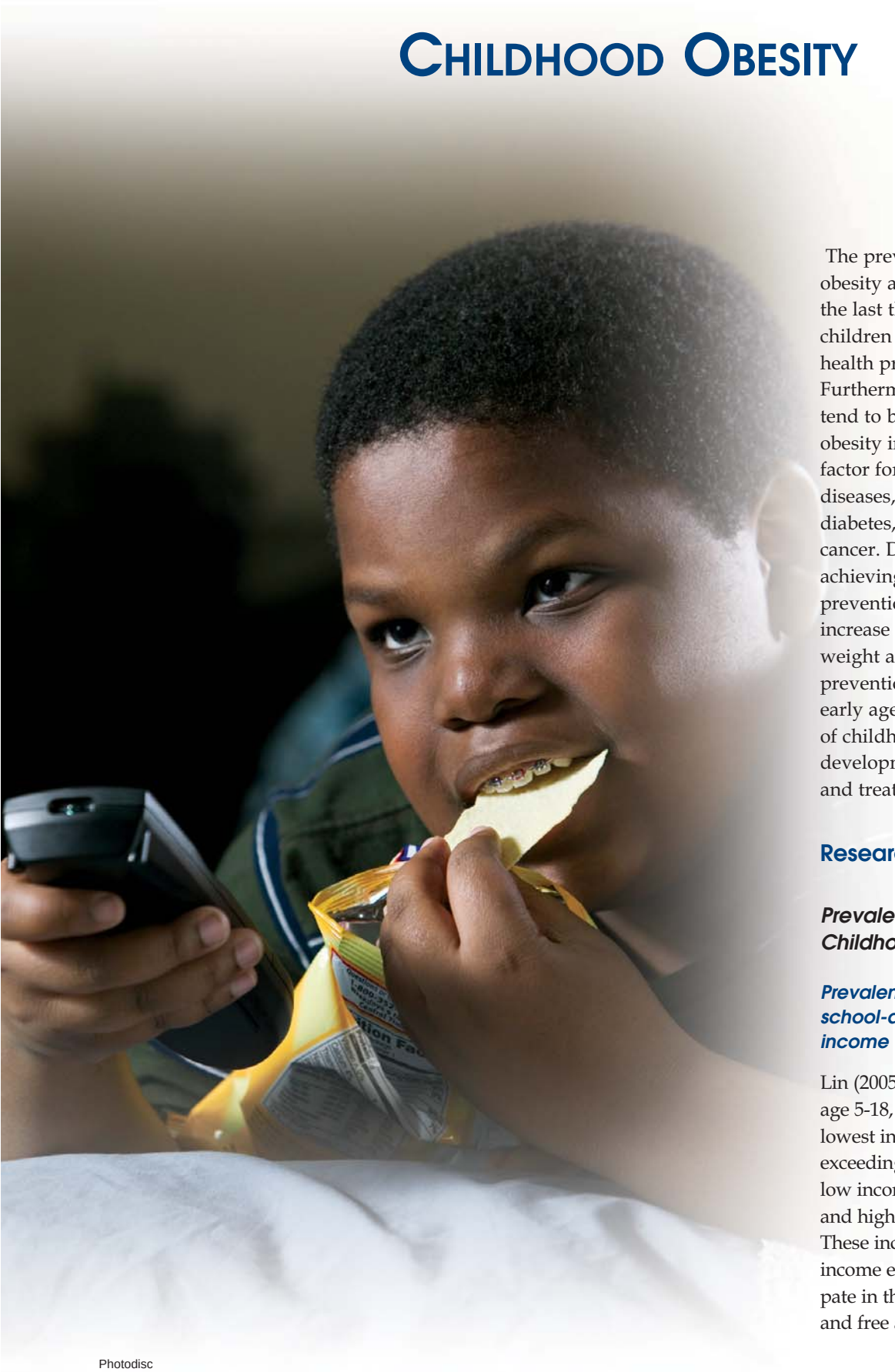
CHAPTER 9

CHILDHOOD OBESITY



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The prevalence of overweight and obesity among children has tripled in the last three decades. Overweight children are more likely to experience health problems during their youth. Furthermore, overweight children tend to become obese adults and obesity in adulthood is a known risk factor for a number of chronic diseases, including heart disease, diabetes, stroke, and some forms of cancer. Due to the difficulty of achieving long-term weight loss, the prevention of obesity is critical. The increase in the prevalence of overweight among children suggests that prevention efforts need to begin at an early age. Understanding the causes of childhood obesity is crucial to the development of effective prevention and treatment strategies.

Research Highlights

Prevalence and Depth of Childhood Overweight

Prevalence of overweight among school-age children differs by income

Lin (2005) grouped school-age children, age 5-18, into three income classes: the lowest income (family income not exceeding 130 percent poverty level), low income (131-185 percent poverty), and higher income (above 185 percent). These income cutoffs correspond to income eligibility thresholds to participate in the Food Stamp Program, WIC, and free and reduced-price school

Research Summary

FANRP has pioneered research to increase our understanding of the factors associated with childhood obesity and the role of the food and nutrition assistance programs. Measures of the prevalence of overweight among children may understate the extent of this public health problem. Not only have more children become overweight in the last three decades, but overweight children have been getting heavier. A number of FANRP studies have examined factors associated with childhood obesity, especially those within parents' control, such as breastfeeding, time spent with the child, eating meals as a family, and television watching. Findings from these studies highlight the importance of pregnancy and childhood as critical stages to intervene in obesity prevention. Other studies have highlighted the linkages between obesity and the consumption and prices of certain types of food and beverages. Studies have found no evidence that participation in food assistance programs increases the likelihood of childhood obesity.

meals. After adjusting for age, children in the lowest income group were more likely to be overweight than children in the low- and higher income groups (fig. 9-1). There were notable differences by gender. The only difference among boys is observed between the lowest income and higher income groups, whereas girls in the lowest income group were almost twice as likely as girls in the low-income group to be overweight.

Prevalence of childhood obesity among preschoolers differs by race/ethnicity

A study of preschool children in 20 large U.S. cities by Whitaker and Orzol (2006) found a disparity in children's obesity rates by race/ethnicity that appears early in life. The prevalence of obesity at age 3 was found to be significantly higher in Hispanics (the largest minority group in the United States) than in either whites or blacks, but prevalence did not differ significantly between whites and blacks. The elevated risk for obesity in Hispanic children was not explained by racial/ethnic differences in household income, maternal education, and children's food security, suggesting that other unidentified factors are responsible.

Severity of childhood obesity is increasing

Measures of the prevalence of overweight among children may understate the extent of this public health problem. A study of children from 1971 to 2001 found that not only have more children become overweight in the last three decades, but overweight children have been getting heavier (Jolliffe, 2004). In fact, the severity of child overweight has been increasing faster than the prevalence of child overweight regardless of age, sex, race, and ethnicity. These findings could have important health implications since it is likely that very overweight children, like adults, are more likely to suffer health problems than the less overweight.

The Role of Parents

FANRP has sponsored a number of studies that examine the important role that parents play in childhood obesity.

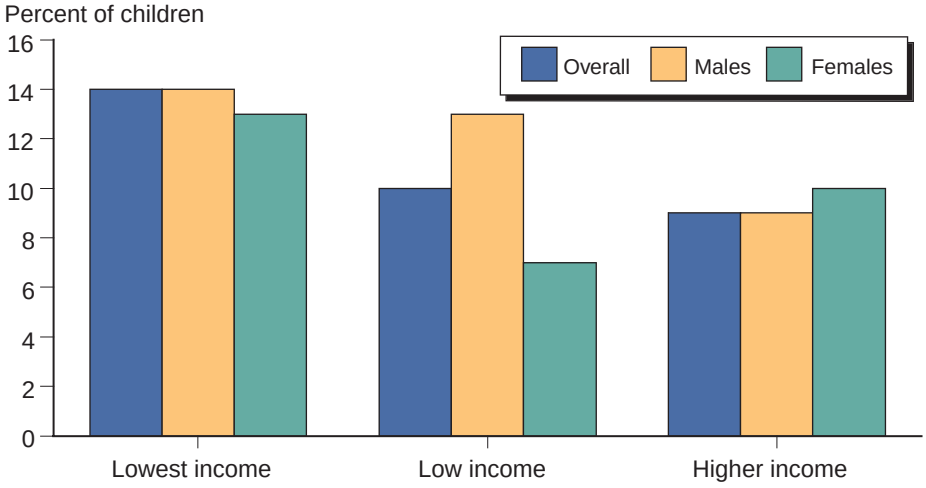
Maternal obesity increases child's risk of obesity

In a study of children participating in the Ohio WIC program, Whitaker (2004) found that obesity during the preschool years was strongly associated with the mother's Body Mass Index (BMI) in early pregnancy. By 4 years of age, obesity was present in almost 1 in 4 of the children who were born to obese mothers compared with less than 1 in 10 of children who were born to normal-weight mothers (fig. 9-2). Even after controlling for birth weight, newborns whose mothers were obese in early pregnancy were more than twice as likely to be obese

Figure 9-1

Prevalence of overweight among school-age children, age adjusted

Lowest income children are more likely to be overweight



Source: Lin, 2005.

preschoolers. Identifying those infants at birth who are at high risk of developing childhood obesity provides an important opportunity to begin early intervention and prevention efforts before the onset of the disease.

Breastfeeding protects children against later obesity only when breastfeeding is sustained

In one of the largest studies to examine the link between breastfeeding and obesity among low-income children, Bogen et al. (2004) found that the effect of breastfeeding depended on four factors—duration of breastfeeding, concurrent formula feeding, child's race, and mother's smoking during pregnancy. Breastfeeding was associated with a reduced risk of obesity at age 4 among the children of white women who did not smoke during pregnancy. Even in this subgroup of children, breastfeeding was associated with a reduced risk of obesity only when breastfeeding continued for at least 16 weeks without concurrent formula or at least 26 weeks with formula. The protection was stronger when breastfeeding occurred without bottle feeding of infant formula.

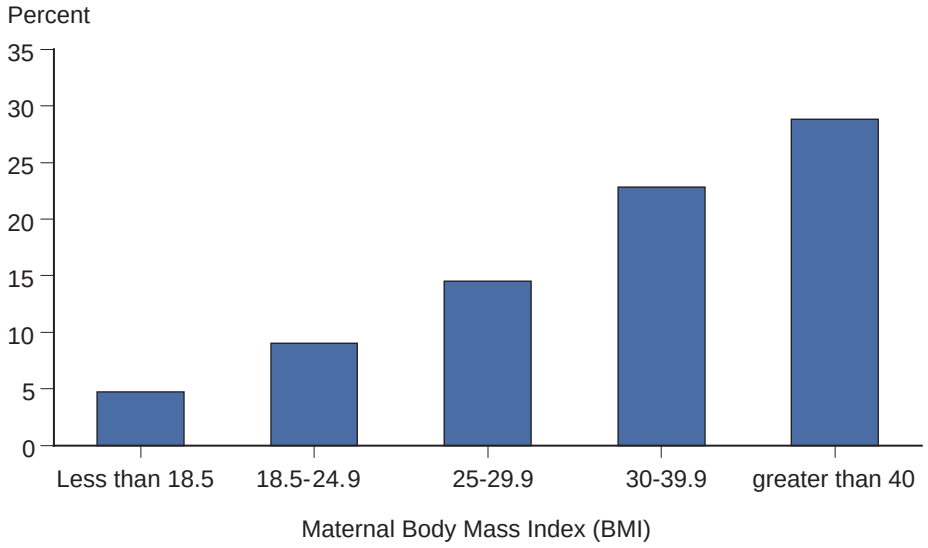
Parental nutrition knowledge is associated with lower prevalence of overweight children

Variyam (2001) examined the association between nutrition knowledge and attitudes of parents and the prevalence of overweight among their children. He found that greater parental nutrition knowledge and use of nutrition labels were associated with lower prevalence of overweight children—a result that provides support for the role of national nutrition education programs. Compared with parents who failed to recognize their own overweight status, parents who correctly perceived themselves as being overweight were less likely to have children who were overweight (fig. 9-3). This finding suggests that a parent's readiness to make changes in their child's diet and activity may be related to their perception of their own weight status.

Figure 9-2

Percentage of obese 4-year-old WIC children by maternal BMI

Child obesity rates increased with increasing mother's BMI



Source: Whitaker, 2004.

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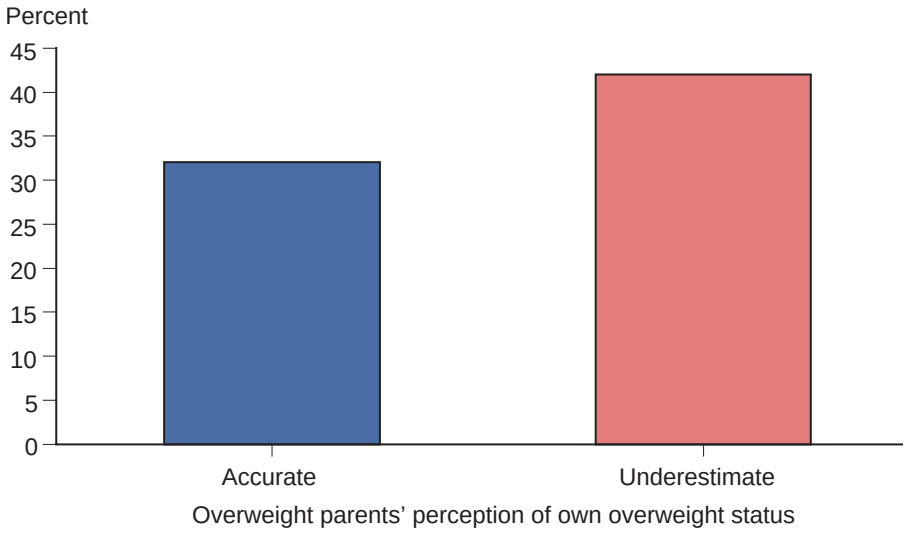
Parents' time with children affects obesity outcomes

McIntosh et al. (2006) found that the amount of time parents spent with children significantly affected children's energy and fat intake and obesity-related outcomes. Mothers' and fathers' time spent with their children had different impacts. For example, the more time mothers spent with their children, the lower the children's BMI, while the more time fathers spent with their children, the higher the children's BMI. And, the more time both fathers and mothers spent with their children, the higher was their children's fat intake (as a percentage of energy). In general, mothers tended to have a greater effect on their children's dietary intake than fathers did. And, as might be expected, both mothers' and

Figure 9-3

Percent of children overweight by parental perception of own overweight status

Children of parents who underestimate their own overweight status have a greater likelihood of being overweight



Source: Variyam, 2001.

fathers' impacts on their children's nutrient intakes and outcomes declined with the age of the child.

Television watching and frequency of family meals are predictive of overweight onset and persistence

Gable et al. (2007) found that children who ate fewer meals with their families and watched more television during kindergarten and first grade were more likely to be overweight in the third grade. Similarly, children who ate fewer meals with their families and watched more television from kindergarten through the third grade, and who lived in neighborhoods perceived by parents as less safe for outdoor play were more likely to be persistently overweight.

Food Consumption and Food Prices

Several FANRP studies have highlighted the linkages between obesity and the consumption and prices of certain types of food and beverages.

Children's food choices are associated with overweight

A study of school-age children found that consumption of low-fat milk, other dairy products, fruits, and legumes was negatively associated with the probabilities of being at risk for overweight and obesity (Boumtje et al., 2005). In contrast, results suggested that increasing consumption of soft drinks, fat, oils, and sodium are the major dietary factors positively associated with childhood overweight.

Fruit and vegetable prices are associated with changes in elementary schoolchildren's BMI

Sturm and Datar (2005) found that children who lived in metropolitan areas where fruits and vegetables were relatively expensive experienced significantly greater increase in BMI than children—matched for otherwise-similar characteristics and standard of living—who lived where fruits and vegetables were cheaper. On the other hand, they found no significant relationship between children's excess weight gain and dairy or fast-food prices. Food outlet density at the neighborhood level was also insignificant, possibly because availability is not an issue in metropolitan areas.

Consequences of Overweight

Change in overweight status is associated with adverse school outcomes

Datar and Sturm (2006) conducted one of the first studies to examine the link between change in overweight status and elementary school outcomes. Among girls, moving from not-overweight to overweight between kindergarten entry and end of third grade was associated with reductions for math and reading standardized test scores, teacher ratings of social-behavioral outcomes, and approaches to learning. However, the link between change in overweight status and adverse school outcomes was mostly absent among boys. Even though a significant association was found between increase in Body Mass Index and worse school outcomes among girls, the magnitude of this association was smaller than that of family characteristics such as mother's education and family income.

Relationship of Food Assistance and Nutrition Programs to Obesity

The major food assistance and nutrition programs were established when hunger and nutrient deficiencies were the Nation's principal nutritional concerns. However, as the major nutrition problems facing the U.S.

population have shifted from under- to overconsumption, some have questioned whether food and nutrition assistance programs contribute to obesity by providing too much food and encouraging participants to either eat too much or eat the wrong types of food. This is an especially important question since a large percentage of the Nation's children participate in at least one of USDA's food assistance programs.

No evidence that participation in food and nutrition assistance programs contributes to overweight among children

A study by Hofferth and Curtin (2005) examined the extent to which three of the food assistance programs contributed to childhood overweight. The study found that participation in the Food Stamp Program was not associated with an increased chance of childhood overweight. Furthermore, within food stamp families, children in families receiving more food stamp benefits were neither more nor less likely than children in families who receive less benefits to be overweight. There was also no evidence that participation in the National School Lunch Program or the School Breakfast Program contributed to overweight among children.

Children's participation in WIC does not lead to increased caloric consumption

Oliveira and Chandran (2005) examined the consumption patterns of WIC children and three different comparison groups: eligible nonparticipating children living in non-WIC households, eligible nonparticipating children living in WIC households, and children living in households whose income was too high to be eligible for WIC. Participation in WIC was associated with a significant increase in calories consumed from all WIC-allowed foods combined (i.e., low-sugar cereal, 100-percent fruit and/or vegetable juice, eggs, milk, cheese, peanut butter, and dried peas/beans). However, WIC participants consumed significantly fewer calories from non-WIC foods than the two groups of eligible nonparticipants. Although WIC participants consumed more total calories than children not eligible to participate because their household income was too high, there was no evidence that participation in WIC contributes to increased caloric consumption among children eligible to participate. The results suggest that WIC foods replace non-WIC foods in the diets of children participating in WIC rather than add to their food consumption.

Children consume more soft drinks and less milk on weekends

Research by Yen and Lin (2002) suggest that the displacement of milk by soft drinks as a child becomes older is a factor that contributes to children being overweight. On average, for each 1-ounce reduction in milk consumption, a child consumes 4.2 ounces of soft drinks, resulting in a net gain of 31 calories per ounce of milk displaced. The study also found that children consume more soft drinks and less milk during weekends than weekdays—a result that may be due in part to children drinking milk provided through the National School Lunch Program on weekdays.

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