12-2014

Knowledge of Nutritional Value of Healthy Foods and the Relationship to Body Mass Index

Lynzie Beth Lee
University of Arkansas, Fayetteville

Follow this and additional works at: http://scholarworks.uark.edu/nursuht

Knowledge of Nutritional Value of Healthy Foods and the Relationship to Body Mass Index

Lynzie B. Lee

University of Arkansas

Student: Lynzie Lee

Mentor: Kelly Vowell Johnson

Institution: University of Arkansas

Classification: Senior

Grade Point Average: 3.7

Area of Study: Nursing

Title: Knowledge of Nutritional Value of Healthy Foods and the Relationship to Body Mass Index.

Abstract

Childhood obesity has remained a persistent problem over the years, according to Potts and Mandleco (2011). Children who are overweight by age 8 are more likely to be obese adults, which can lead to many chronic conditions and diseases. The aim of this study was to explore the relationship between nutrition knowledge and body mass index (BMI). For this study, a normal BMI for an average fourth-grader is defined between the 5th and 95th percentile with a BMI less than 22. A pre-test was given to a sample of twelve fourth-grade students attending Prairie Grove Intermediate School using select questions from the "Catch Kids Club After-School Student Questionnaire". A nutritional education session was provided to all participants after the pre-test using the "U R What U Eat" chart. A post-test was offered using the same selected questions as in the pre-test. Information uncovered by the pre and post-test studies was used to compare the knowledge of smart food choices to determine students' understanding of nutrition. The goal of this study was to increase knowledge about food smart choices, and see if there is a difference between the pre-test and post-test scores. The outcomes of this study explored the changes in students' knowledge of healthy foods concerning the nutritional value of smart food options.

Knowledge of Nutritional Value of Healthy Foods and the Relationship to Body Mass Index

Introduction

Obesity is a medical condition, where excess body fat has accumulated, increasing the risk for adverse effects on health, which could lead to reduced life expectancy and/or increased health problems. Approximately, 22% to 30% of children in the United States are overweight (Kipke, et al., 2007). Researchers suggest that overweight and obese children suffer from myriad health problems, ranging from sleep apnea and orthopedic complications, to negative psychosocial interactions and repercussions from their peers (Zehle, Wen, Orr, & Rissel, 2007).

Childhood obesity is a major concern because obese children are at risk for becoming obese adults. Approximately 25–50% of obese children can progress to obesity in adulthood, resulting in higher risks of cardiovascular disease, diabetes, and cancer (Zehle, Wen, Orr, & Rissel, 2007). Zehle and coworkers discovered that if the current trend continues, morbidity in adulthood originating from obesity in childhood could become a significant component of the total burden of disease. The global burden of childhood obesity is profound; currently 1 child in 10 is overweight or obese worldwide (Newby, 2009). According to the International Obesity Task Force (IOTF), approximately 155 million school-aged children and 22 million preschool-aged children are overweight or obese globally (Zehle, Wen, Orr, & Rissel, 2007).

In response to the childhood obesity epidemic, the Arkansas legislature passed landmark legislation—Act 1220 of 20037—with the stated purpose ''to combat childhood obesity'' (Justus, Ryan, Rockenbach, Katterapalli, & Higginson, 2007). Schools reported individual students' height and weight on standardized assessment forms prepopulated by Arkansas Center for Health Improvement with a unique student identifier, grade, birthdate, sex, race/ethnicity, and

name (MMWR, 2006). Although, much evidence was given in relation to information about each student in the BMI assessment, there was no record of knowledge deficiencies collected.

Epidemiological and experimental evidence suggest populations with a high consumption of fruits and vegetables have a lower risk for developing obesity, cancer and cardiovascular diseases (Perez-Liazur, Kaufer-Horwiz, & Plazas, 2008). Researchers reported the factors that influence food selection are not restricted to personal preferences; they are also conditioned by social, cultural and economic circumstances, food costs, accessibility and the knowledge to design a healthy diet. Perez-Liazur and co-investigators go on to mention that eating habits that are acquired during childhood may persist into adulthood; therefore, factors that influence food consumption should be identified to carry out more effective interventions that will promote a healthy diet during the entire lifespan. The researchers define the characteristics as accessibility (easiness with which the students were able to find ready-to-eat fruits and vegetables); expectancy (value that the person places on a given outcome); self-efficacy (the person's confidence in performing a particular behavior and in overcoming barriers to that behavior); preference (what the child likes to eat) and knowledge (what the child knows about the function of fruits and vegetables in the body).

The rapid increase in obesity over the past 20 years strongly suggests behavioral and environmental influences, such as poor nutrition and a sedentary lifestyle, may be fueling this public health epidemic (Kipke, et al., 2007). Another factor believed to have played an important role in increasing rates of obesity among children is the increased availability and affordability of energy-dense foods, such as fast food (Kipke, et al., 2007).

There is general agreement that prevention must be a key strategy for controlling the current epidemic of obesity and that children should be considered the priority population for intervention strategies (Dehghan, Akhtar-Danesh, Merchant, & Fonseka, 2011). Many reports and conferences about childhood obesity in recent years have concluded that efforts must be made to prevent children from becoming overweight and there is a need for more research in this age group (4-12). According to the Swedish Council on Technology Assessment in Health Care (SBU), there is a great need for knowledge about effective treatment aimed at the weight reduction and maintenance, because it is important to develop and assess long-term methods for prevention and treatment of obesity in children and adolescents (Melin & Lenner, 2009).

Focusing an intervention for elementary-school aged children impacts behaviors before they are established, which may in turn lead to more permanent effects. Another benefit of focusing an intervention for students in this age range is that children 7-12 years old for cognitive capacity to understand the health benefits of foods and can identify specific taste differences (Wall, Least, Gromis, & Lohse, 2012). Potts and Mandleco (2011) stated that during this age the stage of cognitive development is known as concrete operations, which is when the child gains the skills of classification, conservation, and reversibility.

Although underlying genetic factors may predispose a child to obesity, lack of knowledge about certain foods can be a substantial reason as to why many children in the Northwest Arkansas region are struggling with obesity. Nurses have a unique role in the health system and are capable facilitators in delivering heath messages to the public. Nurses are able to increase awareness about the causes and consequences of childhood obesity (Dehghan, Akhtar-Danesh, Merchant, & Fonseka, 2011).

Aim of Study

The aims of this study were to examine a small sample of fourth grade student's knowledge of smart food choices and to determine if there was any change in their knowledge following an educational program that stressed the importance of healthy food choices.

The following research question addressed in this study were:

1. Is there a difference between the pre and post-test smart food choices through the use of the "U R What U Eat" chart and selected questions from the "Catch Kids Club After-School Student Questionnaire" in fourth grade students?

Methodology

The study was conducted with approval from the University of Arkansas Fayetteville Institutional Review Board (IRB) and Prairie Grove Intermediate School, where the study was performed. A letter of support was signed by the principal of Prairie Grove Intermediate School, where the research was conducted and permission was granted to execute the study. A parental consent form was signed for each child participating in the study, in order to inform the parent or guardian of their child's involvement.

Design: The study used pretest and post-test design to examine the differences in knowledge of smart food choices before and after an educational intervention with fourth-grade student's enrolled in Prairie Grove Intermediate School. Descriptive analysis was performed in regard to the information provided. Pre-test and post-test examinations where used to compare the differences in knowledge of smart food choices between a sample of twenty fourth-grade students in Prairie Grove Intermediate School.

Sample: A convenience sample of students willing to participate in the study was used. According to Polit. D., & Beck, C.T. (2010) this type of sampling was necessary because it entails using the most available people as participants. All student information was deidentified as per HIPPA regulations. BMI's below the normal range were excluded from the study. Results of pre-test and post-test scores from students who were of normal weight (as defined by a BMI <22) and students who were overweight (as defined by a BMI>22) were compared. The school nurse and the researcher collected the BMI information, in order to correlate it to the examinations. The test results were then given an untraceable study code.

Instrument: *We Can!* Is a national educational program from the National Institutes of Health, which promotes healthy weight for children. The "U R What U Eat" tool was obtained from this program. The "U R What U Eat" chart was used to enhance the knowledge base smart food choices of the fourth-grade students. The "U R What U Eat" chart uses five different food groups divided into three different categories (go, slow, and whoa) to assist in teaching students food groups and which foods are healthy or unhealthy to eat. "Go" foods can be eaten almost anytime, should be highly recognized, and are the lowest in fat, sugar, and calories. "Slow" foods should be eaten less often because they are higher in fat, sugar, and calories. "Whoa" foods should only be eaten occasionally because they are the highest in fat, sugar, and calories (NIH, 2004). The chart also provides relevant information related to the serving size for each food group, including that each day one needs 2 cups of fruits, 2.5 cups of vegetables, 6 ounces of grains, 3 cups of milk, and 5.5 ounces of meat. The "U R What U Eat" chart used during the educational session was appropriate for the average fourth-grade student based on the developmental classification outlined for this age group by Potts and Mandleco (2011). "Go, Slow, Whoa" was a simple way to help students recognize foods that are the smartest choices (NIH, 2004).

Instrument: The "Catch Kids Club After-School Questionnaire" (NIH, 2013) was used to determine if there is a difference in knowledge of smart food choices in fourth-grade students. The pre-test and post-test questions used were modified from this questionnaire, which corresponds to the "U R What U Eat" chart used in the nutrition education session. Selected questions from the "Catch Kids Club After-School Student Questionnaire" used in the pre-test and post-test were evaluated for positive knowledge base changes for students with BMIs above the normal range versus changes of students with normal BMIs. Questions chosen for the pre and post-test studies were used to gather data about food choices that fourth-grade students make and what this age group knows about nutrition.

The correlation between BMI assessments and knowledge deficiencies was evaluated utilizing average means for each of the factors determined. The difference between the groups was observed through utilization of descriptive statistics.

Implications of Research

The pre-test and post-test questionnaire and education tutorial could provide health care professionals, teachers, or other personnel an opportunity to increase student's knowledge about good nutrition, which could impact their decisions about healthy choices concerning the value of different food options represented by the three different categories on the "U R What U Eat" chart. Expanding the current population size for further research could increase the chance of finding a significant difference in this study. One future intention for this study could serve as a guide for nurses to determine if a relationship exists between students' knowledge of nutritious foods and BMIs.

Data Analysis

Students	BMI	Pre-test Scores	Post-test Scores
A001	17.3	39	36
A002	16.2	42	33
A003	15.2	36	35
A004	26.0	27	43
A005	19.5	32	34
A006	15.4	35	38
A007	14.7	29	31
A008	15.1	35	37
A009	19.7	18	23
A010	22.0	36	37
A011	23.5	29	29
A012	17.3	31	30
Average	18.49	32.42	33.83

Results

Due to the small sample size of both groups descriptive statistics were used to assess the data. Of the 12 students who participated in the study, only 3 had BMIs greater than 20. The BMI average for all students was 18.49 with the BMI range of 14.7 to 26. The average pre-test score, which measures each student's existing knowledge about nutrition before the education tutorial, was 32.42 with the range of pre-test scores between 18 and 42. The average post-test score, a measure of each student's knowledge about nutrition after the education tutorial, was 33.83 with a range of 23 to 43. The difference between pre-test and post-test scores was an average increase of approximately 1.42 in 91.6% of the twelve fourth-grade students who participated in the study.

The results of this research describe the effect of the education tutorial used to increase the student's knowledge related to healthy food choices in a small sample size of fourth grade students. Positive changes between pre-test and post-test scores among seven out of twelve (58.3%) of the student's was noted. Although over 50% of the students did have a positive

change between test scores, 4 student's post-test scores decreased and 1 student's score remained the same as their pre-test.

Discussion

The purpose of this study was to examine fourth grade students' knowledge base changes via pre-test and post-test scores following an educational intervention on healthy food choices to recognize if students food choices relate to BMIs. Potts and Mandleco (2011) report that a typical fourth-grade student is between 9-10 years of age and developing the capabilities to recognize the similarities and differences of objects, understand cause and effect, collect and classify objects, enjoys memorizing and identifying facts, and is interested in the future. This objective was met through the use of a non-experimental study with descriptive analysis of twelve fourth-grade Prairie Grove Intermediate School students.

This small study indicated that for these fourth grade students, there was an educational need for both students with normal and abnormal BMIs. Pre-test scores of children with a BMI> 20 were similar to those with a BMI < 20. Post-test scores for the three students with a BMI > 20 increased in two children and remained the same for the third. Similar changes were also noted in the children with a BMI < 20. The students with normal BMIs in this sample population constituted the majority (9 out of 12 total students) of participants in this study. An interesting finding of note was that 4 of the 12 students with normal BMIs had a decrease in post-test scores.

A positive change of nearly 60% occurred after the education session, but the most relevant data was provided by the questions when individually correlated for each student. The most frequently missed question on the pre and post-test was number one, which asked the student how many fruits and vegetables should be consumed daily. Only 25% of the students

answered this question correctly. Of the students who answered this question correctly 1 out of the 3 students had an abnormal BMI of 22. Other questions that were consistently incorrect on the pre-test include ones, which ask the student to choose the healthier option of two food choices. The question that was answered correctly by all participants was the one concerning the likelihood of the student choosing fat or skim milk instead of regular milk.

Based on the results, students with BMI's above the normal range have gained information that influences knowledge base changes, which differ from knowledge base changes experienced by those student's with normal BMI's. One example that supports this conclusion is the student with the highest BMI of twenty-six had a positive knowledge base change with an increase of sixteen points between on the post-test. Results obtained support the hypothesis that there is a difference between the pre and post-test smart food choices through the use of the "U R What U Eat" chart and selected questions from the "Catch Kids After-School Student Questionnaire" in fourth grade students with a BMI<22 and those with a BMI>22.

Limitations

Certain limitations of this study may have affected changes between the pre-test scores and post-test scores, include general understanding of questions presented on the pre and post-test, communication between the researcher and the students about expectations, each individual student's delivery of a complete answer to each test question, and the amount of time for the overall study. The most significant limitation encountered was the inability to gain an appropriate population size. This study was restricted due the insufficient number of participants. Preferably, the number of participants would have been greater and equally distributed into

normal and abnormal BMI classification. The reason the sample was small was the lack in

number of consent forms returned from students within the given amount of time.

For future research additional time and resending the permission forms multiple times

could increase the sample size. The data from this study can be used to support health education

for students as well as a way to provide an increase in overall health to a community.

References

Akhtar-Danesh, N., Dehghan, M., Morrison, K. M., & Fonseka, S. (2011). Parents'

perceptions and attitudes on childhood obesity: A q-methodology study. *Journal of*

the American Academy of Nurse Practitioners, 23(2), 67-75. doi:10.1111/j.1745-

7599.2010.00584.x

Justus, M. B., Ryan, K. W., Rockenbach, J., Katterapalli, C., & Card-Higginson, P. (2007).

Lessons learned while implementing a legislated school policy: Body mass index

assessments among Arkansas's public school students. *Journal of School Health,*

77(10), 706-713. doi:10.1111/j.1746-1561.2007.00255.x

Kipke, M. D., Iverson, E., Moore, D., Booker, C., Ruelas, V., Peters, A. L., & Kaufman, F.

(2007). Food and park environments: Neighborhood-level risks for childhood

obesity in east Los Angeles. *Journal of Adolescent Health, 40*(4), 325-333.

Melin, A., & Lenner, R. A. (2009). Prevention of further weight gain in overweight school

children, a pilot study. *Scandinavian Journal of Caring Sciences, 23*(3), 498-505.

National Institutes of Health (NIH). (2013). *We Can! "Catch Kids Club After-School*

Student Questionnaire." Received April 29, 2013, from

www.nhlbi.nih.gov/health/public/heart/obesity/wecan/downloads/CKC-

questionnaire.pdf.

National Institutes of Health (NIH). (2004). *We Can!: "U R What U Eat."* Received

October 2, 2012, from

http://www.nih.gov/health/public/heart/obesity/wecan/downloads/urwhateat.pdf.

Newby, P. K. (2009). Plant foods and plant-based diets: Protective against childhood

obesity? *American Journal of Clinical Nutrition, 89*(5), 1572-1587.

Pérez-Lizaur, A., Kaufer-Horwitz, M., & Plazas, M. (2008). Environmental and personal

correlates of fruit and vegetable consumption in low income, urban Mexican

children. *Journal of Human Nutrition & Dietetics, 21*(1), 63-71.

Polit. D., & Beck, C.T. (2010). *Nursing Research: Appraising Evidence for Nursing

Practice*, 7th edition. Lippincott Williams & Wilkins.

Potts, N., & Mandleco, B. (2011). *Pediatric nursing: Caring for children and their

families*, 3rd edition. Clifton Park, NY: Thomson Delmar Learning.

Wall, D. E., Least, C., Gromis, J., & Lohse, B. (2012). Nutrition Education Intervention

Improves Vegetable-Related Attitude, Self-Efficacy, Preference, and Knowledge

of Fourth-Grade Students. *Journal Of School Health*, *82*(1), 37-43.

doi:10.1111/j.1746-1561.2011.00665.x

Zehle, K., Wen, L. M., Orr, N., & Rissel, C. (2007). "It's not an issue at the moment": A

qualitative study of mothers about childhood obesity. *MCN: The American Journal

of Maternal Child Nursing, 32*(1), 36-41.

Appendix

Selected Questions From The Catch Kids Club After-School Student Questionnaire Used in

Pre & Post-test Studies to Evaluate Positive Knowledge Base Changes.

1. How many total servings of fruits and vegetables should you eat each day.

   A. At least 2

   B. At least 5

   C. At least 9

   D. At least 10

   E. I don't know

2. The foods that I eat and drink now are healthy.

   A. Yes, all of the time

   B. Yes, sometimes

   C. No

3. Do you ever eat high fiber cereal?

   A. Almost always or always

   B. Sometimes

   C. Almost never or never

4. Do you ever eat whole wheat bread?

   A. Almost always or always

   B. Sometimes

    C. Almost never or never

5. Do you ever drink 100% fruit juice?

    A. Almost always or always

    B. Sometimes

    C. Almost never or never

6. Do you ever eat fruit for lunch?

    A. Almost always or always

    B. Sometimes

    C. Almost never or never

7. Do you ever eat vegetables for dinner?

    A. Almost always or always

    B. Sometimes

    C. Almost never or never

8. How likely are you to drink low fat or skim milk instead of regular white milk?

    A. Not likely

    B. Likely

    C. Very likely

9. How likely are you to eat high fiber cereal instead of a donut?

A. Not likely

B. Likely

C. Very likely

10. How likely are you to eat fresh fruit instead of a candy bar?

A. Not likely

B. Likely

C. Very likely

11. How likely are you to take the skin off of chicken (and not eat the skin)?

A. Not likely

B. Likely

C. Very likely

12. How likely are you to ask for frozen yogurt instead of ice cream?

A. Not likely

B. Likely

C. Very likely

13. How likely are you to eat a baked potato instead of French fries?

A. Not likely

B. Likely

C. Very likely
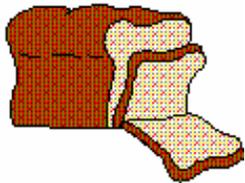
14. How likely are you to drink fruit juice instead of a soft drink (a soda pop)?

   A. Not likely

   B. Likely

   C. Very likely

15. How likely are you to order a grilled chicken sandwich at a fast food restaurant instead

   of ordering a hamburger?

   A. Not likely

   B. Likely

   C. Very likely

16.

   A. Whole Wheat Bread   B. White Bread
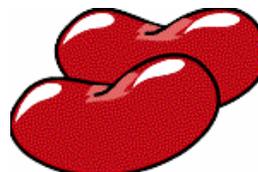
17.

   A. Beef   B. Beans

18.

A. Hamburger   B. Chicken

19.

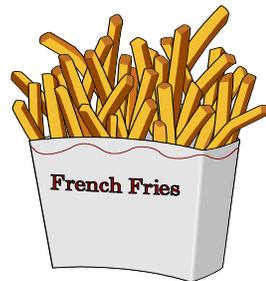A. Regular Milk   B. Low-Fat/Skim Milk

20.

A. Salad   B. French Fries

National Institutes of Health (NIH). *We Can! "Catch Kids Club After-School Student*

Questionnaire." Received April 29, 2013, from

www.nhlbi.nih.gov/health/public/heart/obesity/wecan/downloads/CKC-

questionnaire.pdf.