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Effects of Parent Role Modeling Behaviors in Correlation to Child Overweight and Obesity in Preschool-aged Children

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EFFECTS OF PARENT ROLE MODELING BEHAVIORS IN CORRELATION TO CHILD OVERWEIGHT AND OBESITY IN PRESCHOOL-AGED CHILDREN

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This thesis is approved as a creditable and independent investigation by a candidate for the Master of Science in Nutrition and Exercise Sciences and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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ABSTRACT

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OBJECTIVE: Parents have been proven to shape their children's health through their growing years.[1-6] Extensive research has been done on the correlation between adolescent's health status and parent's role modeling behaviors. However, little research has been done in preschool-aged children. Therefore, the purpose of this study was to determine if parenting style with food and meal behaviors was associated with body mass index (BMI) and weight status in preschool-aged children (3-5 years).

METHODS: This study is a part of South Dakota State University's iGrow Readers study. For this study, a total of 229 child/parent dyads participated from 14 recruited daycare centers across the Midwest. All heights and weights were recorded at pre-, post-, and follow-up data collection points. At pre-assessment, parents were given the Parent Survey, which contained information regarding their demographic and nutrition lifestyle.

RESULTS: A total of 194 parents completed section I, which contained information regarding nutrition-related parent role modeling behaviors, in the Parent Survey. The average child age was 3.6 years. Characteristics of parents included predominantly mothers (83.5%) with an average age of 34.27 years with an Associate's/Bachelor's degree (51.2%) making over $60,00 a year (76.1%). No significance was found between

parent role modeling behaviors and child weight status. However, few positive role modeling behaviors were reported by parents within the survey. Three of the most commonly reported negative behaviors include eating while angry (86.5%), eating from the pan (86.5%), and consumption of sugar-sweetened beverages (75%).

CONCLUSION: Although no significant association was found between parent role modeling nutrition behaviors and preschool-aged child's weight status, this study does show the most frequently modeled nutrition behaviors that may have a negative influence on their child's health. Further research is needed upon this topic and the long-term implications of these modeling behaviors.

Introduction

Overview of Childhood Obesity

In the United States, few children consume the recommended intakes of whole grains (<1%), vegetables (7%), fruits (29%), and milk (37%).[7] Additionally, the consumption of unhealthy foods by children has been rapidly growing. Most children exceed the recommended limits for solid fats (97%) and added sugars (90%).[7] Foods that have been found to be the main contributors of caloric intake from snacking include dessert pastries, soft drinks, salty snacks, and candy.[8,9] Preschool-aged children who are overweight or obese are 5 times more likely to be overweight during adolescence[10] and 4 times more likely to be obese as an adult.[11] Young children are completely dependent on adults for their nutritional needs both in the home and in child care settings.[12] In particular, family environment serves as a fundamental role for a child's recommended dietary intake, as well as physical activity, feeding practices,[13-15] modeling healthy behaviors,[16,17] providing support for health behaviors,[18,19] and general parenting style.[20-22] The Institute of Medicine (IOM) has emphasized the need for interventions in early childhood in order to prevent increased prevalence of obesity later in life.[23] Moreover, increasing awareness and educating parents and teachers in homes and childcare centers will increase the potential for a lasting impact on health and nutrition on children through their adulthood through early interventions.[24,25]

Parent Role Modeling's Impact on Childhood Obesity

Research shows that children's health behaviors are shaped by their parents throughout their growing years of youth through adolescence.[1-6] These role modeling behaviors

correlate closely with physical activity, eating behavior, and body weight[26,27], given that children's health behaviors are highly influenced by their parents.[28] However, different types of parental support behaviors, such as authoritarian, authoritative, or neglectful behaviors, may be a predictor of the adequacy of children meeting recommendations for screen time, physical activity, and healthy eating.[29] The type of parental support behaviors is the most important for predicting child health behaviors.[29] Although little is understood about the psychological reasoning why parents feed children in the way they do, it is important to understand why parents feed their children unhealthy foods in order to understand the dramatic rise in childhood obesity.[30] Most commonly reported feeding goals are those pertaining to health promotion for their child, such as regulating their child's mood through food or emotional feeding, feeding foods that do not take long to prepare or food that fits in with parental time constraints, feeding foods that are tasty or familiar to child and feeding with the goal of child food consumption.[31-34] However, in addition to these feeding goals, it is important to know parents' eating behaviors as well, as they are important sources of information for the development of children's food preferences.[35] Ideally, parents should model a healthful dietary intake, authoritative feeding style, and more frequent family meals in order to promote healthful food consumption among children and adolescents.[36-38] Parents generally want to do what is good for their children; however, on the contrary, some parents, along with caregivers, simply lack education on dietary intake, physical activity, body weight, and the health risks. In addition, they may lack the resources and affordability.[39] It is crucial that parents and caregivers should be aware that one of the main risk factors for childhood obesity is

actually obesity of the parents, when examining the relationships between BMIs of parents and their children.[40]

Relationship between Parent and Child

Understanding the psychological processes that drive parental feeding practices is important in understanding prevention of childhood obesity.[30] Overall functioning of the family, such as the quality of the relationship between a parent and his/her child, may influence the weight status and related behaviors in a child.[41] It has been shown that higher family functioning is associated with healthier eating and activity behaviors for both females and males.[42] Family functioning is defined as the interpersonal interactions of the family as a whole, such as problem solving, behavior control, closeness/warmth, and communication.[43] On the contrary, insecure parent attachment in childhood is found to be correlated with an increased consumption of high calorie food among both children and adults.[44] The recommended style of parenting is authoritative, which is characterized by a high level of warmth and control. This parenting style has been shown to be correlated with a lower obesity risk and healthier weight-related behaviors.[45] On the other hand, neglectful parental style constitutes a risk factor for such outcomes.[46,47] In addition, parental motivation is also a major part for the success of treatments and interventions that aim to improve an individual's health and well-being.[48] Overall, parental support, through social relationships, interpersonal transactions, and active role modeling, have all been shown to have a significant positive impact on children's dietary behaviors. [27]

Parent and Child Diet Quality

Many children's eating patterns are influenced by a variety of parent-focused factors, such as mealtime characteristics, where the meal is eaten, who the meal is eaten with, and diet quality of each meal.[49] When parents encourage family meals together, children are more likely to be in a normal weight range and have a healthier dietary patterns than those children who consume fewer family meals.[50] Parent-controlled behaviors, such as frequency of family meals together, are associated with children's reduced fast food consumption and an increased fruit, vegetable, and fiber-rich food consumption.[51] With fast food in a child's diet at least once per week, the child is likely to consume fat more frequently.[52,53] Aside from where the child eats his or her food, it is also important to know what the child is consuming as well. In the home environment, having unhealthier foods, especially visible to a child, rather than fruits and vegetables can be a barrier for children to acquire fruit and vegetable recommendations.[54] Parents who have fruits and vegetables more available for their children, especially by serving them for a meal or snack, are almost five times more likely to have their children meeting fruit and vegetable recommendations.[27,29,55] In addition to making more healthy foods available, parents who model healthy portion control at mealtimes, along with controlling access to fried snacks by not having them available in the home, had children who had less fat consumption.[35,56,57] Preferred role modeling behaviors recommended for parents include increasing availability of healthy foods, modeling healthy eating, and providing encouragement to eat healthy foods in order to promote children getting adequate dietary recommendations.[16,58] Parents who feed their children to regulate emotions, such as bribing or cheering up, may teach them to use food in non-nutritive ways and increase caloric intake in times of stress when the child is older. [59] In addition, allowing a child to

have the freedom to make their own food choices may also encourage unhealthy food consumption and a negative effect on family mealtime quality.[60,61] Other negative parenting behaviors include pressuring the child to eat, restricting access to healthy foods, and specific household rules about eating. These parenting techniques have been shown to be associated with unhealthy eating behaviors in children.[56,62] Hence, it is important to realize that parental influences are key determinants of children's eating habits[56], in part because young children are dependent on parents for food.[62]

Barriers to Past Research and Objective of Current Study

Research on the effects of parent role modeling has been lacking in preschool-aged children (0-5 years), where few interventions have been done. Research in this population has been small or short-term studies.[63] Preschool-age is the ideal life stage for childhood obesity interventions that incorporate healthy lifestyle practices, as children this age do not have well-established unhealthy behaviors they may have in older childhood.[64] Interventions in the earlier stages of life have been shown to have higher returns than those later in life.[65] In addition, interventions that target parents who have children preschool-aged or younger were seen to be more effective in reducing childhood obesity compared to interventions that do not.[66] However, how to best engage and support parents through obesity prevention interventions still remains unclear.[67] Based on past research, parent role modeling has been strongly correlated with child behaviors. Therefore, this study will focus on specific role modeling behaviors and how they are associated with child behaviors, along with weight status. The objective of this study is to determine if parenting style with food and meal behaviors is associated with body mass

index and weight status in preschool-aged children (3-5 years). The hypothesis is that the self-reported role modeling of unhealthy behaviors by parents is associated with increased odds of overweight/obesity among their children.

Methods

This analyses is a part of South Dakota State Extension's iGrow Readers study. iGrow Readers is an interactive obesity prevention curriculum created for children. This curriculum was developed by SDSU Extension and a transdisciplinary team with expertise in Nutrition, Health Promotion, Physical Education and Early Childhood Education. These lessons and activities consist of popular children's books paired with diet and physical activity information and activities that are focused on pre-K to 3rd grade children. To test the efficacy of the iGrow Readers curriculum in changing diet and physical activity knowledge and behavior, 293 children/caregiver dyads from 14 early childcare centers were recruited from 3 states (South Dakota, Nebraska, and Minnesota). As part of the efficacy testing, data were collected at three time points before (week 0) intervention and after (week 13 and week 30) for the post and follow-up intervention data. At each of these points, both children and parent's height, weight, and body composition were assessed and survey data were collected. Height was measured using a stadiometer with each participant standing still with hands at sides and face forward without any shoes or hair ornaments that may affect results. Height was measured twice to ensure accuracy. If there was a greater than 0.2 cm difference in two measurements, a third measurement was recorded. Weight was measured using an Electronic Seca Scale 890, and two measurements were recorded as well. If there was greater than 0.02 kg in

the two recordings, a third measurement was taken. This data was then used to determine BMI in each participant. A BMI score of 18.5 to 25 indicated a normal weight range; 25 to 30 designated overweight; and over 30 signified as obese.

The present study is a cross-sectional secondary analysis of data from the Comprehensive Home Environment Survey (CHES; Parent Role Modeling Behaviors section)[68], which was administered to caregivers during the follow-up visit. Self-reported parent role modeling behaviors included eating a healthy diet, eating in the living room, taking a second helping, having an unhealthy snack, drinking sugary drinks, eating while standing, eating from the pan, eating while watching TV, eating while bored, eating while angry, eating late at night, and eating while driving. A total of 229 children had complete height and weight data, resulting in a total sample size for analysis of 229 child/parent dyads. Sample sizes for individual analyses vary based on completeness data.

Statistical Analysis

Scoring of the CHES requires each item to have a value between 0 and 1. Questions with multiple responses (i.e. Strongly Disagree, Slightly Disagree, Neutral, etc) were scaled from 0 (most negative response) to 1 (most positive response). Scores for each of the self-reported parent role modeling behaviors were summarized to create a total score. Next, parent role modeling behaviors were dichotomized into two categories (0 or 1). Of the five responses, three responses were categorized into the 'more' or 'less' likely category, which was signified as 0 (worse behavior) or 1 (better behavior). The remaining two responses fell into the opposing category: "0" if the first three responses were "1" or "1"

if the first three responses were "0." For all questions, the higher numbers represented 'better' behaviors.

Three variables were significantly associated with the study outcome (child weight status) and were controlled for in all analyses. This included child gender, parent education level, and parent BMI (P= 0.003, P= 0.025, P= 0.05, respectively). T-tests and Chi-squared tests were used to examine differences in demographic variables among child weight status categories. Linear regression was used to determine the relationship of total overall parent behavior score and child weight status while controlling for child gender, parent education level, and parent BMI. Dichotomized individual parent role modeling behaviors were analyzed using logistic regression while controlling for the same covariates. A p-value of 0.05 was set for statistical significance with 95% Confidence Interval (CI). All analyses were performed using STATA software.

Results

Demographic data for the study sample are presented in Table 1. 55% (n=127) of the children were female (n=127) and mean child age was 3.6 years. The average characteristics of the parents completing the survey were predominantly mothers with an average age of 34.27 with an Associate's or Bachelor's degree making over $60,000 a year with a BMI of 29.71. Parent role modeling behaviors and their relationship with child weight status are presented in Table 2. Neither the overall role modeling section score, nor any individual behaviors within, was associated with child weight status after adjusting for child gender, parent education level and parent BMI.

The proportion of parents modeling healthy behaviors was then examined (Table 2). Higher scores on the CHES indicate 'positive' role modeling (i.e. role modeling positive behaviors frequently and negative behaviors infrequently), so when behaviors are 'negative', higher scores indicate parents were modeling these behaviors less often. While the positive behavior of eating a healthy diet was modeled frequently by 79% of parents, some negative behaviors like eating while angry (13.5%), eating from the pan (13.5%) and drinking sugary drinks (25%) were modeled appropriately by few parents.

Discussion

The purpose of this study was to determine if there was a significant association between parent self-reported role modeling behaviors and child weight status, specifically among preschool-aged children. While there was no statistically significant association between parent reported role modeling behaviors (overall or individual behaviors) and child weight status, we were able to determine the most common parent self-reported role modeling behaviors, which helps to inform practice and future research.

This study showcases positive and negative dietary behaviors that parents are reporting to model for their children. We would expect positive behaviors to be modeled more frequently and negative behaviors to be modeled less frequently. However, many negative behaviors were being modeled frequently. For example, eating from the pan was being modeled often, as only 13.5% of parents reported doing this infrequently. Similarly, 86.5% of parents indicated frequently modeling eating while angry. Eating

while angry, eating from the pan and drinking sugary drinks were the negative behaviors reported as being modeled frequently by the highest number of parents.

According to other research, emotional eating[69-71] and consumption of sugary beverages[72] are both among the unhealthiest parent role modeling behaviors. In one systematic review, the overall results (between both laboratory and longitudinal studies) supported the idea that stress can lead to decreased and increased eating; some evidence suggests when humans are under elevated stress levels, there is a higher desire for highly palatable foods, which are typically energy dense.[69] Based on these findings, this study shows that parents of preschoolers could have a potentially high stress level, which leads them to increased emotional eating. To analyze the association of sugar-sweetened beverages, one study interviewed both parents and their children individually and asked them to list drinks they perceived unhealthy versus healthy. The interviewer also asked for each drink consumed, how much it was consumed, reasons for consumption, conditions associated with consumption, home availability, and any parental rules and discipline regarding the drink(s). Almost all parents and youth deemed soda as unhealthy. However, about half of parents and youth labeled juice as unhealthy, and only a few parents and youth thought sports drinks were unhealthy. Facilitators to these sugar-sweetened drinks included availability (youth indicating always having access to these drinks at home or other adults bought these for them) and a lack of parental rules and guidelines about consuming these beverages.[72] These findings suggest parents may have a lack of knowledge about the impact of sugary drinks or which drinks are less healthy for a child to consume. Because parents of this study reported consuming sugary drinks,

it would have beneficial to know how often they drink these beverages, how many they consume, and whether or not they set rules or guidelines for their children. This additional information would have been beneficial as it would identify whether or not there is an association between lack of knowledge or decreased parental rules and number of sugary beverages consumed.

One unique finding of this study was a majority of parents reported eating from the pan. Few studies have been conducted regarding this negative behavior and the potential effects it may have on their children. It is evident increased research is needed regarding negative behaviors, such as eating from the pan. Although there has been research done on emotional eating and sugary beverage consumption, there needs to be a rationalization for why parents are doing these negative behaviors and what negative impacts it may have short-term and long-term. Little is known regarding this focus area. However, one explanation to this behavior could be due to family time constraints.

Parents current health behaviors have evolved little from the previous generations. Current feeding practices were originally developed years ago to address food scarcity and prevention of diseases.[62] It was common for parents and caregivers to address an infant or child's cry with food. These practices have been passed from one generation to the next and have become a part of traditional practice routinely used by parents without any questions.[62] Parents and caregivers simply portray health behaviors in the same matter their parents once did. However, throughout the generations, cultural differences have transformed in the nation. Fast food restaurants have become increasingly

popular;[52] time is now a huge constraint on the traditional family meals;[31-34] and low-income families are finding it difficult to consume a healthy diet.[7,10] With this evolution in the nutritional society, parents are continuing to shadow their traditional nutritional behaviors by immediately answering infant/child hunger cues; however, in different matters.

Ultimately, based on the infrequent modeling of positive behaviors in this study, it can easily be portrayed that time is a large barrier for the participants. Participants in this study showed high frequency of eating from the pan, while driving, while standing, late at night, and/or in the living room watching TV. These findings are similar to other studies, suggesting time is an obstacle in a parent's lifestyle. Analyzing these behaviors as a whole, it appears parents have a lack of time to sit down at a table to consume their food. The information lacking from this study, however, was average amount of dollars spent on each meal and how often the parent or caregiver got take-out or fast food due to time constraints. This information would have been beneficial to know in order to confirm time and income status are large barriers to achieving a healthy lifestyle for families. With these behaviors being role modeled to their children, it will be assumed by the child that this behavior is "normal" or "okay." The next generation will then follow this behavior because that is simply how their parents raised them.

This study is one of the first to examine the association between parent role modeling behaviors and preschool-aged children weight status. The majority of previous research has been conducted among adolescents and indicates that adolescents are highly

influenced by their parent role modeling behaviors.[1-6] This does not appear to hold true for preschoolers, however. The lack of findings in the present study suggest preschool-aged children may not be as influenced by parent role modeling health and nutrition-related behaviors. In addition, children at this stage in life may have not been exposed to the behaviors long enough to have an impact on their weight status. Additional research is needed in this age group in order to confirm whether or not there is a correlation between parent role modeling behaviors and preschool-aged child weight status.

There are some limitations to this study. The first is, since it was a survey, answers from participants could have been biased, since all answers were self-reported. In addition, the survey was conducted in a population with a similar socioeconomic status; therefore, generalizability of the results to the nationwide population cannot be done. Based on the results of this study, it cannot be concluded that parent self-reported role modeling behaviors are associated with weight status among preschool-aged children. Despite its limitations, this study has several strengths. First, it was one of the first studies to analyze parent role modeling behaviors with preschool-aged children, specifically looking at weight status. Second, this study had a relatively large study sample size with a high response rate. Lastly, this study is one of the first studies to analyze the most common negative health behaviors being modeled by parents.

Conclusion

In conclusion, unlike previous research among adolescents, parent role modeling health and nutrition-related behaviors was not associated with preschool-aged child weight

status. However, this study brings to light negative behaviors being modeled by parents, and shows unique opportunities for future research on parental modeling of health behaviors and how this may be associated with future behaviors in their child(ren). While parent role modeling of the behaviors examined may not be associated with current weight status of preschool-aged children, further research should examine the long-term implications of this modeling. Practitioners should provide education and materials to parents regarding proper health and nutrition-related behaviors for their children and themselves in order to reduce susceptibility to obesity and related diseases.

Appendix

Table 1: Demographic Characteristics of Children and Parents; % (n=)

Characteristic	Overweight/ Obese Child	Normal Weight Child	Total	P-value
Child Gender*				0.003
Female	23.6 (30)	76.4 (97)	55.5 (127)	
Male	8.8 (9)	91.1 (93)	44.5 (102)	
Child Age (y)*				0.351
3	48.9 (93)	48.7 (19)	48.9 (112)	
4	38.4 (73)	46.1 (18)	39.7 (91)	
5	12.6 (24)	5.1 (2)	11.3 (26)	
Parent Gender Role*				0.957
Mother	83.8 (31)	83.4 (156)	83.5 (187)	
Father	16.2 (6)	16.6 (31)	16.5 (37)	
Parent Age (y)**	33.92	34.62		0.563
Parent Education Level*				0.025
High School Diploma	29.4 (10)	11.9 (21)	14.7 (31)	
Associates or Bachelor's Degree	38.2 (13)	53.7 (95)	51.2 (108)	
Masters or Doctorate Degree	32.3 (11)	34.5 (61)	34.1 (72)	
Parent Income Level*				0.480
<$60,000	28.6 (10)	22.9 (40)	23.9 (50)	
$60,000+	71.4 (25)	77.0 (134)	76.1 (159)	
Parent BMI**	31.48	27.94		0.05

*Chi-Squared Test

** T-test

Table 2: Adjusted* Parent-Role Modeling Behaviors and their associated with child weight status

Modeling Behavior	Odds Ratio (OR)	95% Confidence Interval (CI)	P-value	Frequency of positive behavior	Frequency of behavior
Role Model Diet	1.02	(0.74, 1.39)	0.923		
Eat Healthy Diet	1.08	(0.37, 3.10)	0.889	79%	21%
Eat in Living Room	1.29	(0.51, 3.23)	0.594	28.5%	71.5%
Taking a Second Helping	0.67	(0.29, 1,57)	0.356	73%	27%
Having an Unhealthy Snack	1.07	(0.46, 2.47)	0.882	62%	38%
Drinking Sugary Drink	1.24	(0.50, 3.08)	0.637	25%	75%
Eat while Standing	0.75	(0.33, 1.71)	0.497	50%	50%
Eating from the Pan	0.79	(0.21, 2.98)	0.732	13.5%	86.5%
Eat while Watching TV	0.81	(0.33, 1.97)	0.635	37%	63%
Eating while Bored	0.71	(0.27, 1.86)	0.482	26%	74%
Eating while Angry	1.35	(0.43, 4.21)	0.603	13.5%	86.5%
Eating Late at Night	1.17	(0.47, 2.94)	0.734	27.5%	72.5%
Eating while Driving	1.15	(0.48, 2.76)	0.749	34%	66%

*Adjusted for gender of child, education level of caregiver, and BMI of caregiver

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