



Nutritional status of foster children in the U.S.: Implications for cognitive and behavioral development[☆]



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ABSTRACT

Objective: Children in foster care are at greater risk for poor health, physical, cognitive, behavioral, and developmental outcomes than are children in the general population. Considerable research links early nutrition to later cognitive and behavioral outcomes. The aim of this narrative review is to examine the prevalence of poor nutrition and its relation to subsequent health and development in foster children.

Method: Relevant studies for inclusion were identified from numerous sources (e.g., PubMed, Google Scholar, and reference sections). Inclusion criteria were studies published between 1990 and 2016 of (i) the nutritional status of children in foster care or (ii) the nutritional status of children exposed to early adversity (e.g., low-income and internationally adopted children) or (iii) the developmental effects of poor nutrition and micronutrient deficiencies.

Results: Two key findings that have adverse implications for cognitive development emerged: (i) the prevalence of anemia and iron-deficiency anemia is higher among foster children than among the general population of children in the U.S., and (ii) the developmental demands of catch-up growth post-placement may lead to micronutrient deficiencies even after children have begun sufficient dietary intake of these nutrients. Moreover, there is a paucity of recent studies on the nutritional status of children in foster care, despite the multiple factors that may place them at risk for malnutrition.

Conclusion: Attention to nutritional status among care providers and medical professionals may remove one of the possible negative influences on foster children's development and in turn significantly alter their trajectories and place them on a more positive path early in life. Recommendations for further research, policy, and practice are discussed.

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1. Introduction

There are currently >400,000 foster children in the United States, a number that has been on the rise the past four years, with 1 in 184 children in the U.S. in the foster care system (U.S. Department of Health and Human Services, 2015). More than a third of foster children are 5 years old or younger, a fundamentally important time that shapes the child's future health, growth, emotional wellbeing, development and achievement in school, the family and community, and life in general. Children enter foster care (median age at entry is 6.4 years) at a disadvantage due to early adverse childhood experiences (ACEs) such as poor prenatal

and infant health care, food insecurity, chronic stress, and the effects of abuse and neglect. As a result, they are at higher risk for poor physical, psychological, neuroendocrine and neurocognitive outcomes compared to those not in care (Fisher, Stoolmiller, Gunnar, & Burraston, 2007; Pears & Fisher, 2005). Between 20 and 60% of children entering foster care have developmental disabilities or delays, compared to about 10% of the general pediatric population (U.S. Department of Health and Human Services, 2015; Leslie et al., 2003). Compared to the general pediatric population, foster children are also at greater risk for negative health outcomes including chronic medical conditions and developmental issues (Hansen, Mawjee, Barton, Metcalf, & Joye, 2004; Jee et al., 2006; Zill & Bramlett, 2014).

While substantial research has focused on physical and mental health of children in foster care, their nutritional status, eating and food-related behaviors, and the relation to subsequent health and development has received less research attention. Foster children are at risk for growth and nutritional deficiencies due to their nutritional environment prior to placement in foster care, which may be inadequate

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due to food insecurity (limited or uncertain access to adequate food) and/or a poor diet (Ehrle & Geen, 2002). Insufficient caloric content resulting in growth deficiencies were commonly observed in studies of foster children in the 1990's (Halfon, Mendonca, & Berkowitz, 1995; Silver et al., 1999). However, there is a notable lack of recent data on the nutritional status of children in foster care, and the prevalence of micronutrient deficiencies—detrimental to development and cognition—in the presence of sufficient calorie intake is less known in this population.

While it is outside the scope of this paper, it is important to note that feeding issues may play a critical role in the growth and nutritional status of children in foster care. Because many children in foster care have experienced ACEs, including food insecurity, maltreatment, and placement in out-of-home care, they have difficulties with trust and attachment and with establishing a responsive feeding relationship (Casey, Cook-Cottone, & Beck-Joslyn, 2012). This makes challenges around food and behavior common in this population, resulting in disrupted regulation of food intake and poor growth and nutritional status (Baer & Martinez, 2006; Black & Aboud, 2011; Dozier, Higley, Albus, & Nutter, 2002).

The objective of this review is to highlight research gaps in nutrition issues among children in foster care and inspire action among the scientific and health practitioner community to generate evidence-based guidance on how to prevent and address these issues. Relevant studies for inclusion were identified from numerous sources (e.g., PubMed, Google Scholar, and reference sections). Inclusion criteria were studies published between 1990 and 2016 of (i) the nutritional status of children in foster care or (ii) the nutritional status of children exposed to early adversity (e.g., low-income and internationally adopted children) or (iii) the developmental effects of poor nutrition and micronutrient deficiencies.

In this review we first examine the available research about the nutritional status of foster children in the U.S. We then review the available literature about the nutritional status of other populations similarly exposed to early adversity. We subsequently consider the literature on the cognitive and behavioral effects of malnutrition, and we conclude with recommendations for further research, policy, and practice.

2. Nutrition among children in foster care

This section presents current research related to nutrition among foster children, including general measures of health and growth and micronutrient status among this population.

2.1. Growth

Stunting or short stature (height-for-age < -2 z-scores on World Health Organization [WHO] growth charts or height-for-age < 5th percentile on Centers for Disease Control and Prevention [CDC] growth charts), but not wasting (weight-for-height < -2 z-scores on WHO growth charts), was reported among children in foster care. Pears and Fisher (2005) compared 3–6-year-old children entering, re-entering, or switching placements within foster care with a community sample of similarly low-income children and found that 8% of foster children had short stature compared to 0% of community children. No differences in wasting were found between the two samples.

Hansen et al. (2004) found that short stature was common in children in foster care (average age 5.1 years), with 11% having short stature. Although the purpose of the Hansen et al. study was to compare the health status between children in foster care and age- and sex-matched low-income children to determine if health in children living in foster care is not just due to living in poverty, this comparison was not done for physical growth. However, children in foster care did have a greater prevalence of physical, developmental, and mental health problems. Similarly, a large statewide cohort study of 2- to 5-year-olds entering foster care found evidence of stunting (7%) and underweight (10%) in this population (Steele & Buchi, 2008). Given the

higher prevalence of stunting among foster children compared to children with similar demographics, and findings that in foster children stunting is associated with a child's experience of neglect, it has been suggested that stunted growth may be associated with exposure to chronic adversity (Pears & Fisher, 2005).

While under-nutrition (short stature and underweight) has been frequently reported among children entering foster care, overweight and obesity is the most common medical condition noted among foster children 2–19 years of age. Assessments of children at their time of entry into the foster care system revealed that 35% to 44% of those older than 2 years of age were overweight/obese (BMI ≥ 85th percentile) and 17–37% were obese (BMI ≥ 95th percentile) (Steele & Buchi, 2008; Helton & Diaz, 2012; Schneiderman, Arnold-Clark, Smith, Duan, & Fuentes, 2013). These rates are disproportionately higher than the 2011–2013 national averages of 32% for overweight/obesity and 17% for obesity among youths 2–19 years (Ogden, Carroll, Kit, & Flegal, 2014). The foster child's age (older vs. younger), ethnicity (Hispanic vs. non-Hispanic), placement type (group home vs. traditional foster care), early exposure to abuse and neglect, use of psychotropic medications, and problematic eating behaviors are likely to be associated with the high rates of weight dysregulation among foster children (Casey et al., 2012; Schneiderman et al., 2013).

Whether underweight or overweight, this body of research suggests that foster children are frequently malnourished at entry into care. Thus, careful screening of children upon entering foster care and the development of individualized intervention plans is necessary to simultaneously address the need for catch up in growth and to mitigate the long-term risk for obesity. Additionally, research on the extent to which malnutrition persists after entry into care, as well as the factors that subsequently lead to a higher prevalence of overweight and obesity among foster children, is warranted.

2.2. Anemia and iron deficiency

Information on micronutrient intake and deficiencies that are critical to physical and cognitive development has been limited in the foster care population in the U.S. To date, the most widely studied nutrient deficiency has been anemia (the inability to produce enough red blood cells) with and without iron deficiency (ID). ID, a shortage of iron in the body, is the primary cause of anemia in children, referred to as iron-deficiency anemia (IDA).

Anemia prevalence was 7.4% among children ages 3 months to 6 years at admission into foster care, though the etiology of anemia (ID present or absent) was not assessed (Leslie et al., 2005). This is more than double the 3.6% prevalence of anemia in U.S. children ages 1 to 5 years during the same time period (Cusick et al., 2008). To our knowledge, no recent study measured iron status in foster children. We know that the prevalence of IDA among the general pediatric population is 1.6% and we suspect that it would be significantly higher among foster children (Cusick et al., 2008). ID is also more prevalent among low-income populations, an added risk factor for foster children (U.S. Department of Health and Human Services, 2010).

The last study we identified that examined iron intake and ID in foster children dates back to 1991. DuRousseau, Moquette-Magee, and Disbrow (1991) conducted a dietary recall and medical records assessment for foster children in a California clinic. Their findings, while dated, are still relevant. The study revealed that 21% of foster children demonstrated evidence of IDA despite an adequate intake of nutrients. This persistent deficiency may be explained by the extended time required for iron repletion, which requires up to several months of adequate iron intake (Powers & Buchanan, 2014). Also, these children experience high levels of stress, which has been shown to affect nutrient absorption by altering the microbial content and motility of the gut (Boudry, Cheeseman, & Perdue, 2007; Wang, 2005). As such, foster children who have marginal or even adequate nutritional intake may still have

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