutrition students was not surprising. The changes in tone that occurred most likely were due to the discussions about the positive roles that the food industry can play in the obesity epidemic that came from a faculty member from the Department of Food Science and Technology as a guest lecturer, the multidisciplinary class including food science students, and a voluntary tour of the food science department, including laboratories and the pilot

plant for development of new food products. These experiences allowed the class, especially the nutrition students, to have positive experiences with those related to the food industry.

MODULE 7: FOOD-RELATED PUBLIC POLICIES AND OBESITY

Module 7 was related to public policies and those affected by the policies (i.e. National School Lunch Program). From pre to post, the count of themes that fell under this module decreased from 24 to 19. However, the references to the political environment and its impact on obesity increased from 2 students (only nutrition) to 7 students (4 nutrition, 3 non-nutrition). There was also less mentioning of *22500 – Obesity is a "problem" that needs solving*. In the pre assessment, students that mention it as a problem usually did not present a solution to obesity. However, in the post assessment, obesity as a problem was mentioned within the context of listed solutions (ex. 108 post).

> "Obesity is an epidemic that the entire world is currently facing and a problem that is not easily fixed. There are so many components that contribute to obesity that it is really difficult to point at exactly one solution to the problem. Addressing this issue will require action being taken from a multitude of areas, such as health care providers, food companies, public policy and legislation, and educators."

Interpretation: Having a module address obesity-related public policy including guest speakers seemed to affect both groups of students resulting in the increased counts related to the political environment. Although obesity was discussed as a problem throughout the course, it appears that students decreased their mention of obesity being a problem because there was a heavy focus in this class on ways to combat obesity.

MODULE 8: TREATMENT OF OBESITY

Although some nutrition students mentioned this topic, only one non-nutrition student mentioned a topic related to this module in the pre assessment saying that obesity is "entangled with…behavioral management." However, by the post assessment 50% of the non-nutrition

students discussed medical treatments of obesity such as medications and bariatric surgery. As to specific themes, *21300 – Medical treatment (surgery, pharmacological)* received the greatest increase going from 1 mention by a nutrition student to 6 counts in the post assessment (5 by nutrition, 1 by non-nutrition). In the pre course assessment, only 2 nutrition students mentioned *21900 – Specific diets (i.e. low fat, low carb, paleo),* and both were referring to altering macronutrient distribution to reduce intake. By the post assessment, there was no mention of this theme.

Interpretation: Increasing counts of medical treatments such as medication and surgery may be explained by explicit teaching on various obesity-related medications and a guest speaker who works with bariatric patients. The disappearance of *21900 – Specific diets (i.e. low fat, low carb, paleo)* is also likely explained by a class activity that reviewed several diets. After analysis and discussion, calorie reduction instead of macronutrient distribution was seen as a driving factor of weight loss.

MODULE 9: FOCUS ON HEALTH AND WELLBEING

Module 9 themes were evenly distributed between nutrition students and non-nutrition students, and the changes described are characteristic of both student groups. Overall, mentions of themes from Module 9 decreased by over 60% from pre to post, and the number of themes mention decreased from 11 different themes to only 5. Three themes maintained their counts from pre to post: *15400 – Body Image, 21950 – must be individualized* (referencing obesity treatment), *22600 – control over or value of health*. The theme *15100 – Depression, anxiety, stress (Negative)* decreased from 7 to 1 mention from pre to post, and its overall category *15000 – Psychosocial correlates* completely disappeared in the post assessment after 7 mentions in the pre assessment.

Interpretation: Based on the results, student attitudes towards body image, individualized treatment, and value of health were maintained through the content of this module. However, the psychological correlates that had a high prevalence in the pre assessment were no longer mentioned in the post assessment possibly due to the focus of this module being on wellbeing overall and not psychological factors that may contribute to obesity. Because psychological factors are strongly related to obesity, it is recommended that this be emphasized more in the future.

DISCUSSION

The purpose of this study was to evaluate graduate student responses to the open-ended question, "Write down everything that comes to mind when you think of Nutrition and Obesity across the Lifespan." As a course that fulfills the nutrition requirement of the University of Georgia's graduate interdisciplinary Certificate in Obesity and Weight Management, FDNS 6240 Nutrition and Obesity across the Lifespan should improve its students' knowledge of the food-related aspects of obesity prevention and management and perhaps change attitudes as well. Since students entered this course with a diverse nature of educational pursuits, personal experiences, and interests, students mentioned a large number of different themes in the pre course assessment. However, by the end of the course, the responses were condensed to fewer codes. Even with the fewer number of overall codes used, students had an increase in knowledge of some food-related obesity factors outside of nutrition and food such as environment and biology, but there was also a decrease in mentions of mental or psychological factors. While there was change in knowledge, attitudes also appeared to change. For example, in the post assessment, nutrition students mentioned role of food industry in combatting obesity instead of

what was mentioned in the pre assessment which was only advertising and producing energy-dense foods. Both groups of students also demonstrated a change in how they mentioned personal choices and outside influences in relation to obesity.

Broadened Outlook

The variety of student education and experiences were reflected in the pre course assessment as they worked to apply what they knew to obesity. By the end of the course, all of the students had been exposed to the same course explaining the decrease in unique codes used in the post assessment. However, even with the decrease in unique codes, students had an increase in the number of times that they mentioned themes related to obesity and nutrition, especially environment and biology. This trend in nutrition students demonstrated a broadened outlook on obesity by this group beyond food and nutrition. Non-nutrition students had diverse education pursuits, but their enrollment in a nutrition-related course demonstrated a desire to broaden their outlook on obesity as well.

Psychological factors

In contrast to environment and biology, the prevalent pre assessment topics of psychosocial factors and negative mental state such as depression, anxiety, or stress nearly disappeared by the post assessment. These themes corresponded best with Module 9: Focus on Health and Wellbeing, but as in the title, this module's main focus was the understanding of obesity and related diseases in context of overall health. The content dealt with the mental health factors surrounding present obesity rather than causing obesity. Most students in the pre course assessment that mentioned these topics were referencing them as factors contributing towards obesity. In the future, it is recommended that this topic be addressed in collaboration with obesity and mental health experts.

Personal Choice and Outside Influence

In addition to the changes in knowledge from the course, student responses reflect a change in attitudes towards the topics covered during the course. One attitude change of students from both groups was reflected in the increased counts of *22200 – personal choice to engage in obesity-promoting behavior*. Food selection and other choices were often discussed in the class, which may explain why there was an increase in this code from pre to post course assessment. However, in each response that personal choice was mentioned, outside influences or other uncontrollable factors were mentioned as well.

Roles of the Food Industry

The other key change in attitudes was regarding the food industry. Addressing the food industry was more common in nutrition students than non-nutrition students, possibly due to more background and greater personal interest in food and nutrition than the non-nutrition group overall because nutrition students were pursuing a graduate degree in food and nutrition. In the pre course assessment, nutrition students mentioned aspects of the food industry that contribute to obesity such as advertisement of energy-dense foods. However, having faculty and classmates from this discipline may have brought a personal perspective to the food industry instead of the faceless entity that can be portrayed. Hearing the capabilities of the food industry may have led to the mentioning of the food industry's role as an ally in combatting and preventing obesity. It is recommended that in the future, perspectives of the food industry continue to be included in this course such as through guest lectures, discussion, and interactive experiences.

Strengths and Weaknesses

This study had several strengths. First, through each step of the coding process, two researchers worked independently followed by collaboration to analyze each assessment

response. The same methods and coding scheme were used for both the pre course and the post course assessment. Next, researchers had involvement in the course (co-instructor ACB and student KWS) increasing their understanding of assessment responses. Finally, using the course syllabus and description, each code was linked to the module under which it was most discussed. This allows instructors to know which modules need to be improved and which ones were associated with changes in knowledge and attitudes.

This analysis also had some weaknesses. When interpreting the results, the researchers attempted to distinguish between changes in knowledge and changes in attitudes among students, which proved somewhat difficult. In the future, it would be helpful for instructors to intentionally distinguish between these two areas. Secondly, while the nutrition student group was homogenous, the other students came from diverse disciplines, so we may have over simplified the changes in knowledge and attitudes of the non-nutrition group. Due to low numbers of students in the non-nutrition majors, an in-depth comparison could not be performed; however, having a class of nineteen allowed for the highly interactive nature of the course that could not have occurred with a much larger number of students. Another possible weakness is the subjectivity of the researchers analyzing the data since they had been a part of the course, but as mentioned previously, this also served as a strength since it allowed researchers to better understand context and content of responses.

CHAPTER 4

CONCLUSIONS

The goal of this analysis was to evaluate potential changes in student knowledge and attitudes regarding nutrition and obesity. Results of the analysis demonstrated some areas in which students increased knowledge and changed attitudes from the beginning of the course compared to the end of the course. For increased knowledge, students increased their mentions of physiological and environmental influences on obesity over the course of the semester. Additionally, at the end of the semester, students discussed the complexity of obesity and the need for multidisciplinary treatment more than at the beginning of the course. Beyond the increased knowledge, attitudes also appeared to change over the course. In both nutrition and non-nutrition students, responses demonstrated a balance between personal choices and external influences regarding obesity. Another prominent change that occurred mainly in nutrition students was in regards to the food industry. While there was no specific test or tool used to analyze tone of the responses, the food industry appeared to be described in a more positive tone at the end of the semester. This was deduced using wording, context, and experience of being present in the classroom, and researchers needed to create a new code in the post course assessment that the food industry has a role in addressing obesity which could be through both prevention and treatment.

Another aim of this study was to contribute to the course's ongoing course development. Many topics can be viewed as sufficiently covered by the course through the increases in themes that were related to each topic. These well-covered topics include physiological influences,

environmental influences, personal choices, the food industry, public policy, and medical treatments for obesity. Each of these topics should be maintained in future courses. However, during the analysis researchers determined that one topic was not covered in the course: psychosocial factors or mental health. Some students mentioned this topic in the pre course assessment, but by the post course assessment, there was little to no mentions of any themes related to this topic. In the last module of the course, there was a focus on personal well-being and overall health which briefly included some mental health aspects, but in the future, mental health should be addressed in greater depth. Mental health topics that relate to the course and could be discussed in the future include eating behaviors, coping mechanisms, deciding to change habits, discrimination, and mental health before, during, and after weight loss.

Overall, this course is meant to fulfill the nutrition requirement for the University of Georgia's new Certificate in Obesity and Weight Management. This course brought together students from across numerous colleges, departments, and majors to learn about obesity and its food-related aspects. Through lecture, videos, guest speakers, guided discussion, and other methods, the students collaborated together, increased knowledge, and developed attitudes conducive to the future multidisciplinary work that will address the obesity crisis thereby fulfilling the purpose of the certificate.

REFERENCES

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. JAMA 2014;311(8):806-14.

2. Wang Y, Beydoun MA. The obesity epidemic in the United States--gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. Epidemiol Rev 2007;29:6-28.

3. Bhaskaran K, Douglas I, Forbes H, dos-Santos-Silva I, Leon DA, Smeeth L. Body-mass index and risk of 22 specific cancers: a population-based cohort study of 5·24 million UK adults. Lancet;384(9945):755-65.

4. Managing Overweight and Obesity in Adults: Systematic Evidence Review from the Obesity Expert Panel. 2013.

5. Donovan SM. Establishing and Evaluating Transdisciplinary Graduate Education in Obesity Prevention: The Illinois Transdisciplinary Obesity Prevention Program. Graduate Interdisciplinary Instruction in Obesity and Weight Management: State-of-the-Art Conference University of Georgia, 2013.

6. University of Georgia Obesity Initiative. Certificate in Obesity and Weight Management, 2014.

7. Centers for Disease Control and Prevention. Data, Trends, and Maps: Obesity Prevalence Maps. Internet: http://www.cdc.gov/obesity/data/prevalence-maps.html (accessed 14 January 2016).

8. Shaw GM, Velie EM, Schaffer D. Risk of neural tube defect-affected pregnancies among obese women. JAMA 1996;275(14):1093-6.

9. Skinner AC, Perrin EM, Moss LA, Skelton JA. Cardiometabolic Risks and Severity of Obesity in Children and Young Adults. N Engl J Med 2015;373(14):1307-17.

10. Peeters A, Barendregt JJ, Willekens F, Mackenbach JP, Al Mamun A, Bonneux L. Obesity in adulthood and its consequences for life expectancy: a life-table analysis. Ann Intern Med 2003;138(1):24-32.

11. Marihart CL, Brunt AR, Geraci AA. The high price of obesity in nursing homes. Care Manag J 2015;16(1):14-9.

12. Li Q, Blume SW, Huang JC, Hammer M, Ganz ML. Prevalence and healthcare costs of obesity-related comorbidities: evidence from an electronic medical records system in the United States. J Med Econ 2015;18(12):1020-8.

13. Lifshitz F, Lifshitz JZ. Globesity: the root causes of the obesity epidemic in the USA and now worldwide. PER 2014;12(1):17-34.

14. Gaillard R, Felix JF, Duijts L, Jaddoe VW. Childhood consequences of maternal obesity and excessive weight gain during pregnancy. Acta Obstet Gyn Scan 2014;93(11):1085-9.

15. Leung CW, Blumenthal SJ, Hoffnagle EE, Jensen HH, Foerster SB, Nestle M, Cheung LW, Mozaffarian D, Willett WC. Associations of food stamp participation with dietary quality and obesity in children. Pediatrics 2013;131(3):463-72.

16. Bidlack WR. Interrelationships of food, nutrition, diet and health: the National Association of State Universities and Land Grant Colleges White Paper. J Am Coll Nutr 1996;15(5):422-33.

17. Ungefroren H, Gieseler F, Lehnert H. [Obesity and cancer]. Der Internist 2015;56(2):127-8, 30-6.

18. Bantle JP, Wylie-Rosett J, Albright AL, Apovian CM, Clark NG, Franz MJ, Hoogwerf BJ, Lichtenstein AH, Mayer-Davis E, Mooradian AD, et al. Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. Diabetes Care 2008;31 Suppl 1:S61-78.

19. Kushi LH, Doyle C, McCullough M, Rock CL, Demark-Wahnefried W, Bandera EV, Gapstur S, Patel AV, Andrews K, Gansler T. American Cancer Society Guidelines on nutrition and physical activity for cancer prevention: reducing the risk of cancer with healthy food choices and physical activity. CA: a cancer journal for clinicians 2012;62(1):30-67.

20. Lichtenstein AH, Appel LJ, Brands M, Carnethon M, Daniels S, Franch HA, Franklin B, Kris-Etherton P, Harris WS, Howard B, et al. Diet and lifestyle recommendations revision 2006: a scientific statement from the American Heart Association Nutrition Committee. Circulation 2006;114(1):82-96.

21. Roberts DH, Kane EM, Jones DB, Almeida JM, Bell SK, Weinstein AR, Schwartzstein RM. Teaching medical students about obesity: a pilot program to address an unmet need through longitudinal relationships with bariatric surgery patients. Surg Innov 2011;18(2):176-83.

22. Phelan SM, Puhl RM, Burke SE, Hardeman R, Dovidio JF, Nelson DB, Przedworski J, Burgess DJ, Perry S, Yeazel MW, et al. The mixed impact of medical school on medical students' implicit and explicit weight bias. Med Educ 2015;49(10):983-92.

23. Schmidt S, Rice A, Kolasa K. Teaching by example: educating medical students through a weight management experience. Family medicine 2013;45(8):572-5.

24. Spencer EH, Frank E, Elon LK, Hertzberg VS, Serdula MK, Galuska DA. Predictors of nutrition counseling behaviors and attitudes in US medical students. Am J Clin Nutr 2006;84(3):655-62.

25. Castillo M, Feinstein R, Tsang J, Fisher M. Basic nutrition knowledge of recent medical graduates entering a pediatric residency program. Int J Adolesc Med Health 2015

26. Taren DL, Thomson CA, Koff NA, Gordon PR, Marian MJ, Bassford TL, Fulginiti JV, Ritenbaugh CK. Effect of an integrated nutrition curriculum on medical education, student clinical performance, and student perception of medical-nutrition training. Am J Clin Nutr 2001;73(6):1107-12.

27. Adams KM, Kohlmeier M, Powell M, Zeisel SH. Nutrition in medicine: nutrition education for medical students and residents. Nutr Clin Pract 2010;25(5):471-80

28. Jay M, Gillespie C, Ark T, Richter R, McMacken M, Zabar S, Paik S, Messito MJ, Lee J, Kalet A. Do internists, pediatricians, and psychiatrists feel competent in obesity care?: using a needs assessment to drive curriculum design. J Gen Intern Med 2008;23(7):1066-70.

29. Chepulis LM, Mearns GJ. Evaluation of the Nutritional Knowledge of Undergraduate Nursing Students. J Nurs Educ 2015;54(9):S103-6.

30. Wendler C, Bridgeman, B., Cline, F., Millett, C.,, Rock J, Bell, N., and McAllister, P. The Path Forward: The Future of Graduate Education in the United States. Princeton, NJ: Educational Testing Service, 2010.

31. Full RJ, Dudley R, Koehl MAR, Libby T, Schwab C. Interdisciplinary Laboratory Course Facilitating Knowledge Integration, Mutualistic Teaming, and Original Discovery. Integrative and Comparative Biology 2015;55(5):912-25.

32. Sandhu JS, Hosang RN, Madsen KA. Solutions that stick: activating cross-disciplinary collaboration in a graduate-level public health innovations course at the University of California, Berkeley. Am J Public Health 2015;105 Suppl 1:S73-7.

33. Office of the Vice President for Research. Obesity Initiative. Version current. Internet: http://obesity.ovpr.uga.edu/ (accessed January 14, 2016).

34. Qualitative Data Analysis. Edtion ed.: Sage Publications:320-57.

35. Thomson OP, Petty NJ, Moore AP. Clinical decision-making and therapeutic approaches in osteopathy – A qualitative grounded theory study. Manual Ther 2014;19(1):44-51.

36. Foley G, Timonen V. Using Grounded Theory Method to Capture and Analyze Health Care Experiences. Health Serv Res 2015;50(4):1195-210.

37. Chapman AL, Hadfield M, Chapman CJ. Qualitative research in healthcare: an introduction to grounded theory using thematic analysis. J Roy Coll Phys Edin2015;45(3):201-5.

APPENDICES

APPENDIX A:

CONSENT FORM

Certificate of Obesity and Weight Management Course Assessment Consent Letter (Online Version)

Date

Dear Student:

I am Alison Berg, a graduate student in the Department of Foods and Nutrition at The University of Georgia. I invite you to participate in a research study entitled, **Certificate in Obesity and Weight Management Assessment: FDNS 6240 Nutrition and Obesity Across the Lifespan**. The purposes of this study are to: 1) collect data on demographics of students enrolling in certificate courses, 2) to assess changes in awareness and knowledge during and as a result of the course, and 3) to guide future course revisions and course development to better serve students and the goals of the certificate.

Your research participation will only involve the use of your data from assessments throughout the course, with no time commitment from you. Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. If you decide to stop or withdraw from the study, the information/data collected from or about you up to the point of your withdrawal will be kept as part of the study and may continue to be analyzed. Your decision about participation will have no bearing on your grades or class standing.

If you agree to the use of your information/data for this research project, please simply click "Yes, I agree to participate in this study" below; if you don't agree, please click "No, I do not agree to participate in this study. Please do not use my information/data for research." If you select "No," none of your data will be included in the research and you can still complete the assessment to meet your course requirement. The results of the research study may be published, but your name or any identifying information will not be used. In fact, the published results will be presented in summary form only.

The findings from this project may provide information on needs for revision of current courses to help students achieve learning goals, and/or that will advise in the development of new courses. Obesity is a major public health concern. The courses assessed in this study are part of a graduate certificate designed to prepare students to address the obesity epidemic in clinical, community, school, workplace, and research settings. Thus, the minimal risk of emotional discomfort to students participating is outweighed by the potential benefit of course revisions to improve the certificate and better prepare the workforce to address the obesity epidemic.

Measures to maintain privacy and confidentiality, such as coding, are put in place to protect participants from potential harms that may result from a breach in confidentiality. Please be

aware that any future analysis/research that will be conducted will be related to the purposes for which the data were originally collected.

If you have any questions about this research project, please feel free to email me at aclune@uga.edu or your professor for this course, Dr. Mary Ann Johnson, mjohnson@fcs.uga.edu. Questions or concerns about your rights as a research participant should be directed to The Chairperson, University of Georgia Institutional Review Board, 609 Boyd GSRC, Athens, Georgia 30602; telephone (706) 542-3199; email address irb@uga.edu.

Research Subject's Consent to Participate in Research:
To voluntarily agree to take part in this study, you must choose an option below. By clicking on "Yes, I agree to participate in this study," you indicate that you have read or had read to you this entire consent form, and have had all of your questions answered.

☐ Yes, I agree to participate in this study.

☐ No, I do not agree to participate in this study. Please do not use my information/data for research.

Thank you for your consideration!

Sincerely,

Alison C. Berg

APPENDIX B:

COURSE ASSESSMENTS

Note: This is the post course assessment; in the pre course assessment, Q11 and Q12 were not asked

Q1 Please enter your first and last name

Q2 Please select your gender
* Male (1)
* Female (2)

Q3 What is your race/ethnicity?
* Asian (1)
* Hispanic (2)
* Non-Hispanic black (3)
* Non-Hispanic white (4)
* Other (5)
* Prefer not to answer (6)

Q4 What is your age?
_____ Age (years) (1)

Q5 Year in college:
* First year undergraduate (1)
* Second year undergraduate (2)
* Third year undergraduate (3)
* Fourth year undergraduate (4)
* Fifth year or beyond undergraduate (5)
* Graduate Student (6)
* Non-degree seeking student (7)
* Other (8)

Q6 Degree objective
* Bachelor's degree (1)
* Master's degree (2)
* Doctoral degree (3)
* Non-degree seeking (4)
* Other (5)

Q7 Intended or declared degree major
* Foods and Nutrition (Consumer Foods, Nutrition Science, Dietetics) (1)
* Food Science and Technology (2)
* Kinesiology/Exercise Science/Exercise Psychology/Strength and Conditioning (3)
* Human Development and Family Science/Marriage and Family Therapy/Child Life (4)
* Public Health (5)

* Education (Adult Education, Education Administration and Policy) (6)
* Social Work (7)
* Psychology/Counseling Psychology (8)
* Other: please describe (9) _____

Q8 Are you enrolled in this course to satisfy the requirements of the UGA Certificate in Obesity and Weight Management?
* Yes. Please proceed to question 7a. (1)
* No. Please proceed to question 8. (2)
If Yes. Please proceed to ques... Is Selected, Then Skip To What courses have you taken as p...If No. Please proceed to quest... Is Selected, Then Skip To Write down everything that comes to m...

Q9 What courses have you taken as part of the Certificate in Obesity and Weight Management? (Please select all that apply)
* None. This is the first course I have taken as part of the Certificate. (1)
* FDNS 8570 or FDNS 6590 Metabolism and Physiology of Energy Balance and Obesity (3 credits) (2)
* KINS4500/6500 Physical Activity, Exercise and Obesity Across the Lifespan (3 credits) (3)
* KINS8300-8300L Exercise, Obesity, and Cardiometabolic Diseases (4 credits) (4)
* HPAM7050 Health Policy and Obesity (3 credits) (5)
* FDNS/KINS/HPAM/HPRB/ECHD8595 Survey of Obesity and Weight Management (1 credit) (6)
* Other (7)

Q10 Write down everything that comes to mind when you think of Nutrition and Obesity Across the Lifespan (open ended response; max 25000 characters)

Q11 Did you enjoy participating in this interdisciplinary course?
* Yes. Proceed to question 12. (1)
* No. Proceed to question 12. (2)

Q12 Please explain your response to the previous question (Did you enjoy participating in this interdisciplinary course?)

APPENDIX C:

CODING SCHEME

Note: Parentheses indicate which module number wass most associated with each theme.

**codes added during analysis of post course assessment*

10000 Role of Eating/Nutrition/Food (0)

- 10100 – Quantity/Overeating (2)
    - 10110 – Portion sizes (1)
- 10200 – Quality (2)
    - 10210 – Fattening (2)
    - 10220 – Prepared/Convenience foods less nutritious (2)
    - 10230 – suboptimal (2)
- 10300 – Food preferences (6)
- 10400 – Sugar sweetened beverages (4)

11000 Role of Exercise (2)

- 11100 – Sedentary lifestyle (2)
    - 11110 – screen time (2)
- 11200 – Not enough PA/EX (2)
- 11300 – Time restraints (2)

12000 Genetics (3)

- 12100 – Epigenetics (3)
- 12200 – Predisposed (3)

13000 Environment (4)

- 13100 – Food Environment/obesogenic (5)
    - 13110 – Quantity; Easy to access; food is everywhere (4)
    - 13120 – Portion sizes in restaurants (4)
    - 13130 – Inadequate access to fresh, whole foods (4)
    - 13140 – Easy access to fast food and convenience stores (4)
    - 13150- Easy access to energy dense foods (4)
    - 13160 – SSB (4)
    - 13170 – Price (4)
    - 13180 – Food Industry (6)
        - 13181 – Advertising (6)
- 13200 - Sociocultural environment (4)
    - 13210 – family practices/habits (4)
    - 13220 – Peer culture (4)
    - 13230 – “American Lifestyle” (4)
- 13300 – Built environment (5)

    - 13310 – Transportation (4)
    - 13320 – public spaces accommodating obese (i.e. planes, automobiles) (9)
- 13400 – Political environment (7)
    - 13410- Agricultural policy (7)
    - 13420 – School Nutrition Policy (7)

14000 Life Course Obesity Risk (1)

- 14100 – Obese children -> Obese Adults (1)
- 14200 – Leaving home/young adulthood (1)
- 14300 – Pregnancy/Having Children (mother) (1)
- 14400 – Pregnancy (risk for offspring) (1)
- 14500 – Menopause (1)
- 14600 – Middle age, late adulthood (1)

15000 Psychosocial correlates (9)

- 15100 – Depression, anxiety, stress (Negative) (9)
- 15200 – Compassion (9)
- 15300 – Social Stigma (9)
- 15400 – Body image (9)
- 15500 – Quality of life (9)
- 15600 – Social support (9)
- 15700 – Coping skills/food as a coping mechanism (9)

16000 Economics (4)

- 16100 – Poverty (4)
    - 16110 – Can't afford healthy foods (4)
- 16200 – Increased health care costs (1)

17000 Obesity Definition (1)

- 17100- Body composition (1)
- *17200- Obesity is a disease (1)

18000 Physiological/Biological causes (3)

- 18100 – Energy balance (2)
- 18200 – Inflammation cause (3)
- 18300 – Hormone imbalance (3)
- 18400 – Medication (3)

19000 Physiological effects (1)

- 19100 – Co-morbid diseases (1)
    - 19110 – Earlier chronic illness for obese children (1)
- 19200 – Inflammation effect (1)

- 19400 – Declines in physical function/mobility (1)
- 19500 – Bone, lean mass (1)

20000 Demographics (1)

- 20100 – Prevalence (1)
    - 20110 – Adult prevalence (33%) (1)
    - 20120 – Child prevalence (17%) (1)
        - 20121 – School children (7)
        - 20122 – Younger children (7)
    - 20130 – Clinical (1)
    - 20140 – Regional/State(i.e. higher in southern US) (1)
    - 20150 – National (1)
    - 20160 – Global (1)
    - 20170 – within income categories (SES) (1)

21000 Obesity Treatment (8)

- 21100 – Multidisciplinary (1)
- 21200 – Addresses lifestyle/behavior modification (8)
    - 21210 – Lifestyle – diet (2)
    - 21220 – Lifestyle – exercise (2)
    - 2123 – Lifestyle – stress management (9)
- 21300 – Medical Treatment (surgery, pharmacological) (8)
- 21400 – Life course intervention (7)
- 21500 – Compassion for obese patient/practical guidance/managing expectations (8)
- 21600 – Relationship with health care professionals (8)
- 21700 – No quick fix/difficult (0)
- 21800 – family, community approach (7)
- 21900 – Specific diets (i.e. low fat, low carb, paleo, etc.) (8)
- 21950 – must be individualized (9)
- 21960 – emotional (9)
- *21970 – Food Industry has a role in obesity treatment (6)
- 21990 – Addressing food environment (5)

22000 Attitudes toward obesity (9)

- 22100 – Perceived complex (0)
- 22200 – Personal choice to engage in obesity promoting behavior (2)
- 22300 – Shared burden by all/ pervasive (7)
- 22500 – Obesity is a “problem” that needs solving (7)
- 22600 – control over or value of health (9)
- *22700 – out of individual’s control(5)

23000 Knowledge/Education Contributors (4)

- 23100 – General public/obese (4)
    - 27110 - Uneducated in food prep and cooking skills (4)
- 23200 – Student knowledge inadequate (0)

*24000 Prevention (7)

25000 Behavioral factors as causes (4)

APPENDIX D:

ALL CODES AND TOTAL COUNTS

Code #	Code Name	Pre Course			Post Course		
		Total	Non-Nutrition	Nutrition	Total	Non-Nutrition	Nutrition
10000	Role of eating, nutrition, food	10	4	6	8	6	2
10100	Quantity Overeating	2	0	2	4	1	3
10110	Portion sizes	3	0	3	0	0	0
10200	Quality	2	1	1	3	1	2
10220	Prepared, convenience foods less nutritious	1	0	1	1	0	1
10230	Suboptimal	2	1	1	0	0	0
10300	Food preferences	3	0	3	1	1	0
10400	Sugar sweetened beverages	1	0	1	1	1	0
11000	Role of exercise	5	2	3	6	3	3
11100	Sedentary lifestyle	2	0	2	0	0	0
11110	Screen time	2	0	2	0	0	0
11200	Not enough PA/EX	4	1	3	2	1	1
11300	Time restraints	2	0	2	0	0	0
12000	Genetics	6	2	4	8	5	3
12100	Epigenetics	3	1	2	1	1	0
12200	Predisposed	1	1	0	1	1	0

Code #	Code Name	Pre Course			Post Course		
		Total	Non-Nutrition	Nutrition	Total	Non-Nutrition	Nutrition
13000	Environment	4	2	2	9	7	2
13100	Food environment is obesogenic	6	3	3	3	1	2
13110	Quantity; easy to access; food is everywhere	2	0	2	1	0	1
13120	Portion sizes in restaurants	1	0	1	0	0	0
13130	Inadequate access to fresh, whole foods	4	1	3	6	3	3
13140	Easy access to fast food and convenience stores	4	1	3	2	2	0
13150	Easy access to energy dense foods	2	0	2	0	0	0
13170	Price	0	0	0	1	1	0
13180	Food industry	2	1	1	3	1	2
13181	Advertising	3	0	3	0	0	0
13200	Sociocultural environment	1	0	1	8	7	1
13210	Family practices/habits	2	0	2	0	0	0
13220	Peer culture	1	0	1	2	1	1
13230	“American lifestyle”	1	0	1	0	0	0
13300	Built environment	0	0	0	4	2	2
13310	Transportation	1	0	1	0	0	0
13320	Public spaces accommodating obese (i.e. planes,	1	0	1	0	0	0

Code #	Code Name	Pre Course			Post Course		
		Total	Non-Nutrition	Nutrition	Total	Non-Nutrition	Nutrition
	automobiles)						
13400	Political environment	2	0	2	8	3	5
13420	School nutrition policy	1	0	1	1	0	1
14000	Life course obesity risk	13	6	7	3	2	1
14100	Obese children -> Obese Adults	3	0	3	1	1	0
14200	Leaving home/young adulthood	2	0	2	1	1	0
14300	Pregnancy/Having Children (mother)	3	0	3	0	0	0
14400	Pregnancy (risk for offspring)	4	0	4	1	0	1
14500	Menopause	1	0	1	0	0	0
14600	Middle age, late adulthood	3	0	3	2	1	1
15000	Psychosocial correlates	7	3	4	0	0	0
15100	Depression, anxiety, stress (Negative)	7	3	4	1	1	0
15300	Social stigma	3	1	2	0	0	0
15400	Body image	1	0	1	2	1	1
15500	Quality of life	2	0	2	0	0	0
15600	Social support	2	0	2	0	0	0
15700	Coping skills/food as a coping mechanism	1	0	1	0	0	0
16000	Economics	2	1	1	0	0	0

Code #	Code Name	Pre Course			Post Course		
		Total	Non-Nutrition	Nutrition	Total	Non-Nutrition	Nutrition
16100	Poverty	3	2	1	0	0	0
16110	Can't afford healthy foods	2	1	1	2	1	1
16200	Increased health care costs	3	0	3	0	0	0
17000	Obesity definition	2	0	2	1	1	0
17100	Body composition	2	1	1	0	0	0
17200	Obesity is a disease	0	0	0	2	0	2
18000	Physiological/ Biological causes	1	0	1	8	5	3
18100	Energy balance	4	2	2	5	3	2
18300	Hormone imbalance	2	1	1	6	3	3
18400	Medication	3	1	2	1	1	0
19000	Physiological effects	1	0	1	2	0	2
19100	Co-morbid diseases	9	2	7	5	3	2
19110	Earlier chronic illness for obese children	2	0	2	0	0	0
19200	Inflammation effect	2	0	2	0	0	0
19400	Declines in physical function/mobility	1	0	1	1	0	1
19500	Bone, lean mass	1	0	1	0	0	0
20000	Demographics	1	0	1	0	0	0
20100	Prevalence	1	1	0	2	1	1
20110	Adult prevalence (33%)	1	0	1	1	1	0

Code #	Code Name	Pre Course			Post Course		
		Total	Non-Nutrition	Nutrition	Total	Non-Nutrition	Nutrition
20120	Child prevalence (17%)	2	1	1	0	0	0
20121	School children	1	0	1	0	0	0
20122	Younger children	1	0	1	0	0	0
20130	Clinical	2	0	2	0	0	0
20140	Regional/State(i.e. higher in southern US)	2	2	0	0	0	0
20150	National	3	2	1	1	1	0
20160	Global	3	1	2	2	0	2
20170	Within income categories (SES)	1	0	1	0	0	0
21000	Obesity treatment	0	0	0	3	2	1
21100	Multidisciplinary	5	1	4	12	5	7
21200	Addresses lifestyle/behavior modification	6	1	5	9	5	4
21210	Lifestyle – diet	2	2	0	3	1	2
21220	Lifestyle – exercise	0	0	0	3	1	2
21300	Medical treatment (surgery, pharmacological)	1	0	1	6	1	5
21400	Life course intervention	4	2	2	0	0	0
21500	Compassion for obese patient/practical guidance/managing	1	0	1	2	0	2

Code #	Code Name	Pre Course			Post Course		
		Total	Non-Nutrition	Nutrition	Total	Non-Nutrition	Nutrition
	expectations						
21600	Relationship with health care professionals	1	1	0	1	0	1
21700	No quick fix/difficult	3	0	3	4	1	3
21800	family, community approach	4	2	2	2	0	2
21900	Specific diets (i.e. low fat, low carb, paleo, etc)	2	0	1	0	0	0
21950	must be individualized	2	1	1	4	2	2
21960	emotional	0	0	0	1	1	0
21970	Food industry has a role in obesity treatment	0	0	0	5	1	4
22000	Attitudes toward obesity	1	0	1	0	0	0
22100	Perceived complex	9	3	6	19	8	11
22200	Personal choice to engage in obesity promoting behavior	1	0	1	8	2	6
22300	Shared burden by all/ pervasive	0	0	0	2	0	2
22500	Obesity is a “problem” that needs solving	9	4	5	3	1	2
22600	Control over or value of	1	0	1	2	1	1

Code #	Code Name	Pre Course			Post Course		
		Total	Non-Nutrition	Nutrition	Total	Non-Nutrition	Nutrition
	health						
22700	Out of individual's control	0	0	0	1	0	1
23000	Knowledge/Education contributors	1	0	1	1	0	1
23100	General public/obese	3	1	2	7	4	3
23200	Student knowledge inadequate	4	2	2	4	3	1
24000	Prevention	0	0	0	3	1	2
27110	Uneducated in food prep and cooking skills	2	0	2	0	0	0