

Mini Review

Infant Feeding Practices and Childcare use in Infancy

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***Corresponding author:** Juhee Kim, Department of Public Health & Center for Health Disparities, East Carolina University, Greenville, USA**Received:** January 18, 2015; **Accepted:** February 27, 2015; **Published:** March 25, 2015**Abstract**

Infants are not immune from the epidemic of obesity. Given the persistence of obesity through later years and the absence of effective treatment, it is important to intervene as early in age as possible. The complex and chronic nature of obesity is widely recognized in the search for driving forces behind emerging trends in infants and toddlers. Currently, however, we have limited information about modifiable determinants and contextual influences, other than the protective effects of breastfeeding and the negative effects of early introduction of solids on the risk of obesity during infancy. Given the increased number of working mothers, infant childcare arrangements are prevalent and raise questions about their potential effect on early childhood growth and development. Childcare is becoming an important point of intervention where children first interact with others than family members and develop diet and play behaviors in social contexts. Studies on 'infant' (rather than pre-school) childcare are scarce, and importantly, previous child development studies do not account for the increase in numbers of infants being cared for outside the home. Recent studies indicate that infant feeding practices at childcare settings are not meeting the current nutritional recommendations. Feeding practices such as breastfeeding and early introduction of solids have been raised as possible predictors for risk of obesity. Nonetheless, there has been little research on the potential impact of childcare on infant feeding and subsequent development of obesity, especially during the first few years of life. Hence, this review aims to summarize the studies examining infant feeding practices at childcare setting and related childcare practices.

Keywords: Infant feeding; Childcare; Obesity; Public health**Introduction**

The focus of infant nutrition has been breastfeeding and relatively little attention given to early introduction of solids, infant food consumption, and their influence on weight gain. With the increase in maternal employment and use of childcare, it is imperative to consider 'childcare providers' as a second source of mealtime gatekeepers. The majority of childcare studies on children's health outcomes have been based upon exposure to center-based care. Research on relative care and home-based care is scarce. Public health efforts to develop education and resources tailored to relative childcare settings may yield greater improvements in infant feeding and obesity prevention. Furthermore, results of this study may provide a justification for local and federal childcare professionals to develop or refine child feeding regulations and policies that meet the recommendations. This study is ultimately relevant to setting specific approaches to prevent pediatric obesity that can reach large numbers of young children.

Importance of obesity and weight gain during infancy

In the U.S. the obesity epidemic has reached children as young as infants and toddlers [1]. An estimated 10% of children less than 2 years of age have been classified as having high weight for length (WFL). In 2010, the World Health Organization approximated that 42 million children were classified as overweight under the age of five, with an estimated 35 million of these children in developing countries [2]. In a landmark study over a 22-year period that documented the prevalence and secular increase in obesity for infants and toddlers from primarily middle-income families, [3] the increase in obesity

was dramatic; 9% of infants between 6-12 months and 12% of toddlers between 12-24 months were obese. Childhood obesity has both short and long-term health consequences and social and economic disadvantages. Overweight and obese during childhood is associated with comorbidities, such as asthma, hyperlipidemia, hypertension, and type II diabetes [4, 5] as well as with higher adulthood morbidity and mortality [6]. In addition, being obesity during childhood is negatively related to the level of education and income as an adult [7].

Overwhelming and consistent data support the notion that early weight gain during infancy is a strong risk factor for later obesity in childhood as well as adulthood [8-10]. Considering the higher weight fluctuation typical of infancy, categorizing infants' weight status may have limited clinical implications. Nevertheless, accumulating evidence supports the importance of weight status and weight change during early infancy, even in the first week of life [11], as a risk factor for the development of later obesity. Review articles consistently document rapid weight gain during infancy as a risk factor for later obesity [8-10]. Rapid weight gain may be especially harmful to children born with low birth weight. Early accelerated weight gain among children with low birth weight was associated with higher BMI, especially central obesity in early childhood [12] and with higher adult systolic blood pressure [13]. Thus, it is important to achieve moderate weight gain for infants at both ends of the birth weight distribution during the first year of life. A prospective longitudinal study showed that rapid weight gain is more prevalent (25%) during infancy than in early childhood (9%), and the population attributable risk of rapid weight gain was 16% in infancy

and 12% in early childhood [14]. Another longitudinal study showed that children who were above 50th BMI percentile at ages of 2-5 years continued to increase in BMI percentile and were more likely to become obesity at age of 12 [15]. The risk was higher for those who were at the higher end of BMI percentiles than those of the lower end. This study underscored the importance of considering 'weight status' as a continuous spectrum from early in life, and suggests infancy and preschool years may constitute a key period for the development of obesity and its long-term health consequences.

Previous research shows that we need to consider 'weight status' as a continuous spectrum originating very early, and suggests infancy and preschool years may constitute a key period for the development of obesity and its long-term health consequences. However, studies on how to prevent obesity in infancy are scarce, and importantly, do not take into account the reality that infants are increasingly being taken care of outside the home, in childcare settings.

Early and more childcare among infants

Maternal employment in the US has more than doubled from 24% in 1970 to 57% in 2000 among mothers with children younger than 3 years old [16]. Correspondingly, the number of US childcare facilities has increased fourfold from 1977 to 2004 [17]. Previous studies on the effects of childcare on children's physical health have been confined to the study of infectious diseases. Children in daycare centers are at a higher risk of having several morbidities such as respiratory tract illness, ear infection, and enteric illness, than children cared for in homes [18]. The responsibility for feeding young children may have shifted from family members to child care providers because these children spend the majority of their day in child care settings. Because more children are in child care programs today than ever before, the potential for successfully addressing childhood obesity in the child care setting is great.

Kim and Peterson showed that at 9-11 months of age, more than half of US infants had entered regular non-parental child care; about 22% of infants began childcare before 3-months of age and care by relatives was more frequent than other types of child care using a nationally representative sample of infants [19]. Among those who entered childcare, about half of infants experienced full-time care [19].

Infancy childcare influences infant feeding practices

Recent studies started pay attention on the role of childcare and risk of obesity [20,21]. Kim's studies [19] showed that all childcare factors (age at initiation, type, and intensity) were associated with early introduction of solids (<4 months of age). Infants who were initiated with childcare before 3-months of age were 1.75 times (95% CI 1.37-2.23) more likely to have early introduction of solids than those in parental care. Infants with part-time child care were 1.32 times (95% CI 1.08-1.62) more likely to have an earlier introduction of solids compared with those of parental care. Infants who initiated childcare before 3-months of age had a 0.4 month shorter duration of breastfeeding than those in parental care. However, there was no difference in breastfeeding duration due to the type and intensity of the child care. Childcare initiation, type, and intensity were related to infant feeding practices and also were related to infant weight gain from birth to 9 months and obesity status at 9 months of age.

Shim et al further investigated the childcare influence on breastfeeding duration between WIC and non-WIC participants. Approximately 50% of US infants were enrolled in WIC, and 47% received child care on a regular basis. They reported that WIC participation and childcare use were independently associated with short breastfeeding duration [22]. In particular, WIC participants using relative care had a greater likelihood to discontinue breastfeeding before the age of 6 months, followed by WIC infants in center-based and non-relative care. An evaluation of feeding practices generally involves the study of breastfeeding duration and when complementary foods are introduced. These results indicate that 'risk factors' for obesity clearly exist for infants in childcare. Thus, it is needed to explore the determinants of infant feeding practices and risk of obesity among infants attending childcare.

Need of improvement of childcare quality and regulation

Although the effect sizes and long-term effects of childcare quality on developmental outcomes are debatable; studies consistently showed that children in high-quality care performed better in social and intellectual competences, while children in low-quality care fared worse, compared with those of children in parental care [23,24]. Only 16 States have or are in the process of developing Childcare Credentials for infant and toddler age groups according to the 2005-07 Childcare and Development Fund (CCDF) plans [25]. A study of childcare centers in four states found that 40 % serving infants and toddlers were rated as poor [26]. Also, the Study of Children in Family Childcare and Relative Care found that only 9% of family childcare homes in three states were rated as good quality; and 35% of the homes were rated as inadequate, raising a concern about the early childcare arrangement for infants and toddlers [27]. Parents are not well aware about the care their children receiving in the childcare and usually overrates the quality according to the Cost, Quality, and Child Outcome Study [28]. In short, although childcare quality matters tremendously in child development, the current quality of childcare needs to be improved. Infant and toddler care are very expensive while parents' income and state subsidies are often inadequate. With dramatic increases in childcare facilities, the care of infants and toddlers is not sufficient to meet the demand [29]. Also, the price of childcare cannot be set high enough in many communities to encourage investment in new facilities or quality programs. Low-income communities have a smaller child-care supply than more affluent ones because of the cost [30]. For children ages 12 to 35 months, ratios of children to adults range from 4 to 13 children per caregiver and teacher training requirements are vary widely [30]. It is noted that the availability, affordability, and quality are main dilemmas that today's parents face in management of work and family life. Thus, in order to make improvements in the feeding practices to childcare settings, interventions must include broad changes to regulations and policy.

Public health there is a national guideline for childcare centers provided in the Caring for Our Children-National Health and Safety Performance Standards: Guidelines for Out of Home Child Care Programs (CFOC) [31]. The CFOC released guidelines for out of home care settings to promote a healthy nutritious childcare environment that supports growth and development for infants and children. Further, Benjamin et al, 2009 compared individual state regulations regarding menus for child-care centers and family

child-care homes with national menu standards and reported great discrepancies were found between model child-care menu policies and current state regulations in most states. However, many states lack specific nutrition and physical activity licensing regulations related to childhood. Few uniform standards apply to nutrition or physical activity offerings in the nation's child care centers. [32,33]. Most of the literature cited however [34,35] has underscored the opportunity to improve regulations regarding health care policies related to childhood obesity to ensure that childcare providers develop accurate, healthful menus and incorporate physical activity in daily schedule. If widely implemented, enhancing state regulations could help address the obesity epidemic in young children in the U.S. Hughes et al, 2007 have highlighted the important and positive influence that child care providers have in the development of healthy and unhealthy eating behaviors in minority children [35]. They have shown that when childcare providers sat with 549 children during lunch at Head start program feeding behaviors were positively related to children's consumption of vegetables, dairy, entrees, and starches.

Feeding practices in childcare programs in question

The Child and Adult Care Food Program (CACFP), a federal food program, provides subsidies to meet the nutrition needs of children in daycare centers, especially in low-income areas [36]. The number of meals served in childcare homes and centers by the CACFP has almost doubled from 862 million in 1989 to 1,747 million in 2004 [37]. Evaluation studies showed that the CACFP has provided adequate nutrition among children in daycare centers, [36] [38] while some studies found the meals served in childcare centers were inadequate to meet the energy and some micronutrients [39,40] and the Food Guide Pyramid recommendation [41]. Fleischhacker et al. [42] conducted a menu monitoring study in one of the Health Start center in an inner city by comparing the meals actually served with the menus provided by the center. There was a huge discrepancy between them; only 4 out of 269 meals/snacks matched the planned menus. Another nutrient content study among the licensed childcare centers in Mississippi reported that the menus served in the childcare centers did not provide adequate nutrients regardless of participation in the CACFP [43]. These findings suggest that even CACFP childcare centers may not guarantee children's nutrition intake. Thus it raises major concerns about the feeding practices of the unlicensed childcare homes and centers. The American Dietetic Association positioned nutrition standards for child-care programs in 1999; however, there are no recommendations for infants [44]. Recently, the experts presented 'the Start Health Feeding Guidelines' for parents and caregivers to help their feeding practices to infants and toddlers, such as when, what, and how to feed complementary foods [45].

Further many studies have highlighted that the food consumed by children while in center-based child care did not meet the new My Pyramid food group recommendations. Ball et al. found that children were not consuming recommended amounts of whole grains, fruits (excluding 100% fruit juice), or vegetables while attending full-time child care, and were consuming excess amounts of saturated fat and added sugar [46]. Similarly, Fox et al. evaluated the nutritional content of CACFP and reported that meals consumed by children, like the lunches offered by providers, supplied more saturated fat (total amount as well as a percentage of total energy) than recommended

by RDA [47]. Oakley & Bomba et al [43] evaluated menus planned in Mississippi child-care centers participating in the Child and Adult Care Food Program and stated that mean fat levels for all centers exceeded the recommendation of no more than 30% of total energy from fat. Yet, the current infant feeding practices in childcare settings, as well as how child caregivers accommodate the need of parents' infant feeding preferences and concerns remain unknown.

Conclusion

Infancy is the stage of life when the foundations for eating habits and nutritional adequacy over one's lifetime are established. Changes in family and social environments over time have resulted in the increased use of childcare at earlier ages among infants in the U.S. Understanding the relative importance of different childcare factors on infant feeding practices during the infancy is the focus of this review article. It is suggested that the increased use of childcare due to the changes in family and society might have played a pivotal role in pediatric nutrition problems in the U.S. Available studies show that some characteristics of childcare are related to infant feeding practices and risk of obesity among infants. Therefore, uncovering the determining factors of infant childcare that may influence infant feeding practices and subsequent risk of obesity is in need.

There is no question that infant feeding practice beyond the family level, extending to the level of childcare, community, and policy. Health education and promotion research has been focused on individual behavior change with less attention given on environmental factors that support the process of individuals' behavior change. Nutrition professionals should encompass different levels of influences on infant feeding practices: intrapersonal, interpersonal, organizational, community, and policy factors. The overarching goal of the current public health effort to fight pediatric obesity has to address the needs of parents and childcare providers to promote healthy feeding, and then to administer interventions for preventing obesity among infants and toddlers attending childcare. It connects the diverse fields of nutrition, childcare, and public health to develop an interdisciplinary intervention to address infant feeding practices in both the home and childcare settings to achieve an overall healthy eating environment for today's infants and toddlers.

Previously, both infant feeding and childcare studies have been one-dimensional by examining at either family or childcare-level influences on child's outcome. Because in the future, the family and society structures will change with more mothers working and more infant childcare facilities projected to grow in demand, public health efforts to serve the need of infant health should advance the understanding of determinants of feeding practices in childcare as well as in the home among infants who attend day care.

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