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Longitudinal Study Tracking the Body Mass Index of Children in Clark County, Arkansas

Alex Morrison, Hunter Heird and Detri Brech, Ph.D.

Abstract

The research project was approved by the Institutional Review Board at Ouachita Baptist University. Five sites (summer childcare facilities) in Arkadelphia, Arkansas agreed to participate in the study. Three sites were designated the treatment groups and two sites were designated the control groups. Parents/guardians signed and dated an informed consent form to allow the child to participate in the program. All children in both groups were measured and weighed before and after the treatment. Weights were used to calculate body mass index and body mass index for age percentile. In addition, age, gender, ethnicity and grade completed were collected. An age appropriate nutrition/physical activity education program developed by two undergraduate dietetic majors was presented each week for six weeks during the 2014 summer. The education lessons were as follows:

Week 1: Pre-assessment of height and weight. Sugar: How it can affect the body.
Week 2: MyPlate: Creating a healthy plate.
Week 3: Physical activity: The importance of staying fit.
Week 4: Protein: What is protein and the effects it has on the body. Saving money: How to save your plate.
Week 5: Nutrition Basics: How to use your plate.

Data was entered into an Excel spreadsheet. Comparisons were made between the pre-assessment data and the post-assessment data within groups and between the groups. The 2014 summer data was added to the longitudinal data for years 2007-2014.

Methods

According to the Centers for Disease Control and Prevention (CDC), National Health and Nutrition Examination Survey data obtained in 2011-2012, 17% (12.6 million) of children and adolescents aged 2-19 years are obese. Racial and age disparities exist with higher levels among Hispanic children (22.4%) and non-Hispanic black children (20.7%). As a child ages, the rates of obesity increase; 8.4% of 2-to-5-year-olds, 17.7% of 6-to-11-year-olds, and 20.5% of 12-to-19-year-olds. The CDC has set a body mass index (BMI) percentile for underweight as less than the 5th percentile, a healthy weight as a BMI percentile ranging from the 5th percentile to less than the 85th percentile, overweight as a BMI percentile ranging from the 85th to less than the 95th percentile and obese as a BMI percentile equal to or greater than the 95th percentile. A longitudinal study originating in 2007 tracks the BMI percentiles of children aged 3 to 14 years in Clark County, Arkansas. Each year children in the treatment and control groups are weighed and have height measured. A BMI and percentile are calculated for each child. The treatment groups receive two months of weekly nutrition and physical activity classes as well as parents receive nutrition and physical activity information to implement at home. At the end of the data period, the treatment and control groups are re-assessed. Comparisons are made within and between the groups. Five hundred and forty-five children (262 males, 283 females) participated in the study. The children’s average age was 8.7 years (SD=2.1 years). Children included 262 boys (48%) and 283 girls (52%) aged 3-14 years. Two hundred and forty-three children were Caucasian (43.9%) and 218 African American (39.9%) and 83 children were Hispanic (15.2%).

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Longitudinal Data

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Purpose

The purpose of this research was to assess BMI of children before and after nutrition/physical activity education occurred to determine the effects of education and knowledge of nutrition/physical activity on the BMI of children.

Introduction

According to the Centers for Disease Control and Prevention (CDC), National Health and Nutrition Examination Survey data obtained in 2011-2012, 17% (12.6 million) of children and adolescents aged 2-19 years are obese. Racial and age disparities exist with higher levels among Hispanic children (22.4%) and non-Hispanic black children (20.7%). As a child ages, the rates of obesity increase; 8.4% of 2-to-5-year-olds, 17.7% of 6-to-11-year-olds, and 20.5% of 12-to-19-year-olds. The CDC has set a body mass index (BMI) percentile for underweight as less than the 5th percentile, a healthy weight as a BMI percentile ranging from the 5th percentile to less than the 85th percentile, overweight as a BMI percentile ranging from the 85th to less than the 95th percentile and obese as a BMI percentile equal to or greater than the 95th percentile. A longitudinal study originating in 2007 tracks the BMI percentiles of children aged 3 to 14 years in Clark County, Arkansas. Each year children in the treatment and control groups are weighed and have height measured. A BMI and percentile are calculated for each child. The treatment groups receive two months of weekly nutrition and physical activity classes as well as parents receive nutrition and physical activity information to implement at home. At the end of the data period, the treatment and control groups are re-assessed. Comparisons are made within and between the groups. Five hundred and forty-five children (262 males, 283 females) participated in the study. The children’s average age was 8.7 years (SD=2.1 years). Children included 262 boys (48%) and 283 girls (52%) aged 3-14 years. Two hundred and forty-three children were Caucasian (43.9%) and 218 African American (39.9%) and 83 children were Hispanic (15.2%).

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Conclusion

The 2014 summer research project conducted at three treatment sites and two control sites consisted of 72 children in the treatment group for pre-BMI and post-BMI assessments and 36 children in the control group for pre-BMI and post-BMI assessments. One hundred and fourteen children were present on the pre-BMI assessment day for the treatment group, while only 72 children were in attendance on the post-BMI assessment day for the treatment group. Attendance varied from week to week. Within the treatment group, there were 33 females (12 Caucasian and 21 African American) and 39 males (20 Caucasian, 18 African American and 3 Hispanic). Within the control group, there were 17 females (11 Caucasian and 6 African American) and 19 males (12 Caucasian and 7 African American). The mean treatment group BMI was 19.5 pre-treatment and 19.4 post-treatment (p=0.05). The mean control group BMI was 16.4 pre-treatment and 16.5 post-treatment (p=0.05). Rates of obesity (BMI percentile for age >95%) for the treatment group were 12% of 2-to-5-year-olds; 34% of 6-to-11-year-olds; and 50% of 12-to-19-year-olds. The only age group with obesity in the control group were the 2-to-5-year-olds with 0.70%. The national rates of obesity were 17.7% of 6-to-11-year-olds; and 20.5% of 12-to-19-year-olds. See the tables and graphs for data.

Acknowledgment

We would like to express gratitude to Dr. J.D. Patterson for his fervent support of undergraduate research and the support of this research project.