

Obesity Prevention in Children from Birth to Age 5

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ABSTRACT: Once obesity appears, it is difficult to reverse. Overweight infants/preschoolers tend to become overweight school children. Who frequently become overweight adolescents and, in turn, overweight adults. Thus it is imperative to prevent obesity as early in life as possible. Unfortunately, obesity diagnosis is difficult in young children, and both pediatricians and parents are reluctant to “label” an infant or young child as obese. Lack of diagnosis compounds the difficulty preventing obesity early in life. There are few obesity prevention interventions for infants: breastfeeding, no solid food supplementation until age 6 months, promoting active play and sleep. Obesity interventions for preschoolers include promoting a varied diet full of fruits and vegetables, restricting television and encouraging physical activity. Diet and not physical activity appears to be the primary determinant of obesity in infants; however, as the child grows, promotion of both healthy diet and physical activity becomes an important obesity prevention tool.

KEYWORDS: pediatric obesity, nutrition, physical activity, obesity prevention

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Introduction

Obesity has become a serious population health issue with childhood obesity rates rising all over the globe. Obesity is both a disease of malnutrition stemming from unhealthy diet quality and a disease of abnormal body composition (fat to muscle ratios) affected by lack of physical activity. Obesity prevention is becoming critically important in primary care. However, “the how to” prevent obesity is extremely problematic. The earlier a prevention effort begins, the better chance it has to be effective. But designing health promotion programs to prevent obesity in very young children is difficult. Sparse evidence exists regarding timing and types of interventions that can be used to moderate development of obesity in early life. The article explains what is known and the most promising ways to prevent obesity from birth to age 5.

Obesity Trends in Early Life

Accumulating evidence reveals that obesity begins very early in life, possibly in infancy. Obesity in infants under 2 years has

traditionally been disregarded¹ because of conventional wisdom that there is no such thing as a “fat baby.”² Infant weight has not been considered a sign of obesity because high weight gain has been considered necessary for optimal brain development;³ the fattest infants were believed to have the best survival potential.⁴ Thus, defining obesity in infants and young children can be difficult. The clinical definition of obesity is if the infant’s or child’s weight/length⁵ or Body Mass Index (BMI)⁶ (depending upon growth charts used) is more than the 95th percentile, he or she is obese and if it is between the 85th and 94th percentiles, he or she is overweight. Both weight/length and BMI growth charts provide similar obesity classifications.⁷

Once obesity appears, it tends to remain throughout an individual’s life.^{1,8} Overweight infants tend to become overweight school children.⁹ Overweight school children frequently become overweight adolescents and, in turn, overweight adults.^{10,11} It is difficult to reverse obesity once it has become established; hence, prevention at the earliest



age possible appears to be the best way to stop the obesity epidemic.¹² The cost of obesity in the US is more than \$195 billion annually in ill health and lost productivity.¹³ When obesity develops in early life, costs increase dramatically.^{14,15} Early development of obesity leads to longer duration and impact of comorbidities.¹⁴ Comorbid consequences of childhood obesity such as diabetes, high blood pressure, heart disease, and stroke in the US cost \$14 billion annually.¹⁶ Obese children cost the healthcare system approximately three times more than non-obese children.¹⁶ Thus, early prevention leads toward better quality of life, improved population health, and lower expenditure on healthcare. Despite evidence supporting the benefits of early prevention, there is sparse research regarding obesity development and prevention in early life; most pediatric obesity research has been performed with older school-aged children and adolescents.

Increased BMI in the first year appears to be an early warning sign of obesity development at the school age.^{9,17–19} First-year weight gain in low-birth-weight infants also predicted the development of obesity by 8 years of age.²⁰ Appropriate weight-for-gestational age children who displayed rapid weight gain in infancy had a greater risk of being overweight or obese during childhood than children who did not experience rapid weight gain post-birth.²¹ Rapid and consistently sequential increases in weight, height, and BMI patterns from 6 months to 1 year were associated with the development of later obesity.¹⁹ Children who have rapid weight gain in infancy have growth trajectories that diverge from normal growth around 6 months of age. By 7 years, these children have 6.2 times higher BMIs (95% CI), 2.4 times greater fat mass ($P = 0.0002$), and 16.5 times higher overweight/obese weight statuses ($P = 0.0002$) than children who did not have rapid infancy weight gain.²²

There is a 30-year trend of increasing obesity in young children. In 2000, only 3.6% of toddlers (age 2–5 years) were obese²³ but by 2012, 8.4% of toddlers were obese.²⁴ Additionally, in 2012, 12.4% of kindergarteners were obese and 14.9% of them were overweight,²⁵ and 20.8% of adolescents were obese and 17.0% of them were overweight.²⁵ Most children (43%), their parents (40%), and their pediatricians (33%) all underestimated young children's degree of overweight when using either a word scale or a picture scale.²⁶ The providers are reluctant to intervene even if the child is clearly overweight using standard growth charts as long as the child is "eating well" and does not exhibit any significant disease-related comorbidities.^{27,28}

Research has demonstrated the need to educate providers to recognize obesity and overweight so that they can provide appropriate counseling.²⁶ The providers documented an obesity diagnosis in only 18% of 2–18-year-old children with BMIs greater than 95th percentile (the cut off for obesity) during well-child office visits.²⁹ An obesity diagnosis was almost three times (2.87×) more likely for non-White than

White children.²⁹ Children under age 5 years and those with a BMI of 85th–94th percentiles (the cut off for overweight) were the least likely to receive any diagnosis and/or intervention for being overweight.³⁰ At present, accurate documentation of obesity diagnoses in children is suboptimal among healthcare professionals.^{29,30} Obesity interventions are unlikely without accurate obesity diagnosis.

Other research suggests that parents do not consider their children as overweight if they were active and had a good appetite.^{31,32} Parents of overweight children are much more likely to underestimate their child's weight status than parents of normal weight children; >50% of the overweight children's parents underestimated their child's weight status compared to 24% of the normal weight children's parents.^{33,34} Parental underestimation of their child's weight status was strongly linked with the absence of their pediatrician diagnosing overweight/obesity in the child.³⁴ In preschool age children, parents considered normal weight status as underweight and overweight status as normal weight.³⁵ Thus, parental perceptions of normal weight status in preschool age children are not accurate.³⁵ Additionally, the parents of overweight children who underestimated their child's weight status were much less likely to believe that their child was at risk of health problems than those who did not.³³ Many urban non-White parents felt that "a little extra weight" was healthy for their child.³⁶ As a child ages, parents are better able to recognize overweight/obesity, and by adolescence, most parents (>68%) recognize that their adolescent is overweight.³⁷ Most prevention interventions for overweight/obese children involve the parent; thus, if the parent does not believe their child is overweight, they may not be supportive of the intervention.³³

Process Control to Predict and Prevent Obesity in Early Life

Because the early onset of obesity predicts later life obesity,^{1,38–40} the current research is focused on early diagnosis,^{7,18,41–43} and determines parental/infancy factors that predict later obesity.^{40,44,45} Presently, the best way to diagnose and predict early life obesity is to use a combination of World Health Organization (WHO) BMI growth charts,⁶ Centers for Disease Control and Prevention (CDC) growth charts,⁴⁶ and an Obesity Risk Score scale.^{45,47} But there are limitations in using tools that require complex calculations during a short well-child visit. Using the CDC and WHO charts is not optimal because of the following. (1) There are two CDC growth charts for infants, one is length-vs.-age and the other weight-vs.-age.⁴⁶ It is difficult to obtain a clear picture of infant growth using the two charts because there is no one value that is used to identify an obesity growth pattern. (2) The WHO charts are based on BMI, but BMI is an adult, not infant, body density/dimension index.⁴⁸ WHO BMI charts make assumptions about bone density, fat density, and hydration that do not pertain to infants.⁴⁹ The use of BMI can lead to variability and



incorrect estimations of obesity in infants.⁵⁰ BMI in infants has low sensitivity because a high BMI can mean either the infant is obese or is tall.⁵¹ WHO BMI charts are also based on infant's breastfed for the first year and are criticized as not representative of more economically developed countries' children who are predominately formula fed.⁵² (3) Obesity Risk Scores require anthropometric and other measures not typically available in infants' medical records (ie parental weights and/or BMIs, family SES),^{44,45,47} which make diagnosis and predicting risk of infant obesity onset impossible. To overcome these limitations, our work^{9,18,53} and others' work^{7,41-43} have examined other metrics for diagnosing obesity from 0 to 5 years, such as process control charts, abdominal circumference, crossing of >3 BMI value lines, and rapid weight changes.

Our team developed and pilot tested a process control tool to diagnose and predict obesity up to school age (5 years) in US infants.⁵⁴ Our process control charts represent children's growth as a longitudinal, continuous process that has decision limits calculated by modeling growth change and predicting future growth outcomes.⁵⁵ Lower and upper decision limits delineate whether growth is in or out of control. The lower limit separates the "in control" normal weight growth from "out of control" overweight/obese/severely obese growth.⁵⁴ This work contributes to meeting the need for routine growth assessment to identify infants with growth patterns that lead to obesity.⁵⁶ Currently, however, the WHO BMI charts⁶ are the best growth standard, but inappropriate for many populations. Presently, the process control tool is the only instrument to concurrently diagnose infant obesity and predict later obesity that also incorporates risk factors based on data from only healthy US children.^{9,54} The Institute of Medicine recommends that regular growth monitoring and consideration of obesity risk during infancy be undertaken, and they call for novel tools to facilitate delivery of the best obesity prevention treatments at the lowest cost.^{57,58} While the process control tool shows considerable promise, there is a critical need to continue to develop tools to diagnose and predict obesity at young ages.

Obesity Prevention Measures in Early Life

Infancy (birth–2 years). Pediatric well-child visits are the obvious choice for diagnosis, tracking, and addressing early life development of obesity. There is frequent contact (at least 10 visits) between birth and 2 years of age; however, development of obesity is very rarely addressed.⁵⁹ Infant obesity detection can promote development of early treatments to minimize the occurrence and duration of infant and childhood obesity. Obesity in infants is a controversial topic; however, research supports a link between rapid early infant growth and later obesity.⁶⁰⁻⁶³

Feeding. There are concerns with diagnosing obesity in infancy because of the unintended consequence of a mother's restricting food intake during infancy; restriction of fat

intake can adversely impact brain development.⁶⁴ In the first 2–4 months of post-birth, mothers intensely scrutinize their infant's satisfaction with the amount of feeding and often offer additional nutrition whenever an infant cries.⁶⁵ The mother is learning to distinguish hunger cues from other cues, and if she misreads these cues, she could be potentially overfeeding her infant. Infant feeding methods such as breast vs. bottle feeding,^{66,67} breastfeeding duration,⁶⁸⁻⁷⁰ liquid diet weaning age,^{71,72} and introduction of solid foods^{11,73} affect obesity risk. Two different meta-analyses found breastfeeding offers a protective effect to reduce the infants' later life obesity risk (by as much as 15%), but the causality is still not understood.^{44,74} Observational research shows that breastfeeding, relative to formula feeding, reduces obesity risk at the school age by about 20% even after adjustment for biological and sociodemographic confounders.⁷⁵ A multi-country study showed that exclusive breastfeeding for 4–6 months reduces the risk of obesity.⁷⁶ However, a large multi-site European study determined the opposite that breastfeeding did not significantly reduce obesity risk.⁷⁸ Many studies report that breastfeeding decreases childhood obesity risk,^{78,79} but a study of >7,000 children found breastfeeding offered no protection.⁷⁷ Thus, conflicting evidences concerning the obesity prevention effects of breast vs. bottle feeding provide no clear guidance for parents and health care professionals as an action point in obesity prevention.

Despite the lack of conclusive protection against obesity, breast milk has the best formula of ingredients to meet infant growth needs throughout the first 2 years of life. Research shows that no infant formula is without some health risks; however, modern soy-protein-based formulas are the best alternative to breast milk.⁸⁰ Calorie consumption in infancy (3-, 6-, 9- months) is both related to current body size and predicts future (2-year) body size, thus it is critical to monitor infant feeding quantity.⁸¹ Conflicting results about protective effects of breastfeeding compared to formula feeding may not take into consideration the effect modification by place.⁸² Breastfeeding practices and its association with obesity potentially differ across place. Exclusive breastfeeding for 2 years is a rarity in the United States. Studies in developing countries showed that higher BMI was more related to greater lean body mass than fat mass. It appears that increased length at 2 years of age was positively associated with height, weight, and fat-free mass, and was only weakly associated with fat mass. The protective associations between breastfeeding and obesity may differ in developing countries compared to developed countries because many studies in developed countries used formula feeding as a control.⁸³

Early introduction (ie before 4 months) of solid foods has been associated with school age obesity in formula-fed infants.^{72,84} Solid food introduction is very common in low-income populations with ~33% of formula-fed infants receiving solids by 7–10 days that increases to 77% by 8 weeks and 93% by 16 weeks of age.⁸⁵ Exclusively breastfed infants



were the least likely to receive solid food supplementation.⁸⁵ Parental health literacy effects can create an obesogenic infant feeding environment; parents with low health literacy were significantly more likely to formula feed their children, feed as soon as the infant cried, and force the infant to consume all the bottle and early solid food supplement.⁶² Since health literacy can be increased by education, a childhood obesity prevention strategy might be to increase parent's health literacy so that they do not create obesogenic conditions for their child. Higher caloric consumption (ie carbohydrate) during solid food supplementation is associated with higher BMI in childhood.⁸⁶ In addition, better adherence to dietary guidelines during weaning is associated with a higher lean mass and less obesity later in childhood. Solid foods should not be introduced until after 6 months of age. Semi-solid cereals and then fruits, vegetables, and meats should be introduced from 6 to 8 months. From 8–12 months varied small, solid foods should be introduced. After the 12th month, family foods can be integrated into the infant's diet.^{11,46,73,87} High intakes of energy and protein, particularly dairy protein, in infancy are associated with an increase in BMI and body fatness in later childhood.⁸⁶ Thus, the amount and type of calories consumed needs to be monitored early in life because inappropriate nutrition/overfeeding can contribute to the development of obesity and cannot be discounted when looking at early life-course obesity prevention.

Sleep and activity. Infant sleep throughout the night and naps throughout the day contribute to fat storage. Because newborns have small stomachs, they sleep for 2–4 hours and then awaken for feedings every 2–4 hours.⁸⁸ Newborns sleep 17–20 hours out of 24. At 1 month, infants need 16 hours of sleep per day and have a morning, afternoon, and evening nap in addition to night time sleep. One-month-old infants may sleep up to 5 hours at a stretch at night but commonly awaken every 4 hours for feeding and sleep 16–17 hours per day. At 6–8 weeks of age, infants start having more sleep at night than during the day, and at 3 months, infants sleep 15 hours out of 24 and 2/3 of their sleep is at night after two to three naps during the daytime. At 4 months, infants still have two to three naps during the day and are able to sleep 6–7 hours at a time after a late night (11:00 p.m.) feeding, for a total of 13–15 hours of sleep per day. By the age of 5 months, infants sleep 8–12 hours per day and are increasingly able to sleep “through the night” for a 7–8-hour stretch, but mostly continue to wake up for a feeding at night, sometimes well into the second year of life.⁸⁹ When not asleep, the infant burns calories more efficiently and faster; hence, energy to fuel activity is available. Parents can create appropriate sleep environments, little distractions, low noise levels, and low light to encourage nighttime sleep,⁹⁰ which will promote better active periods during the day.

Parental stimulation of their infant during wake periods with active play and simple games will encourage movement.^{91,92} Parents can position their infant to encourage muscle

development and motor control by placing the infant in prone and standing positions rather than in sitting and supine positions.^{91,93} Active infant stimulation not only reduces the risk of obesity but also enhances brain development and builds muscle coordination. Infants with higher television exposure were perceived as being more active or fussier by their mothers, leading to overfeeding as a way to compensate for the “fussiness.”⁹⁴ Parental television viewing during infant feedings was also related to higher rates of overfeeding and infant obesity.⁶² Time in the prone position while awake (ie “tummy time”) helps an infant develop musculature and increases active play;⁹⁵ based on the existing recommendations, inadequate tummy time is <30 minutes per day.⁶² Parents with low health literacy reported less daily tummy time.⁶² Tummy time has not been well studied; thus, additional studies are needed to explore tummy time link to reducing obesity.⁶² As an infant begins to walk, physical activity becomes more important in preventing obesity. New evidence shows that vigorous exercise stimulates stem cells to produce more lean muscle.^{96–98} Thus, physical activity by stimulating the development of lean tissue rather than fat tissue could be another way to prevent obesity.⁹⁹

Excessive television viewing time (>2 hours per day) is associated with impaired childhood development and childhood obesity.^{100,101} Television viewing is related to lower physical activity and lower bone mass accrual in toddlers.¹⁰² Television exposure has been documented in infants as young as 2 months of age in parents with low health literacy.⁶² Understanding the relationship between television exposure, and infant temperament and obesity is needed, and television viewing time should be limited.¹⁰³ Interventional studies with infant's parents appeared to be successful in decreasing sweetened beverage consumption and television viewing but had no effect on body mass index and weight gain in the infants.^{103,104} However, new research suggests that many parents believe infants are naturally active; thus, the parents do not understand and are not receptive to messages to increase infant physical activity through active play.¹⁰³

Preschoolers (2–5 years). Interventions targeting childhood obesity must aim to reduce parents' underestimation of their child's weight status and increase their awareness of the effects of overweight/obesity on their children's health and quality of life.¹⁰⁵

Feeding. Eating is a cultural and social event not just a necessity of life that balances energy intake with energy expenditures. The feeding relationship is complex between the parent and child; effective feeding provides the groundwork for growth patterns and healthy eating behaviors.^{28,106} Parents are role model for food preferences; hence, it stands to reason that children's food preferences are positively correlated to their parent's food preferences.¹⁰⁷ Preschoolers, whose mothers skipped breakfast and did not eat fruits and vegetables, had the highest incidence of poor nutritional status.¹⁰⁸ Preschoolers' repeated exposure to food advertisements for particular types of foods and ease of access to these foods in the home



may cultivate preferences for energy-dense, nutrient-poor foods.^{109,110} If high-calorie, non-nutritious foods (junk foods) are the only foods available in the home, the child develops a preference for that type of food.¹¹¹ Many studies have shown that to implement a lifestyle such as eating a healthy diet, the whole family needs to be involved for food consumption patterns to shift.¹⁰⁶

Thirty-year trends (1970–2000) in preschoolers' food choices correspond with the national food supply and are influenced by taste, television, and cultural norms.¹¹¹ However, on any given day, preschoolers did not eat a balanced diet; >90% drank milk and ate some type of protein, but only 69.8% ate any vegetables (~60% of the vegetables consumed were potatoes) and 75.6% ate fruit or fruit juice (fruit juice was the predominate fruit).¹¹² Iceberg lettuce, white potatoes, and canned tomato products accounted for 43% of the fruits and vegetables consumed in an average diet; the nutritional content is limited and does not provide adequate dietary intake of vitamin and minerals.¹¹³ Sweetened drink consumption was directly linked to increasing obesity in pre-school children.¹¹⁴ As the child begins to eat solid foods, studies have shown that high protein intakes (from milk and other proteins) have been associated with a higher risk for later life obesity.⁷⁵ Interestingly, high fat intake was not shown to be associated with later life obesity but fat intake did affect blood lipoproteins, blood pressure, and neurodevelopmental performance.⁷⁵ Almost 50% of preschoolers are enrolled in childcare; but there is little research assessing the nutritional quality of foods in child care settings.¹¹⁵ Studies suggest that children who attend child care may have an increased risk of developing obesity; more than 12.2 million of US children under age 5 years attend some form of child care.¹¹⁶

Activity. Children of obese parents were less physically active than children of normal weight parents.¹¹⁷ National Association for Sport and Physical Education recommendation for preschoolers is that they engage in at least 60 minutes a day of unstructured physical activity and 30–60 minutes of structured activity and not be sedentary for more than 60 minutes at a time except when sleeping.¹¹⁸ Thus, a child needs at least 2 hours of exercise a day, half in structured physical activity and the remainder in unstructured, free-play settings.¹¹⁸ Physical activity is protective against obesity in preschoolers.¹¹⁹ Sedentary behavior, particularly television viewing, was found to be obesogenic in preschoolers; however, definitive evidences on the dose–response between physical activity, sedentary behavior, and obesity have not been elucidated.^{117,119} In addition, the more a child engaged in outside activity, the higher their overall physical activity.¹¹⁷ Studies have shown that only about half of preschoolers have adequate amounts of active play during the week, and 65% meet the guidelines on the weekends.¹²⁰ Active play (jumping, running, and organized games) and reduced sedentary behavior during preschool years is important to reduce the risk for later life obesity and cardiovascular diseases.¹²⁰ Vigorous physical activity creates a high-energy metabolism that has

relatively high levels of both energy intake and expenditure, which balance each other.^{99,121} Thus, lean children consume more calories than children with higher fat mass to balance their energy expenditures during physical activity.¹²¹

Data are mixed on the effects of parental education on children's active play. Some studies say higher parental education is correlated with more active play,¹²⁰ whereas the others state that there is no relationship.¹²² However, all studies have shown that preschoolers with higher education had less electronic media/screen time than children from lower education families.^{120,122–125} Boys were engaged in more active outdoor physical activity compared to those of girls.¹²² White children were more likely to engage in outdoor physical activity play than non-White children.¹²²

A growing literature focuses on obesogenic characteristics of neighborhoods. Environmental insult at the neighborhood level has been implicated in early childhood obesity, particularly through maternal and early life exposures to environmental estrogens.¹²⁶ Unsafe neighborhoods, poor housing conditions, and lack of sidewalks are all associated with higher rates of obesity in children, but not specifically young children,¹²⁷ while environments that promote walking are associated with lower rates of childhood obesity among school age children.¹²⁸ Children living in neighborhoods with the high levels of neighborhood greenness (parks, large grassy area, large lot size) were more likely to engage in active outdoor physical activity than children in more urban environments without adequate greenspace.¹²² Parents' perception of the neighborhood environment affected young children's physical activity, but the role of the neighborhood needs further study.¹²⁹ Thus, preschoolers' exposure to greener neighborhoods encourages them to spend more time outdoors in play.¹²² Other studies found that favorable neighborhood social conditions were associated with lower childhood obesity through increased outdoor physical activity ie playing actively with others among fifth-grade children.¹²⁹ No research has tested these relationships in younger children. Attendance at childcare centers was also found to directly affect children's active play amounts. Variations among childcare centers were strongly associated with amounts of active play in preschoolers.¹³⁰ Children were found to have higher levels of active play if the childcare center had more than one piece of portable playground equipment, more wide open spaces, and a larger playground size.¹³⁰

Other Factors to Consider

Low health literacy in parents has also been associated with childhood obesity;⁶² interventions that increase parental health literacy may also reduce a child's development of obesity.⁶² Adults with low health literacy have poorer understanding of preventive care information and lower access to services, and their children have poorer health.¹³¹ There is a link between low health literacy with consumption of unhealthy foods, non-compliance with the US Dietary Guidelines,^{132–134}



and playing less with their infants (tummy time).⁶² Higher health literacy of parents has been shown to increase effective communication with their child's providers.¹³¹ Parents with low health literacy were unable to understand nutrition, medication, and infant formula labels, simple health brochures and flyers, and basic child-safety recommendations.⁶⁰ Identification of low levels of health literacy is important for effective communication between providers and parents when delivering health promotion/prevention information (ie healthy food choices, appropriate physical activities, etc.).^{132,135} Wallace et al developed a useful health literacy quick screening instrument (three questions) that can indicate the level of health literacy.⁶¹ Kumar et al developed a 10-question screening instrument that specifically assesses parental health literacy.⁶⁰ Either of the screening instruments could be used in a busy well-child clinic. Once health literacy is determined, a provider can provide information that is tailored to the parents' health literacy level. A program to improve nutrition in low health literacy individuals was successful by (1) providing low literacy materials (ie fourth-grade reading level), (2) focusing on a few selected key messages (ie 1–3), and (3) making the programs easily accessible (ie flexible delivery, phone, mail, in person).¹³⁶ Another program showed that for nutritional guidance to be followed, all communication materials (oral and written) needed to be tailored toward the literacy level, dietary habits, and cultural background of the parent.¹³⁷ Research shows that child health programs are most effective if the provider tailors his or her communication skills to the parents' health literacy level.⁶²

Conclusions

“To return to the average weights of the 1970s, we would need to reverse the increased food intake of about 350 calories a day for children. Alternatively, we could achieve similar results by increasing physical activity by about 150 minutes a day.”¹³⁸ Realistically, although a combination of both is needed, research shows that energy intake from diet and not energy expenditure because of physical activity was the primary determinant of obesity status in very young children.⁸¹ However as the child ages, a balance between stimulating exercise and eating appropriately needs to be found for each infant to prevent obesity occurrence.^{138–140}

Providers can advise parents to closely monitor their infant's feeding in infancy and not routinely offer food as a pacifier. In addition, guidelines for solid food introduction can be reviewed; hence, parents understand the importance of waiting until after 6 months of age to offer solid foods. However, parents need to be educated on how to engage their infants in active play, and the appropriate sleep and wake positioning should be reviewed. Since a significant proportion of children spend their day in some type of child care, child care providers need to likewise engage infants in active play and understand infant positioning. As the child ages, a wide variety of food should be offered with parents modeling healthy eating in the home. Junk food and sugar-sweetened beverages should be

severely restricted or not offered at all in preschoolers' diets. Parents can encourage their preschoolers to actively play outdoors and should select child care centers that offer at least 1 hour of outdoor play time each day. Limitations on electronic media screen time for all children needs to be promoted. Prevention of obesity will require both the provider and parent to actively engage in obesity prevention beginning at birth.

Author Contributions

LSG conceived the concepts, wrote the first draft of the manuscript, made critical revisions, reviewed and approved of the final manuscript.

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