

High School Students' Knowledge of Nutrition and Physical Activity Guidelines

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Abstract

Purpose: The present study examined the health and nutrition knowledge of current high school students to evaluate if adequate education is being taught to reflect the health education guidelines set forth by the Missouri Department of Elementary and Secondary Education (DESE). **Methods:** Participants were high school students from grades 9 through 12 from a private school in the Midwest. Thirteen participants completed this study. Participants were given a 29-question survey asking questions on nutrition and physical activity. **Results:** The average score on the survey was found to be 16 correct out of 29. Eight out of the 13 participants scored between a 70% and 79% with the highest score being a 19 out of 24 or a 79%. **Conclusions:** The main findings of the study were indicative that the students completing the survey did not score high on the content question leading to a conclusion that more health and nutrition information can be beneficial for this population. **Recommendations:** Getting the survey out to a larger population group would bring in a larger amount of completed surveys, allowing for more information to be collected.

Key Words: Health, Physical Activity, Education, Guidelines, Nutrition

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INTRODUCTION

Obesity is defined as abnormal or excessive body fat accumulation that presents a risk to health. Obesity can affect an individual at any age, whether it be their youth or adulthood. Obesity is also an issue across all parts of the world. In fact, the World Health Organization defines obesity as a global epidemic (WHO, 2021). "The obesity epidemic is not restricted to industrialized societies; in developing countries, it is estimated that over 115 million people suffer from obesity related problems" (WHO, 2021).

Obesity among high schoolers is a growing concern. Obesity for this population is defined as a body mass index (BMI) at or above the 95th percentile (CDC, 2018). This is by sex as well as age and is based on a BMI-for-age growth chart. This is slightly different than how obesity is defined for an adult. For an adult, obese is defined as a BMI at or above 30, based on a BMI chart (CDC, 2021).

Based on recent data by the World Health Organization, obesity rates have been found to increase almost five times in both developed and developing countries, across all age groups (WHO, 2020). Data collected every two years via the Youth Risk Behavior Surveillance System (YRBSS) also supports these findings. These findings indicate that overweight and obesity rates are higher than we would like to see them.

When referring to the percentage of obesity and reviewing data sets from YRBSS from 2001 to the most recent of 2019, there has been an increase in obesity rates of high school students each year since 2001 (WHO, 2020). This means that students had a body mass index that classified them above the 95th percentile based on sex- and age specific data. When referring to high school students who were found to be overweight, there has also been an increase since 2001. Overweight for this population is defined as students who are over the 85th

percentile but below the 95th percentile in body mass index, based on sex- and age-specific data.

An individual who is obese during their childhood or teenage years are five times more likely to be obese during their adulthood, unless they begin healthier practices (i.e. increasing physical activity and healthier eating habits). According to the American Academy of Child and Adolescent Psychiatry, obesity typically begins around the age of five or during adolescence and a child who is obese between the ages of ten and thirteen have an 80% chance of becoming an obese adult (AACAP, 2016). This is why it is important to stress obesity prevention methods and distill healthier habits when a child is young, in order to help prevent obesity when they are older.

There are many different causes of obesity among the high school population. In part, this can be due to genetics, however, there are many different modifiable causes of obesity as well in this population. Lifestyle factors also can play a role in the onset of obesity. This can include: alcohol use, tobacco use, poor sleep habits, lack of physical activity, and poor dietary habits to name a few.

Current Health and Physical Education Guidelines

Current health and physical education guidelines are set in place by the Missouri Department of Elementary and Secondary Education (DESE). DESE has many different standards, but there are two in particular that relate most to this research: National Health Education Standards and Standards for K-12 Physical Education (DESE, 2020).

PURPOSE

The purpose of the National Health Education Standards is to provide students with experiences and the knowledge needed to live healthy lives. There are eight standards total that cover everything from disease prevention to peer influences and

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also being able to practice health enhancing behaviors. Students should be able to meet certain requirements by grades 2, 5, 8 and 12 (DESE, 2020). For example, students should be able to differentiate healthy and unhealthy foods by the first grade.

The Standards for K-12 Physical Education were created by SHAPE America in 2014 and are what students should know and be able to do as a result of a quality physical education program. There are a total of 5 standards in this category that were developed in order to design motor skills, knowledge and behaviors for active living, physical fitness, sportsmanship, self-efficacy, and emotional intelligence (DESE, 2020).

Generally, health education (based on the Centers for Disease Control and Prevention) focuses on six categories: (1) behaviors that lead to intentional or unintentional injuries, (2) tobacco use, (3) alcohol and other drug use, (4) sexual behaviors leading to sexually transmitted diseases, human immunodeficiency virus infection, and unintentional pregnancy, (5) poor nutrition and (6) lack of physical activity. The West Virginia Health Education Assessment Project assessed the six health education categories. This study assessed 17,549 students in grades six, eight and high school. A total of 40 questions were used with a time limit of 45 minutes to test the students. According to the data collected, high schoolers did not achieve the standard on any of the subsets, however, their closest score was on the nutrition questions. This indicates a need for enhancement of health education (Tompkins, 2005).

Another study completed at Ohio State University completed a pre-test, a three-week education course, and a post test. The pre- and post-test were composed of the same questions that were used in the current study. The difference in scores from the pre and post-test indicated that a school-based education program for nutrition and physical activity was an effective method of giving

young individuals a basic understanding of healthy lifestyle behaviors (Shirk, 2009).

The purpose of this study is to evaluate if high school students are gaining an adequate nutrition and physical activity education to be able to live healthy lifestyles after they graduate and begin to live on their own. This is an important area of study because if these individuals are not gaining this information at a young age and beginning these good habits early on, then when will they learn or begin practicing this important information. It is also important that the health education standards, set in place by DESE, are being met and the individuals are learning the information and meeting the goals that are set for their age group. This research looks to determine if high school students' knowledge of nutrition and physical activity needs to be strengthened.

METHODS

Data for this study were collected from 13 high school students in grades 9 through 12. Eligible participants were from a private high school in the Midwest. To be eligible for this study, students had to be between the grades of 9 through 12 and their parents had to send back a signed consent form giving the students permission to participate. The study was approved by Southeast Missouri State University Institutional Review Board.

Permission forms were sent out to the parents of students in grade 9-12 who completed a health course at the school. Once the signed consent permission forms were sent back to the researcher, students were sent an assent form that informed the students of the study, withdrawal from the study, as well as contact information.

A majority of the questions came from a survey previously tested for reliability and expert panel validity used in a study completed at Ohio State University titled "A School-Based Intervention Increased Nutrition Knowledge in High School Students" (Shirk, 2009). A few minor modi-

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fications were made to the survey that could encompass all the information needed for the current study. These modifications included updating a MyPyramid question to a MyPlate question, asking if they could prepare a healthy meal as well as self-reported height and weight. The survey consisted of 29 questions with about half of them including questions about healthy eating habits and the other half of the questions were included on physical education recommendations such as the recommended frequency of various activities such as muscle strengthening and moderate to vigorous activity. Five of the 29 questions were personal characteristic questions (i.e. height, weight, age, etc.). The question content for the survey included nutrition guidelines, energy balance, general knowledge (i.e. what is a calorie?), lifestyle choices, and health outcomes. The physical activity questions were added by the researcher for this study. These 29 questions represent the variables being assessed.

Once data were collected, the survey was coded so that it could be entered into SPSS statistical analysis software 27.0.1.0 (IBM Corp, 2020). A descriptive statistics test (both measures of frequency and measures of central tendency) was then run. Personal characteristic questions (height, weight, and age) that were answered at the beginning of the survey were used to calculate body mass index (BMI). Height, weight, and age were plotted on the growth chart to see which category the individuals BMI fell into (underweight, overweight, healthy weight). The nutrition and physical activity content items were analyzed using frequencies and percentages. First, we calculated the overall scores for each participant on the entire survey, and determined the frequencies and percentages for each range of scores (see Table 1). Second, we computed the frequencies and percentages of participants who answered each nutrition item correctly. Finally, we computed the frequencies and percentages of participants who answered each physical activity item correctly. Due to

the small sample size, inferential statistics were not used in data analysis.

RESULTS

The present study evaluated high school students' knowledge of nutrition and physical activity guidelines. Out of all consent and assent letters that were sent out, 13 were sent back to be able to participate in the study. Out of the 13 that were eligible to complete the survey, all 13 individuals completed the survey. All surveys that were collected had complete data and were able to be used. The purpose of this study was to evaluate if high school students are gaining an adequate nutrition and physical activity education to be able to live healthy lifestyles after they graduate and begin to live on their own.

Results from this study were based on the 13 responses, 5 male and 8 female, who completed this study. The survey consisted of 29 questions, 24 of the questions were content related. Out of the 24 questions, the average score was 16.46 (69%). Four of the thirteen participants scored below average, one scored at the average and 8 scored above average. Although most individuals scored above average, the overall average was below a passing score. The breakdown of scores into groups are presented in table 1. A majority of individuals scored between a 79% and 70%, on 8 out of the 13 surveys. (See table 1).

Table 2 presents data on students' knowledge of nutrition guidelines. All participants scored 100% on four of the questions. These questions included: the result of food energy equaling the energy being used, BMI classification, weight loss and how a healthy diet is defined. Three questions had below 50% answered correctly. These questions included: excess body fat, the dietary guideline for consuming whole grains, and what component should be looked at first when reading a food label. The other questions were all scored about average, meaning that about half of the

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responses were correct and half of them were not correct. (See Table 2)

Table 3 shows data on students' knowledge of physical activity guidelines. The results indicated that 62% of the participants correctly identified physical activity recommendations for adults. Conversely, only 15% and 46% of the participants correctly identified the recommendations for muscle strengthening activities and physical activities for adolescents respectively. (See Table 3). A plausible reason for the low scores regarding physical activity guidelines for adolescents may be that many high schools offer sport-oriented physical education programs that often overemphasize the acquisition of sport skills.

CONCLUSION

Overall, with the results of the study, it was found that the students completing the survey did not score high on the content questions leading to a conclusion that more nutrition and health information could be beneficial to be able to live the healthiest lives possible. These findings are not surprising based on the recent call to action on Health Education in Schools which calls for enhancing health education (Auld et al., 2020). Although more research is needed on a more diverse and larger population, the results in combination with previous research can be indicative that students may not be learning nutrition and physical activity guidelines to the extent that the DESE guidelines state. The results found in this study were similar to the finding of the West Virginia study (Tompkins, 2005) and the Ohio State University study (Shirk, 2005) mentioned above. This is that individuals in the high school age group are not achieving the standards needed, which indicates a need for further research into the enhancement of both health and physical education.

LIMITATIONS

There are some limitations to this study. One limitation is that there was a limited geographic population, which limits the generalizability of study findings. The low response rate limited the amount of conclusions, future studies should aim to increase study participation throughout geographic areas. Another limitation of the study was self-reported height and weight. These limitations should be considered when interpreting study results.

RECOMMENDATIONS

More research needs to be completed to identify the best method of teaching individuals the health and physical education knowledge to be healthy adults. Although in need of replication, results of this study can be indicative that individuals are not learning the proper amount of information that is needed for them to live healthy lives and prevent obesity. Research should continue reviewing health curriculum teaching methods and learning styles in the high school population. Nutrition and physical activity standards can have life long impacts on our youth. Exploring ways to enhance the knowledge and application of the health education guidelines is crucial to our nation's health.

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Table 1: Overall Scores for Students' Knowledge

Score	Frequency/Percentage
100% - 90%	0 (.00)
89% - 80%	0 (.00)
79% - 70%	8 (61.5)
69% - 60%	2 (15.4)
59% - 50%	3 (23.1)

Table 2: Students' Knowledge of Nutrition Guidelines of Nutrition and Physical Activity Guidelines

Question	Frequency/Percentage Correct
Preparing healthy meals:	Yes (12) No(1)
Energy balance and weight maintenance:	13 (100%)
Health consequences of being overweight:	12 (92%)
Energy at rest:	8 (62%)
Energy balance and weight loss:	8 (62%)
Development of excess body fat:	6 (46%)
Healthy body weight and BMI:	13 (100%)
Reasons for weight gain:	11 (85%)
Healthy weight loss	13 (100%)
MyPlate:	11 (85%)
Define calorie:	10 (77%)
Whole grains:	3 (23%)
Dairy and health:	7 (54%)
Diet and disease:	8 (62%)
Dietary fiber:	9 (69%)
Fruits/Vegetables	8 (62%)
Dietary guidelines:	13 (100%)
Reading a food label:	2 (15%)
Foods for bone health:	9 (69%)
Calories on a food label:	11 (85%)
Nutrient density:	11 (85%)

Table 3: Students' Knowledge of Physical Activity Guidelines

Question	Frequency/Percentage Correct
Physical activity recommendation for adolescents:	6 (46%)
Physical activity recommendation for adults:	8 (62%)
Frequency of muscle strengthening activities:	2 (15%)

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