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Nutrition knowledge of high school senior students in Northwest Arkansas

Grace Heymsfield* and Cynthia K. Moore†

ABSTRACT

Though there are many complex factors influencing diet, nutrition knowledge correlates with healthier food choices in older adolescents and can play a pivotal role in health. Nutrition curriculum was addressed in the state of Arkansas through Arkansas Act 1220 of 2003. Numerous changes have been seen in the school environment regarding nutrition, but there is no means of testing nutrition curriculum effectiveness in terms of nutrition knowledge of students. It is the purpose of this descriptive study to improve understanding of the nutrition knowledge of high school seniors. High school senior students (n = 25; males = 12, females = 13) successfully completed a validated *Survey to Assess the Knowledge of Conventional and Unconventional Dietary Methods of Weight Control* based on the *Dietary Guidelines for Americans 2010*. The survey also included demographic questions and items regarding sources of nutrition information. The mean nutrition knowledge score (out of 24) was 8.7 ± 2.8 or 36% (min. score = 4, max. score = 14). There was no significant difference in nutrition knowledge scores based on ethnicity, those on specialized diets, frequency of eating out, physical activity, gender, source of nutrition information, thoughts about food, or for any criteria based categorizing scores by High/Low. Though the study indicates better education is needed, this pilot test should be followed up with a larger sample size to confirm these results.

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† Cynthia Moore is the faculty mentor and a clinical assistant professor and director of the Didactic Program in Dietetics in the School of Human Environmental Sciences.

MEET THE STUDENT-AUTHOR



Grace Heymsfield

I am from Elkins, Ark. and will be graduating from the University of Arkansas in December 2014 with a Bachelor of Science in Human Environmental Sciences with a major in Food, Human Nutrition, and Hospitality and a concentration in dietetics. I am proud to have represented the Razorbacks as a member of the cross country and track and field teams during my time at the University of Arkansas. Being a student-athlete allowed me to pursue my athletic dreams while also teaching me the value of perseverance and teamwork. Coupled with the opportunities afforded to me by the Honors College Fellowship such as the Honors Student Board and Honors menteeship, I believe I truly maximized my undergraduate experience.

After graduation, I will pursue a graduate degree in nutrition and a dietetic internship. In conjunction with my graduate degree, I hope to achieve my Registered Dietitian Nutritionist (RDN) credential.

Thank you to the outstanding dietetic faculty for all of their support and encouragement. I would particularly like to thank Cynthia Moore for her extensive guidance during the completion of this project, and committee members Kate Shoulders and Mechelle Bailey for their help with the completion of my Honors thesis. Thank you to Curt Rom for his outstanding leadership of the Bumpers Honors program, as well as for his personal support of my athletic and academic careers.

INTRODUCTION

Despite the increasing accessibility of health information in our country, adolescents continue to struggle with unhealthy weight. National rates of overweight or obese children ages 10-17 years reached 31.3% in 2011 (Ogden et al., 2012). Children who are overweight or obese are more likely to be overweight or obese in adulthood, and they are more likely to develop cardiovascular disease as well as Type II Diabetes Mellitus during childhood (CDC, 2014). Arkansas has historically had rates of overweight and obese adolescents that exceed the national average. Rates of overweight and obese Arkansas adolescents were 37.5% and 33.9% in 2007 and 2011, respectively (NSCH, n.d.). As of 2011, 15% of high school students in Arkansas were obese (CDC, n.d.).

As adolescents become more autonomous, the behavior patterns they acquire during this part of the life cycle are likely to affect long-term behaviors (Kelder et al., 1994). As they become more capable of controlling their own diet and food choices, increased nutrition knowledge during the adolescent stage is essential (Sichert-Heller et al., 2011).

Though diet is incredibly complex, nutrition knowledge has been shown to correlate with healthier food choices

(Crockett and Sims, 1995; NSCH, 2012; Pirouznia, 2001; Rabiei et al., 2013; Worsley, 2002). A major study of over 1,000 adults ages 18-75 years identified that participants in the highest quintile of nutrition knowledge were nearly 25% more likely to meet current fruit, vegetable, and fat intake recommendations than those in the lowest quintile (Wardle et al., 2000). The HELENA Study was the first to examine the nutrition knowledge of a large sample of European adolescents (Sichert-Hellert et al., 2011). It was found that while body weight did not correlate with nutrition knowledge as much as parental education level, formal knowledge of dietary principles is required to make an informed food choice (Sichert-Hellert et al., 2011).

Factors influencing the health of children in Arkansas and a plan to decrease high obesity rates were both addressed in Arkansas Act 1220 of 2003. The Act outlined a set of initiatives to battle unhealthy body mass index (BMI) measures and required integration of nutrition education in school-wide curriculum (State of Arkansas, 2003). Each district's school nutrition and physical activity committee is responsible for integrating nutrition education into the overall curriculum (State of Arkansas, 2003). A means of testing the effectiveness of the nutrition curriculum in each district is lacking. High school students

are tested statewide in the areas of algebra, biology, geometry, and literacy per the Arkansas Department of Education (Arkansas Department of Education, 2014). No survey or test has been administered in Arkansas to test nutrition knowledge specifically.

The purpose of this study was to determine the level of nutrition knowledge of senior high school students in a Northwest Arkansas school district. Relationships between nutrition knowledge, sources of nutrition information, and demographic characteristics were also investigated. It was hypothesized that high school senior students have insufficient nutrition knowledge.

MATERIALS AND METHODS

The target population for this study was high school senior students from a Northwest Arkansas school district. The specific district was chosen for the study due to convenience and permission from the district. This dis-

trict has only one high school. The sample selection for this study was taken from the senior graduating class of 2014. Only students who gave consent, or returned parental consent forms if less than 18 years old, were included in the study. The survey instrument was 32 items—24 of the questions were nutrition knowledge based, and there were eight added demographic questions. The 24 nutrition knowledge based questions were adapted for the purpose of this study from Cynthia Moore's *Survey to Assess the Knowledge of Conventional and Unconventional Dietary Methods of Weight Control* based on the *Dietary Guidelines for Americans 2010* (Moore, 2006).

Data collection for this study was done on-site. Paper assent forms and parental consent forms were distributed, and the researcher explained the study during a forty-minute college preparation class required of all senior students at the school district. All students were given parental consent forms regardless of age, though only students under age 18 were required to return one for participation in

Table 1. Demographic information and mean knowledge score.

Demographic ^a		Frequency ^b	Percentage	Mean ^c	Range	P-Value
Gender	Male	12	48%	8.5 ± 3		0.884 ^d
	Female	13	52%	8.9 ± 2.8		
Ethnicity	White	19	76%			0.585 ^d
	Other	6	24%	8.8 ± 2.6		
Frequency of eating out	None	7	28%	9.1 ± 2.4		0.659 ^e
	1-6 times weekly	16	64%	8.8 ± 3.2		
	Daily	2	8%	7 ± 1.4		
Special Diet	Yes	1	4%	9		0.922 ^d
	No	24	96%	8.7 ± 2.9		
Sources of Nutrition Info.^f	Teacher	1	4%	14		0.055 ^d
	Doctor	4	16%	9.5 ± 1.7		0.132 ^d
Physical Activity	Light	11	44%	8.2 ± 2.8		0.29 ^e
	30-60 mins/day	8	32%	8.3 ± 2.9		
	Hour+	6	24%	10.3 ± 2.7		
Nutrition Knowledge Score^g				8.7 ± 2.8	4-14	

^a Population = Senior class of high school.

^b N = 25.

^c Knowledge Score.

^d t-test.

^e ANOVA.

^f Compared to other indicated sources of nutrition information.

^g For entire sample.

the study. One month later, printed surveys were distributed to students with signed consent forms and parental assent forms, if under 18 years old. The guidance counselor at the school assisted in verifying birth dates according to school records. The students completed the survey with pencil under the researcher's supervision to ensure no collaboration and/or use of electronic devices to aid completion. No compensation or incentive was provided to the school district.

The software SPSS Statistics 21 (IBM Corporation, Armonk, N.Y.) was used to analyze descriptive statistics and to conduct a series of t-tests, as well as analysis of variance tests (ANOVA). The researcher investigated differences in knowledge score by gender, ethnicity, thoughts about eating, medical condition, reported sources of nutrition information, frequency of eating out, and physical activity level. Knowledge score was re-coded into "low" score and "high" score. "High score" was defined as greater than or equal to 50% (12 out of 24 correct answers or higher). The same series of t-tests and ANOVAs were conducted. Institutional Review Board approval was granted at the University of Arkansas.

RESULTS AND DISCUSSION

The survey was distributed to seventy students in a college preparatory class that is required of all students in the senior class at the school district. Forty-four students indicated a desire to participate in the study on the assent form. Nineteen students with signed assent forms were unable to complete the survey due to lack of parental consent or absence. Twenty-five students completed the survey, resulting in a response rate of 36%.

Of the twenty-five students who completed the survey, 12 (48%) were males and 13 (52%) were females (Table 1). Nineteen students (76%) identified themselves as "White (not Hispanic)" when asked about their ethnicity. The mean nutrition knowledge score (out of 24) was 8.7 ± 2.8 , or 36% (Table 1). The minimum score recorded was 4, and the maximum score was 14. The mean score for females (8.9 ± 2.8) was not statistically different than the mean score for males (8.5 ± 3) ($P = 0.884$). There was no significant difference in nutrition knowledge scores based on ethnicity ($P = 0.585$), following a special diet for a medical condition ($P = 0.922$), or frequency of eating out ($P = 0.659$). No significant differences were found for any criteria based on High/Low scores.

Two listed sources of information nearly significantly correlated with nutrition knowledge scores: sources of information from a teacher ($P = 0.055$; $n = 1$) and sources of information from a doctor ($P = 0.132$; $n = 4$). It is worth noting that the survey participant who identified a teacher as a source of nutrition information also scored

highest on the survey (14 questions answered correctly). A positive though not significant trend was noted between knowledge and physical activity ($P = 0.290$).

Five questions on the survey addressed fruit and vegetable consumption. Knowledge scores calculated with these five items were 40%. Sources of nutrition information varied among respondents (Table 2). Family was the most common source of nutrition information. The second most common source of nutrition information was a three-way tie between television, doctor, and Internet. When asked about daily thoughts about food, the majority of students tried to think about health when making food decisions but did not let it determine everything they ate. The second most common thought regarding food was eating whatever "sounds good at the time."

Though the findings of this study regarding nutrition knowledge were statistically insignificant, certain trends in the results were consistent with the literature. First and foremost, the results of this study supported the concerns raised by various sources regarding poor nutrition knowledge of adolescents. Adolescents in this study were found to have low nutrition knowledge scores as assessed by this instrument regardless of age, gender, and ethnicity.

A particularly troublesome area of adolescent nutrition is low fruit and vegetable intake. Five items on the survey instrument addressed fruit and vegetable recommendations. Nutrition knowledge calculated with these five items alone was 40%. This is higher than the overall score recorded on the survey (36%), but not substantially.

Table 2. Sources of nutrition information.

Response	Total (N)^a	Percentage
Family	11	44%
Friends	3	12%
Television	4	16%
Dietitian	0	0%
Doctor	4	16%
Nurse	1	4%
Internet	4	16%
Magazines	1	4%
Books	0	0%
Texbooks	0	0%
Food Advertisements	2	8%
Other: _____		
Teacher	1	4%
Coach	1	4%
Do Not Receive Information	1	4%
School	1	4%

^aMultiple responses allowed.

Students' responses regarding daily thoughts about eating were also consistent with the literature. Increasingly autonomous adolescents may not see the need to concern themselves with sound nutrition during their current stage of life; 52% did not let health concerns determine everything they ate, 20% ate according to convenience, and 32% ate whatever sounded good at the time. Thus, nutrition education and intervention efforts may need to address the importance of health during adolescence in terms of future consequences, particularly because obesity in adolescence is a strong risk factor for obesity in adulthood (CDC, 2014).

The trend identified in this study support the hypothesis that adolescents across the state and nation are lacking in nutrition knowledge. Research on this topic should not stop here. Assessment of nutrition knowledge of adolescents should be made region-wide (Northwest Arkansas) and statewide (Arkansas) if improvements in statewide nutrition curriculum are to be suggested. Replication of this pilot study with the revisions addressed earlier could aid in understanding how to best improve nutrition education for high school students.

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