

Nutrition and Physical Activity Recommendations and Tools for Obesity Prevention in Preschool-aged Children

Sherri Cirignano, MS, RD, LDN

Family and Community Health Sciences Educator
Rutgers Cooperative Extension of Warren County, NJ
Rutgers University

Abstract

Obesity prevention programming that focuses on preschool-aged children is important due to the continued high rates of overweight and obesity in this population. This review provides a compilation of nutrition and physical activity recommendations and tools for community nutrition educators and clinical nutrition professionals to utilize in prevention or counseling efforts with preschoolers. Topics addressed include obesity prevalence, contributing factors to obesity, and nutrition and physical activity recommendations from the following: the preliminary report of the 2010 Dietary Guidelines for Americans, the American Academy of Pediatrics, the Institute of Medicine, and the National Association for Sports and Physical Education. Tools for implementation are also included from *MyPyramid for Preschoolers* and the Food and Nutrition Service *Core Nutrition Messages*.

Keywords: Preschoolers, childhood obesity, nutrition recommendations, physical activity recommendations

Introduction

With sustained elevated rates of childhood overweight and obesity in the U.S. for over a decade (Ogden et al. 2010; Polhamus et al. 2009) and a pronounced focus on the battle against the obesity epidemic in a growing variety of sectors, (Executive Office of the President of the U.S. 2010; U.S. Dept of Health and Human Services 2010; Robert Wood Johnson Foundation 2010) the need for age-specific nutrition and physical activity guidelines for use by nutrition educators is as important as ever. Obesity prevention programming focused on preschool-aged children,

ages 2 – 5 years, is particularly important due to the continued high rates of overweight and obesity in this population, (Ogden et al. 2010; Polhamus et al. 2009) and the realization that this is a crucial age group that needs to be reached to pre-empt obesity issues in later years. Evidence indicates that an obese preschool-aged child is more likely to be obese as an adolescent and as an adult (Whitaker et al.1997). With this reality comes the risk of very young children developing risk factors for adult diseases such as diabetes, hypertension, hyperlipidemia, asthma, and sleep apnea, (American Academy of Pediatrics 2003) and dealing with other potential problems of overweight and obesity such as depression, stigma and issues with body image (Robert Wood Johnson Foundation 2010). New research even suggests that the preschool age group responds better to prevention interventions than their older counterparts (Swinburn 2010).

As a result of the needed focus on this age group, an expert committee of the Institute of Medicine (I.O.M.) is conducting a review of the specifics of overweight and obesity in children as it relates to nutrition and physical activity from birth through five years (I.O.M. 2010). In addition to examining the evidence related to the many risk factors associated with obesity in young children, the I.O.M. committee will also identify and make recommendations for policies that will promote obesity prevention “across a range of settings and types of programs” and will do so with the possible differences within the birth through five-year age group in mind (2010). These recommendations are expected in early 2011.

In the meantime, general nutrition and physical activity guidelines to promote the prevention of obesity are available from a number of organizations for children of all ages. This paper will provide a review of available nutrition and physical activity guidelines to utilize for the prevention of obesity in the preschool-aged child, and tools to implement these guidelines for this population. The goal is to provide a current review for use by community nutrition educators, caregivers or health professionals who are delivering obesity prevention programming in the preschool population and for clinical nutrition professionals who counsel parents and preschool-aged children on weight management.

Obesity prevalence in preschool-aged children

The prevalence of childhood obesity, including in preschool-aged children, has remained at a fairly fixed level over the past 10 years (Ogden et al. 2010). Obesity in youth ages 2 through 19 years is defined as a body mass index (B.M.I.) for age that is at or above the 95thCenters for Disease Control and Prevention (C.D.C.) percentile (Barlow and Dietz 1998) based on the 2000 C.D.C. growth charts (Kuczmarski et al. 2002). B.M.I., a calculation of weight in kilograms divided by height in meters squared, is considered a better indicator of body fatness in children over the use of skinfold-thickness and circumference measurements at this time. (Freedman and Sherry 2009).

Data on obesity levels for children ages 2-5 years are available from the C.D.C.'s Pediatric Nutrition Surveillance Survey (PedN.S.S.) and National Health and Nutrition Examination Survey (N.H.A.N.E.S.). PedN.S.S. obtains data from children who are enrolled in federally funded programs, including a large majority (85.3 percent) from the Special Supplemental Nutrition Program for Women, Infants, and Children (W.I.C.) (Polhamus et al 2009). This report largely represents the nutritional status of low-income preschool-aged children nationwide based on participation in these federal programs. Findings from the 2008 PedN.S.S. report indicate that the obesity prevalence of all children studied ages 2-5 years of contributing states and territories was 14.8 percent. This is an overall increase from 12.7 percent in 1999, although the rate in this age group has been fairly stable since 2003 (14.7 percent). There were no contributing geographic areas that met or approached the "expected level" of 5.0 percent, an objective of *Healthy People 2010*, in this time frame (Polhamus et al. 2009).

N.H.A.N.E.S. is a survey that is conducted by the National Center for Health Statistics of the C.D.C. that obtains height and weight data from a representative sample of the U.S. population. N.H.A.N.E.S. for 2007-2008 also reported stable findings of obesity prevalence in the ten years prior in children aged 2-5 years (Ogden et al. 2010). In this sample, 10.4 percent of all children in this age group were found to be in the obese category and 6.9 percent were found to be in a higher B.M.I. category (greater than the 97th CDC percentile).

Contributing factors to childhood obesity in preschool-aged children

Many factors play a role in the promotion of obesity in children, including the parent or caregiver's weight, the family's socioeconomic status and the child's level of nutrition, physical activity and non-activity (Fitzgibbon and Stolley 2006). Other environmental factors such as parent feeding styles, (Johnson 2000) accessibility to healthful food, (Executive Office of the President of the U.S. 2010) and the influences of advertising (Federal Trade Commission 2008) among others, also figure into the obesity equation. Influences outside of the home most likely also play a significant role in the weight outcomes of children. Recent federal programs such as *Let's Move* (Executive Office of the President of the U.S. 2010) and the focus of current C.D.C. funding streams to promote school wellness in the battle against childhood obesity are a testament to this. Obesity prevention initiatives for children in elementary through high school have been the focus of 22 grants provided by the C.D.C. in 2010 alone (Robert Wood Johnson Foundation 2010). Likewise for preschool-aged children, addressing the settings where these children spend time is equally important.

An increase in caloric intake (Piernas and Popkin 2010; Wang, Bleich and Gortmaker 2008) and a probable decrease in physical activity (Troost et al. 2003) have also been cited as contributors to obesity in the preschool age group. Over the past 30 years, preschool-aged children were found to have consumed an increase of over 180 extra daily calories from snacks according to the

Nationwide Food Consumption Survey (1977-78) and the U.S. Department of Agriculture National Health and Nutrition Examination Surveys (2003-06) (Piernas et al. 2010). More specifically, an average of 124 daily calories from sugar-sweetened beverages (defined as including soda, sports and energy drinks, lemonade and other fruit drinks) was consumed by preschoolers between 1999-2004, comprising 7 percent of their total daily calories (Wang et al. 2008). In the same study, this age group was also reported to have a significant decline in milk consumption and an increase in 100% fruit juice consumption that was found to be close to “twice the A.A. P. recommended amount of 4 to 6 oz./day.” Intakes of fruit punch were found to contribute to more than fifty percent of all caloric intake from sugar-sweetened beverages in this age group.

Nutrition and physical activity recommendations for preschool-aged children

Nutrition and physical activity recommendations that are available from the federal government, and nutrition, physical activity and pediatric-focused organizations are primarily generalized, focusing on children of all ages. Few recommendations are specific to preschool-aged children. The following is a review of available recommendations that focus specifically on the prevention of obesity based on proposed policy, regulations and guidelines. (Individual recommendations that are focused solely on overall health and well-being and are not specific to obesity prevention are noted below by their placement in parentheses.) Please see Tables 1 and 2 for a compilation of the nutrition and physical activity recommendations respectively, and suggested educator tools for assistance with implementation.

Nutrition recommendations

2010 Dietary Guidelines for Americans Preliminary Report

The *Dietary Guidelines for Americans* are developed every 5 years by the U.S. Department of Health and Human Services (H.H.S.) and the U.S. Department of Agriculture (U.S.D.A.). In preparing the most recent guidelines, the 2010 Dietary Guidelines Advisory Committee (D.G.A.C.) has reported on the “urgent need” for obesity prevention efforts targeting children to “start very early” and to “emphasize(ing) early childhood nutrition” (H.H.S. 2010). The following are nutrition-focused recommended strategies, from the D.G.A.C. preliminary report*, (July 2010) that could be utilized when planning obesity prevention efforts for preschool-aged children:

- Improve foods sold and served in schools, including school breakfast, lunch, and after-school meals and competitive foods so that they meet the recommendations of the I.O.M. report on school meals (I.O.M. 2009) and the key findings of the 2010 D.G.A.C. This includes all age groups of children, from preschool through high school. (Please see Table 1 for a breakdown of specifics of the I.O.M. report).

- Increase comprehensive health, nutrition, and physical education programs and curricula in U.S. schools and preschools, including food preparation, food safety, cooking, and physical education classes and improved quality of recess.
- Remove sugar-sweetened beverages and high-calorie snacks from schools, recreation facilities, and other places where children gather.
- Develop and enforce responsible zoning policies for the location of fast food restaurants near schools and places where children play.
- Develop and enforce effective policies regarding marketing of food and beverage products to children.

(H.H.S. 2010.)

*The *2010 Dietary Guidelines for Americans* are expected to be released in late 2010.

American Academy of Pediatrics (A.A.P.)

The A.A.P. first released child overweight and obesity prevention recommendations in 1998 (Barlow and Dietz 1998). Updated in an Expert Committee report for clinicians in 2008, (Barlow et al. 2007) the A.A.P. addresses recommended target behaviors for children of all ages, as well as the role of the parents or caregivers in obesity prevention. Recommendations for target behaviors are based on evidence ratings that are categorized as either “consistent evidence” (C.E.) or “mixed evidence” (M.E.). Behaviors specific to nutrition with C.E. include those that recommend limiting

- consumption of sugar-sweetened beverages.
- eating out, especially at fast food restaurants.
- portion sizes.

And

- encouraging family meals and eating breakfast daily.

The single behavior recommended with M.E. is to

- encourage the consumption of fruits and vegetables in quantities as recommended by the U.S.D.A.

The A.A.P. also suggests several other behaviors for children with regard to diet. These behaviors are those for which there are no, limited or unclear research findings. These behaviors include:

- eating a diet that is rich in calcium.
- eating a diet that is high in fiber.
- eating a diet that is balanced with regard to fat, carbohydrate, and protein.
- limiting energy-dense foods.

The A.A.P. report recognizes the importance of outside influences on the development of overweight and obesity in young children by encouraging parenting behaviors that mimic all target behaviors (Barlow et al. 2007).

Model State Child Care Regulations

Recommended regulations specific to healthful eating for preschool-aged children in child care settings are provided by experts in this area as follows:

- High fat*, high sugar, and (high salt foods) are served less than one time per week or are not served.
- Sugar sweetened beverages are not served.
- Children older than two years are served skim or 1% milk.
- (Clean, sanitary drinking water is available for children to serve themselves throughout the day.)
- Nutrition education is offered to child care providers at least one time per year.
- Juice is limited to a total of 4-6 ounces or less per day for children over one year of age.
- Child care providers do not use food as a reward or punishment.
- Nutrition education is offered to children at least three times per year.
- At least one child care provider sits with children at the table and eats the same meals and snacks.
- Providers encourage, but do not force, children to eat.

**saturated fat and trans fat*
(Benjamin et al. 2009)

Physical activity recommendations

2010 Dietary Guidelines for Americans Preliminary Report

In the *2010 Dietary Guidelines for Americans* preliminary report regarding physical activity recommendations, the D.G.A.C. defers to the *2008 Physical Activity Guidelines for Americans* (see below) and, includes the following physical activity-focused recommended strategies that could be utilized when planning obesity prevention efforts for preschool-aged children:

- Increase safe routes to schools and community recreational areas to encourage active transportation and physical activity.
- Increase awareness and promote action around reducing screen time (television and computer or game modules) and removing televisions from children's bedrooms.
- Increase comprehensive health, nutrition, and physical education programs and curricula in U.S. schools and preschools, including food preparation, food safety, cooking, and physical education classes and improved quality of recess.

(H.H.S. 2010).

2008 Physical Activity Guidelines for Americans

The H.H.S. developed the *2008 Physical Activity Guidelines for Americans* to complement the *2005 Dietary Guidelines for Americans*. These guidelines provide “science-based guidance to help Americans aged 6 and older improve their health through appropriate physical activity” (H.H.S. 2008). Guidelines for preschool-aged children are not addressed in this report.

Active Start: A Statement of Physical Activity Guidelines for Children from Birth to Age 5, 2nd ed.

The National Association for Sports and Physical Education (N.A.S.P.E.) provides parents and caregivers with guidelines for physical activity that are specific to age. The N.A.S.P.E. *Guidelines for Preschoolers* are as follows:

Preschoolers should

- accumulate at least 60 minutes of structured physical activity each day.
- engage in at least 60 minutes, and up to several hours, of unstructured physical activity each day, and should not be sedentary for more than 60 minutes at a time, except when sleeping.
- be encouraged to develop competence in fundamental motor skills that will serve as the building blocks for future motor skillfulness and physical activity.
- have access to indoor and outdoor areas that meet or exceed recommended safety standards for performing large-muscle activities.

And

- caregivers and parents in charge of preschoolers' health and well-being are responsible for understanding the importance of physical activity and for promoting movement skills by providing opportunities for structured and unstructured physical activity. (N.A.S.P.E. 2009).

American Academy of Pediatrics (A.A.P.)

In its 2008 Expert Committee report for clinicians, the A.A.P. suggests behaviors for children with regard to physical activity and non-activity. Behaviors specific to activity with C.E. include the following:

- Limiting screen time (television and other screen time) to a maximum of 2 hours per day for children 2 years of age and older (the A.A.P. recommends no television viewing for children under the age of 2).
- Removing televisions and other screens from a child's "primary sleeping area."

A suggested behavior is to

- encourage moderate to vigorous physical activity for a minimum of 60 minutes daily. (Barlow et al. 2007)

Model State Child Care Regulations

Recommended regulations specific to physical activity for preschool-aged children in child care settings are provided by experts in this area as follows:

- Children are provided with 60 minutes of physical activity per day, a combination of both teacher-led and free play.
- Television, video, and computer time are limited to one time per week or less and not more than 30 minutes each time. (A total of 30 minutes or less per week)
- Child care providers do not withhold active play time as punishment.
- Children with special needs are provided opportunities for active play while other children are physically active.
- Children are provided outdoor active play time at least two times per day.
- Physical activity education is offered to child care providers at least one time per year.
- At least one provider joins children in active play at least one time per day.
- (Shaded area provided during outdoor play.)
- Children are not seated for periods longer than 30 minutes except when sleeping or eating.

- Physical activity education is offered to children at least three times per year. (Benjamin et al. 2009)

Nutrition and physical activity tools for preschool-aged children

Numerous educational tools exist to assist in the implementation of obesity prevention messages to preschool-aged children and their parents or caregivers. The following are some of the available materials:

MyPyramid for Preschoolers

MyPyramid for Preschoolers, developed by the Center for Nutrition Policy and Promotion, an agency of the U.S.D.A. was released in September 2008 (U.S.D.A. 2008). This offshoot of the original *MyPyramid* (2005) and *MyPyramid for Kids* (2005) provide educators with a large array of age-specific tools and suggestions to pass on to parents and caregivers of children 2 to 5 years of age.

Tools of *MyPyramid for Preschoolers* are found on the Web site <http://www.mypyramid.gov/preschoolers/index>.

Nutrition-focused tools:

- A. *MyPyramid Plan for your Preschooler*, a tool for creating an individualized eating plan.
- B. *Growth During the Preschool Years*, includes links to growth charts.
- C. *Developing Healthy Eating Habits*, a set of 9 behavior-focused fact sheets.
- D. *Food Safety*, promoting food safety habits, and avoiding choking hazards.
- E. *Sample Meals and Snacks*, includes meal and snack patterns for 1000 – 1600 calorie *MyPyramid Plans*.
- F. *Kitchen Activities*, progressive suggestions for ages 2 through 5.
- G. *Be a Healthy Role Model for Children: 10 tips for setting good examples*.
- H. *Pointers to Help Your Preschooler Develop Healthy Eating Habits.*, a helpful handout for parents.

Physical activity-focused tools:

- I. *Physical Activity: what is physical activity for preschoolers?*
- J. *Why is Physical Activity Important?*, includes health and developmental benefits.
- K. *How Much Physical Activity?*, includes a checklist for parents and caregivers.
- L. *How Can You Help with Physical Activity?*, includes lists of indoor and outdoor activities for preschoolers.
- M. *How Much Inactive Time is too Much?*, includes ways to limit screen time.

(U.S.D.A. Center for Nutrition Policy and Promotion 2008).

Food and Nutrition Service (F.N.S.) Core Nutrition Messages

In 2008, the F.N.S. agency of the U.S.D.A. released the guide *Maximizing the Message: Helping Moms and Kids Make Healthier Food Choices* developed for use in low-income populations to help promote the messages of the *2005 Dietary Guidelines for Americans* and *MyPyramid*. There are 7 messages for moms of preschool aged children within this guide, created and tested with the assistance of mothers and children in this age group. The *F.N.S. Core Nutrition Messages* for mothers of preschoolers are divided into 3 specific concepts and are as follows:

N. *Role modeling*

- They learn from watching you. Eat fruits and veggies and your kids will too.
- They take their lead from you. Eat fruits and veggies and your kids will too.

O. *Cooking and eating together*

- Cook together. Eat together. Talk together. Make mealtime a family time.
- Make meals and memories together. It's a lesson they'll use for life.

P. *Division of feeding responsibilities.*

- Let them learn by serving themselves.
- Sometimes new foods take time.
- Patience works better than pressure.

This guide also provides other helpful information for educators such as suggestions for dissemination of nutrition messages and for designing and using print or other materials to reach both moms and kids (U.S.D.A., F.N.S. 2008).

Key for Table 1: Letters A – H, heading each tool, and N – P, heading each concept above refer to column 6, “Educator Tools”, in Table 1

Key for Table 2: Letters I – M above, heading each tool, refer to column 6, “Educator Tools”, in Table 2.

Table 1. Nutrition strategies and tools targeted to preschoolers. (SA=Strategy Addressed, SNA=Strategy Not Addressed. Refer to *Nutrition and physical activity tools for preschool-aged children* for key to “Educator Tools” column)

Recommended Nutrition Strategies	2010 D.G.A.C. Preliminary Report	Model State Child Care Regulations	A.A.P. Expert Committee Report	I.O.M. School Meals Report	Educator Tools
Increased fruits and a variety of vegetables included (dark green, bright orange, legumes, starchy and others)	SNA	SNA	SNA	SA	A,C
One-half of grains as whole grains	SNA	SNA	SNA	SA	A,C
Fat-free (plain or flavored) and plain low-fat milk only	SNA	SNA	SNA	SA	A
Calories within minimum and maximum level	SNA	SNA	SNA	SA	A
Gradual decrease in sodium	SNA	SNA	SNA	SA	A
Decrease/eliminate sugar-sweetened beverages	SA	SA	SA	SNA	A
Decrease energy dense foods	SA	SA	SA	SNA	A
Attention to placement/use of fast food restaurants	SA	SA	SNA	SNA	None
Food not used as a reward or punishment	SNA	SA	SNA	SNA	C,H

Increase policies for food/beverage marketing to children	SA	SNA	SNA	SNA	C
Limit portion sizes	SNA	SNA	SA	SNA	A,C
Children encouraged, not forced to eat	SNA	SA	SNA	SNA	C,P
Family meals / meals with child care provider encouraged	SNA	SA	SA	SNA	C,G,H,N
Promote daily breakfast consumption	SNA	SNA	SA	SNA	C
Limit juice to 4-6 ounces daily	SNA	SA	SNA	SNA	A
Encourage fruit and vegetable intake	SNA	SNA	SA	SNA	A,C
Provide reduced fat milk to children > 2 years	SNA	SA	SNA	SNA	A
Provide water for self-serve throughout the day	SNA	SA	SNA	SNA	C
Food preparation education - child	SA	SNA	SNA	SNA	F,G,O
Food safety education - child	SA	SNA	SNA	SNA	D
Nutrition education - child	SNA	SA	SNA	SNA	F

Nutrition education - caregiver	SNA	SA	SNA	SNA	None
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[Table 1 Summary: This table provides a list of recommended nutrition strategies in column 1 that are proposed by the organization reports listed across the top row. “SA” indicates “strategy addressed” and “SNA” indicates “strategy not addressed” in columns 2-5. Educators tools for strategy implementation are in column 6.]

Table 2. Physical activity strategies and tools targeted to preschoolers. (SA=Strategy Addressed, SNA=Strategy Not Addressed. Refer to *Nutrition and physical activity tools for preschool-aged children* for key to “Educator Tools” column)

Recommended Physical Activity (PA) Strategies	2010 D.G.A.C. Preliminary Report	Child Care Model Regulations	A.A.P. Expert Committee Report	N.A.S.P.E. Guidelines	Educator Tools
At least 60 minutes PA daily - structured	SNA	SA	SNA	SA	K
At least 60 minutes PA daily – unstructured	SNA	SA	SNA	SA	K
At least 60 minutes PA daily - general	SNA	SNA	SA	SNA	K
Access to indoor large muscle activities	SNA	SNA	SNA	SA	L
Access to outdoor large muscle activities	SNA	SA	SNA	SA	L
Limit screen time	SA	SNA	SA	SA	M
No T.V. in child’s bedroom	SA	SNA	SA	SNA	M
PA not withheld as punishment	SNA	SA	SNA	SNA	J
PA available for children with special needs	SNA	SA	SNA	SNA	None

PA modeling by caregiver	SNA	SA	SNA	SNA	L
Encourage movement after 30 minutes sedentary	SNA	SA	SNA	SNA	M
Encourage movement after 60 minutes sedentary	SNA	SNA	SNA	SA	M
Encourage active transportation	SA	SNA	SNA	SNA	None
Encourage development of motor skills	SNA	SNA	SNA	SA	J
Caregivers responsible for providing PA opportunities	SNA	SNA	SNA	SA	L
PA education – child	SNA	SA	SNA	SNA	I
PA education – caregiver	SNA	SA	SNA	SNA	I

[Table 2 Summary: This table provides a list of recommended physical activity strategies in column 1 that are proposed by the organization reports listed across the top row. “SA” indicates “strategy addressed” and “SNA” indicates “strategy not addressed” in columns 2-5. Educators tools for strategy implementation are in column 6.]

Conclusion

It is clear that obesity prevention efforts by educators and caregivers are needed in all settings that include preschool-aged children in order to lay the groundwork for decreasing the likelihood of childhood and adult obesity in future generations. Preschoolers are in a critical period of life when eating and activity habits are being formed and can be guided in positive ways. To effectively complete this task, evidence-based nutrition and physical activity guidelines specific to this population are required. Past guidelines for children have not always addressed the preschool age group due to a lack of sound evidence. Current preschool specific guidelines, although not as thorough as those for their older counterparts, are increasingly available by the aforementioned organizations for use by educators and caregivers alike. Future guidelines will prove to be more comprehensive and precise as expert committees provide recommendations specific to our youngest children.

Programming that includes nutrition and physical activity messages should be ongoing in child care and preschool settings. Several preschool-focused resources have been developed to assist in implementation through USDA's Team Nutrition, "an integrated, behavior based, comprehensive plan for promoting the nutritional health of the Nation's children" (U.S.D.A. 2010) including *The Two Bite Club*, *Grow it, Try it, Like it!*, and *Nibbles for Health: Nutrition Newsletters for Parents of Young Children*. These resources are available on the Team Nutrition website at <http://teammnutrition.usda.gov>. *Color Me Healthy*, by the North Carolina Cooperative Extension and Division of Public Health, is a curriculum which has reported positive results (n=486) in increasing preschool-aged children's knowledge about healthy eating (ninety-three percent) and in increasing their physical activity (ninety-two percent) when evaluated in 2002 (Dunn et al. 2006).

Additional outcome-focused resources are needed that address the diversity of preschool-aged children including socio-economic, ethnic, racial and geographic factors. Grant funding and curriculum development specific to this age group would assist in meeting this goal. Finally, developing and implementing validated survey tools to evaluate these programs for preschoolers is needed for documentation of outcomes in this population.

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