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Family Factors and Body Mass Index Among Korean-American Preschoolers

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Purpose The purpose of this study was to examine family factors related to BMI z-scores and overweight/obesity among Korean-American (KA) preschoolers.
Methods: A cross-sectional study was conducted with 104 KA preschoolers and their mothers in the Chicago metropolitan area. KA mothers completed questionnaires and their preschool-age children's weights and heights were measured. Hierarchical multiple linear regression and multiple logistic regression were performed.
Results: Twenty-two percent of preschoolers were overweight or obese (BMI ≥ 85th percentile). Family factors explained 30% of the variance in the children's BMI z-scores, with parenting feeding style and family functioning contributing most. In logistic regression, children were more likely to be overweight/obese if: a family had more children, the mother perceived her child as overweight/obese, and the family had regular child routines.
Conclusion: Health care providers should consider the family as one unit of care and use that unit to implement culturally appropriate childhood overweight/obesity prevention for Korean-American preschool-aged children. Parental feeding style and parents' attitudes about child weight should be considered when advising Korean-Americans about reducing children's overweight/obesity.

THE INCREASING PREVALENCE of childhood overweight and obesity is a major health concern in the U.S. and globally. The number of obese children in the U.S. more than tripled during the last three decades, from 5% to 17% (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Childhood obesity in the U.S. is responsible for $14.1 billion in annual medical costs for drug prescriptions, emergency room visits, and outpatient visits (Trasande & Chatterjee, 2009). In addition to the economic burden associated with obesity, it has both immediate and long-term negative effects on the physical and psychological health and quality of life of children. Obesity is significantly related to development of type 2 diabetes, cardiovascular disease, and other chronic illnesses (Berenson & Heart, 2012; Lim, Xue, & Wang, 2014). Moreover, these health problems may persist not only throughout childhood but also into adulthood (McCurdy, Winterbottom, Mehta, & Roberts, 2010; Wofford, 2008).

The preschool years are a critical period for overweight/obesity prevention because earlier adiposity rebound, a point of maximal leanness or minimal body mass index (BMI), is related to a higher risk of adult overweight/obesity (Wofford, 2008). Children's dietary habits and physical activity patterns are also shaped within this period. Although the preschool period is important in this regard, few studies have focused on overweight/obesity among preschoolers.

The family plays a pivotal role in shaping lifestyles related to childhood overweight/obesity, especially for preschool-aged children. Modifiable lifestyle factors

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contributing to overweight/obesity include excessive calorie intake, lack of physical activity, and increased sedentary behavior (Skelton, Irby, Miller, & Grzywacz, 2011; Vos & Welsh, 2010); these factors occur within a shared family environment (Kitzman-Ulrich et al., 2010).

Family factors have been significantly associated with childhood obesity in previous studies. Children are more likely to be overweight/obese if they have working mothers or if they live with single parents (Chen & Escarce, 2010; Huffman, Kanikireddy, & Patel, 2010). Acculturation is related to ethnic, racial, and cultural identity, and the degree of acculturation may contribute to racial and ethnic disparities regarding childhood obesity (Pena, Dixon, & Taveras, 2012). However, prior research results are inconsistent with respect to the association of acculturation with childhood obesity. Two studies with Asian/Pacific Islanders and Hispanics found that a lower level of acculturation was associated with an increased risk of childhood obesity among school-age children (Balistreri, Baker, & Hook, 2010; Wojcicki, Schwartz, Jiménez-Cruz, Bacardi-Gascon, & Heyman, 2012). In contrast, two other studies with Latinos found that a higher level of language acculturation was associated with a poorer diet and greater body weight among children (Liu, Chu, Frongillo, & Probst, 2012; Sussner, Lindsay, & Peterson, 2009).

Family functioning is another aspect of the family environment that is related to childhood obesity (Kitzman-Ulrich et al., 2010). However, the relationships identified between family functioning and childhood obesity have been inconsistent. Some studies have found that family dysfunction is associated with greater BMI of children (Chen & Kennedy, 2004; Moens, Braet, & Soetens, 2007; Sousa, 2009). In contrast, Gibson et al. (2007) did not find a significant relationship between childhood obesity and poor family functioning.

Parental feeding style refers to parents' approach to feeding their children, and it also affects children's eating styles and weight outcomes (Birch et al., 2001; Patrick, Nicklas, Hughes, & Morales, 2005). Prompting children to eat, use of rewards, and restricting access to food tend to result in intake of more food than is healthful for children (Rhee, 2008). Parents of overweight children monitor and restrict their food consumption more than parents of children who are not overweight (Moens et al., 2007). Furthermore, it has been reported that parental encouragement of the choice of healthful foods through role modeling is important to establishing healthful dietary patterns for children (Tibbs et al., 2001).

Previous studies have suggested that child routines are key factors in preventing childhood obesity (Slusser et al., 2012). Anderson and Whitaker (2010) analyzed a nationally representative sample of preschool-age children and found that children who had dinner with their families, had adequate nighttime sleep, and had limited television viewing time exhibited a lower prevalence of obesity. These family factors may vary by race/ethnicity.

The number of Asians in the U.S. increased faster than any other racial group between 2000 and 2010 (United States Census Bureau, 2012). Asian Americans have a lower prevalence of overweight/obesity than other racial/ethnic groups (World Health Organization [WHO] Expert Consultation, 2004). However, chronic diseases in Asian Americans may develop at lower BMI levels than in other racial/ethnic groups because of Asian Americans' greater tendency toward abdominal obesity (Taveras, Gillman, Kleinman, Rich-Edwards, & Rifas-Shiman, 2010; World Health Organization Expert Consultation, 2004). In addition, the risk of overweight/obesity among Asian Americans increases with their time in the U.S. (Unger et al., 2004).

Childhood obesity rates among Asian American children were about 26%, and the obesity rates vary by country of origin and processes of assimilation for that group (Ike-Chinaka, 2013; Jain et al., 2012). The few studies that have been conducted regarding different Asian groups identified cultural factors that may affect the child's obesity. For example, in Chinese families, overfeeding children is considered a way parents show their love, and the dominant parent's unhealthy lifestyle contributes to the child's weight (Wong, 2011). In another study, Vietnamese mothers reported that they are more concerned about their children's underweight than overweight (McGarvey et al., 2006). Lee (2008) also presented that higher levels of acculturation of Korean-American mothers were related to greater regularity of eating out and frequency of eating snacks.

Approximately 1.7 million Korean-Americans (KAs) live in the U.S., and are the fifth-largest subgroup among Asian Americans (United States Census Bureau, 2013). One third of KA adults in the U.S. are overweight or obese (U.S. Department of Health & Human Services, 2013), and 20% of KA preschool-aged children are overweight or obese (Jain et al., 2012).

Previous research has documented that KA families tend to maintain Confucian values with respect to child-rearing practices and family interactions (Farver & Lee-Shin, 2000; Lee, Sobal, & Frongillo, 2000). KAs place an especially strong emphasis on families and filial piety while Americans stress individualism and autonomy (Kim & Foreman, 2011). For example, KAs view the family as an extension of the self and emphasize children's obedience to parents (Kim & Wolpin, 2008). In this regard, one study reported that authoritarian control and subsequent poor communication (e.g., language barriers and cultural gaps) between parents and children are a source of conflict in the KA family (Sohng & Song, 2004). Moreover, most KAs are first generation immigrants who were born in Korea, and 80% of KAs speak only Korean language at home (Kim & Foreman, 2011). These unique characteristics of KA families may influence the prevalence of childhood overweight/obesity.

Similar to other American children, the prevalence of obesity among Korean children also has been gradually increasing: 9.1% of preschool-age children were overweight and 9.6% were obese in 2010 (Korean National Health and Nutrition Examination Survey [KNHANES], 2011). In Korea, low socioeconomic status, mothers' sedentary behavior, and parental BMI are significantly related to