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Effect of Nutrition Education by Paraprofessionals on Dietary Intake, Maternal Weight Gain, and Infant Birth Weight in Pregnant Native American and Caucasian Adolescents

Janice Hermann

Oklahoma State University, jrher@okstate.edu

Glenna Williams

Oklahoma State University, gwill@okstate.edu

Donna Hunt

Stephen F. Austin State University, dhunt@sfasu.edu



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Effect of Nutrition Education by Paraprofessionals on Dietary Intake, Maternal Weight Gain, and Infant Birth Weight in Pregnant Native American and Caucasian Adolescents

Abstract

Oklahoma Cooperative Extension Service Expanded Food and Nutrition Education Program, in cooperation with the Chickasaw Nation and Choctaw Nation WIC programs, implemented and evaluated a nutrition education program for pregnant adolescents. Program evaluation investigated the effects of nutrition education by paraprofessionals on dietary intake, maternal weight gain, and infant birth weight in pregnant Native American and Caucasian adolescents. Nutrition education by paraprofessionals was effective in improving adolescents' dietary intake, maternal weight gain, and infant birth weight. The decreased rate of low birth weight infants among participants represents a saving of \$297,500 in medical costs during the first year of life.

Janice Hermann

Nutrition Education Specialist
Oklahoma Cooperative Extension Service
Oklahoma State University
Stillwater, Oklahoma
Internet Address: jrher@okstate.edu

Glenna Williams

Community Nutrition Education Programs Coordinator
Oklahoma Cooperative Extension Service
Oklahoma State University
Stillwater, Oklahoma
Internet Address: gwill@okstate.edu

Donna Hunt

Assistant Professor
Stephen F. Austin State University
Nacogdoches, Texas
Internet Address: dhunt@sfasu.edu

Introduction

Adolescents are at higher risk for poor pregnancy outcomes, including low birth weight infants (Fraser et al., 1995). Oklahoma ranks 17th in the nation in adolescent pregnancies, and 22% of all low birth weight infants in Oklahoma are born to adolescents (Oklahoma Kids Count, 1998; Oklahoma State Department of Health, 1997). Low birth weight infants are more likely to die in the first month of life or have serious health or developmental problems than normal weight infants (Rees et al., 1996). Seven out of ten infants who die in Oklahoma in the first month of life are low birth weight, and one in four low birth weight infants who live experience serious health and developmental problems (Oklahoma Kids Count, 1998).

Most low birth weight infants require costly medical care at birth, and national medical costs for low birth weight infants born to adolescents are estimated to be more than \$1 billion annually (ADA, 1994). Adequate dietary intake and maternal weight gain are important factors in lowering the risk of low birth weight infants (Strauss & Dietz, 1999), and adolescents, in particular, need to gain adequate weight during pregnancy (Rees et al., 1992). However, adolescents are at increased risk of low maternal weight gain, with 23% of adolescents gaining less than 21 pounds during pregnancy (Story & Alton, 1995).

Adolescents' nutritional requirements are already high for their own growth and development, and pregnancy further increases their nutritional needs. Unfortunately, many adolescents enter pregnancy in poor nutritional status (Brech, 1996). Nutritional issues that affect pregnant adolescents are similar to those affecting all adolescents, including skipping meals, snacking on foods high in fat and sugar and low nutritive value, being too busy to eat, relying on convenience and fast foods, and concern about weight (Story & Alton, 1995). Complicating their nutritional status is the fact that at-risk pregnant adolescents are more likely to be poor, not have steady employment, and live in poverty (Oklahoma Kids Count, 1998).

Oklahoma Cooperative Extension Service Expanded Food and Nutrition Education Program (OCES EFNEP), in cooperation with the Chickasaw Nation and Choctaw Nation WIC programs, implemented and evaluated a 3-year nutrition education program for pregnant adolescents. The project was funded by the ES/WIC Education Initiative. Program evaluation investigated the effect of nutrition education by paraprofessionals on dietary intake, maternal weight gain, and infant birth weight in pregnant Native American and Caucasian adolescents.

Materials and Methods

This cooperative nutrition education program was implemented in seven counties in Oklahoma, five counties where the Chickasaw Nation operates WIC clinics and two counties where the Choctaw Nation operates WIC clinics. The intended audience was rural pregnant adolescents participating in the Chickasaw Nation and Choctaw Nation WIC programs.

The paraprofessionals for this project were Native American and Caucasian, and were supervised by County Extension Educators. The paraprofessionals received an initial 4-week in-service training and, thereafter, monthly in-service training on basic nutrition, food preparation and food safety, maternal nutrition, and infant nutrition delivered by State Cooperative Extension Service Specialists, County Extension Educators, and Chickasaw Nation and Choctaw Nation WIC Nutritionists.

The paraprofessionals conducted an eight-session nutrition education program for participants using the "Have A Healthy Baby" curriculum developed for pregnant adolescents (Konzelmann et al., 1991) along with supplementary materials developed at Oklahoma Cooperative Extension Service (OCES). The nutrition education sessions were conducted at the public schools in which the participants were enrolled. Two to four participants were typically present at each session. In addition, paraprofessionals conducted nutrition education sessions at the participants' homes during the summer or when a participant was not enrolled in school.

Participants enrolled in the nutrition education program completed a demographic questionnaire prior to receiving education and a 24-hour food recall before and after receiving education. A registered/licensed dietitian trained the paraprofessionals on administering the 24-hour recalls. The 24-hour recalls were analyzed using the EFNEP Reporting System (ERS) for servings from the Food Guide Pyramid food groups. Postpartum participants also completed a questionnaire on maternal weight gain and infant birth weight.

Demographic, dietary, maternal weight gain, and infant birth weight data were analyzed using the Statistical Analysis Systems Analysis of Variance and Least Squared Means procedures available at Oklahoma State University (Statistical Analysis System Institute, 1990). Significance was set at $p < 0.05$.

The number of servings consumed from each Food Guide Pyramid food group were analyzed separately for participants who consumed less than the minimum number of servings recommended for pregnant adolescents and for participants who consumed at least the minimum number of servings. The Food Guide Pyramid can be used as a guide to recommend the number of food servings required to meet nutritional needs during pregnancy (Brech, 1996). For pregnant adolescents, the recommended number of servings from the Food Guide Pyramid are: six to eleven bread, cereal, rice, and pasta servings; three to five vegetable servings; two to four fruit servings; four to five milk, yogurt, and cheese servings; and three meat, poultry, fish, dry beans, and nut servings (Story & Alton, 1995).

Results and Discussion

Three hundred and thirty-six pregnant adolescents participated in the nutrition education program; 78% were Caucasian, and 22% were Native American. The Choctaw Nation and Chickasaw Nation WIC programs are open to eligible participants of all races. Participants ranged from 13 to 19 years of age, with an average age of 16.7 years. The majority of participants were in school (78%), not employed (77%), and from small communities (71% from communities with a population less than 10,000), and this was their first pregnancy (83%).

Significant improvements in the number of servings consumed from the Food Guide Pyramid food groups were observed among participants after receiving nutrition education (Table 1). For participants as a whole whose initial number of servings were less than the minimum recommended for a food group, a significant increase in servings was observed. A similar trend was observed for Caucasian participants whose initial number of servings were less than the minimum recommended. For Native American participants whose initial number of servings were

less than the minimum recommended for a food group, a significant increase in servings was observed except for the fruit group.

Table 1

Average Number of Servings from the Food Guide Pyramid Food Groups Consumed by Pregnant Adolescents Before and After Nutrition Education

Servings from Food Guide Pyramid Food Groups	All Participants		Caucasian Participants		Native American Participants	
	Before	After	Before	After	Before	After
Bread, Cereal, Rice, and Pasta						
< 6 servings	3.7	5.3*	3.7	5.4*	3.8	5.1*
◆ 6 servings	8.1	6.4*	7.9	6.5*	8.9	5.8*
Vegetable						
< 3 servings	1.4	3.5*	1.3	3.5*	1.5	3.3*
◆ 3 servings	4.7	3.6*	4.7	3.4*	5.1	4.3
Fruit						
< 2 servings	0.4	1.5*	0.5	1.7*	0.4	0.9
◆ 2 servings	3.8	2.4*	3.8	2.4*	3.8	2.1*
Milk, Yogurt, and Cheese						
< 4 servings	2.0	2.5*	2.1	2.5*	1.6	2.6*
◆ 4 servings	5.9	3.6*	6.0	3.7*	5.5	3.2
Meat, Poultry, Fish, Dry Beans, and Nuts						
< 3 servings	1.6	2.3*	1.6	2.3*	1.7	2.3*
◆ 3 servings	3.9	1.6*	3.8	1.6*	4.1	1.5*

*Significant difference in number of servings before and after education, $p < 0.05$.

A difference in the direction of intake was observed among participants who were consuming at least the minimum number of recommended servings before education. For participants as a whole whose initial number of servings was at least the minimum recommended for a food group, a significant decrease in servings was observed. A similar trend was observed for Caucasian participants. For Native American participants whose initial number of servings was at least the minimum recommended for a food group, a significant decrease in servings was observed except for the vegetable and the milk, yogurt, and cheese groups.

Despite the decrease in the number of servings consumed, these participants still consumed more servings than the improved intake among participants whose initial number of servings was less than the minimum recommended, with the exception of the meat, poultry, fish, dry beans, and nut group. A possible explanation for this observation is that these participants had increased their food intake during pregnancy, but after receiving the nutrition education believed they were over consuming and reduced their food intake in an effort to meet the nutritional demands of pregnancy but prevent excessive weight gain.

The increase in the number of servings consumed from the Food Guide Pyramid food groups among adolescents who consumed less than the minimum number of recommended servings before education is important. Adequate nutrition during pregnancy can reduce the risk of adverse pregnancy outcomes (Brech, 1996). Several studies have reported that pregnant adolescents do not consume adequate servings from the Food Guide Pyramid food groups. In one study of pregnant adolescents in a rural southern community, 77% did not consume the recommended servings from the fruit or vegetable groups, and 60% did not consume the recommended servings from the milk, yogurt and dairy group (Dunn et al., 1994). In another study of pregnant adolescents, 52% did not consume the recommended servings from the bread, cereal, rice, and pasta group, and 74% did not consume the recommended servings from the fruit and vegetable groups (Skinner et al., 1992).

Important trends in maternal weight gain were observed among participants. In this program, only 7.4% of all participants gained less than 21 pounds (8.0% of Caucasian and 5.7% of Native American participants). This favorably compares to the national average of 23% of pregnant adolescents gaining less than 21 pounds (Story & Alton, 1995). Adequate maternal weight gain can reduce the risk of poor pregnancy outcomes (Strauss & Dietz, 1999). The incidence of low birth weight infants and infant mortality decreases with a 21 to 25 pound weight gain and even further declines with a 26 to 35 pound weight gain (Brech, 1996). Adolescents may be higher risk for low maternal weight gain due to concern over their own body weight and lack of understanding about maternal weight gain. In a focus group study, pregnant adolescents expressed an overwhelming feeling of confusion as to why an adequate maternal weight gain was important (Story & Alton, 1995).

Important trends in the incidence of low birth weight infants (<2500 g) also were observed among participants. In this program, the rate of low birth weight infants was only 4.5% for all participants,

3.5% for Caucasian, and 7.5% for Native American. This favorably compares to statewide low birth weight infant rates of 11.8% for all pregnant adolescents, 11.6% for Caucasian adolescents, and 11.1% for Native American adolescents (Oklahoma State Department of Health, 1997). These data represent an impressive reduction in the rate of low birth weight infants for program participants.

Conclusion

Pregnant adolescents want to have healthy infants, and this concern is a major influence in the change in pregnant adolescents' dietary behaviors (Pope et al., 1997). This desire should be viewed as a motivation for adolescents to improve their diets. However, if adolescents are to make dietary changes, nutrition recommendations must be made within the context of adolescents' everyday lives (Skinner et al., 1996).

This program evaluation demonstrated that nutrition education by paraprofessionals with pregnant adolescents was effective in improving dietary intake, maternal weight gain, and infant birth weight. In addition, nutrition education delivered within the schools was an effective method in reaching pregnant adolescents. Although the "Have A Healthy Baby" curriculum was developed for pregnant adolescents, further modifications to target Native American adolescents may be beneficial for this group. Further research is also needed evaluating pregnant Native American adolescents' dietary patterns and food preferences.

The observed decrease in the rate of low birth weight infants represents a decrease in medical costs. The estimated medical costs for a low birth weight infant for the first year of life is \$11,900 (Lewit et al., 1995). Thus, the decreased rate of low birth weight infants among participants receiving education from paraprofessionals represents a saving of \$297,500 in medical costs during the first year of life. These medical savings will undoubtedly continue beyond the first year of life.

Recommendations

As a result of the Government Performance and Results Act of 1993 (GPRA), decision-makers are asking for documented evidence as to the effectiveness of public dollars spent in CES education. Extension Educators will increasingly make programming choices based on proven program effectiveness in order to meet these expectations. Therefore, the researchers recommend nutrition education programs such as "Have A Healthy Baby" for pregnant adolescents as an effective program that clearly demonstrates a benefit to society in terms of both health outcome and medical savings.

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