

## Summary

# Precursors of Early Childhood Obesity: A Review

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### Introduction

Overweight/obesity in childhood years has become a worldwide epidemic in the current decades. World Health Organization (2018) reported that the prevalence of obesity in children worldwide tripled between 1975 and 2016 with more than 41 million children under the age of 5 being overweight/obese in 2016. Since obesity has been associated with a wide range of health problems (Eschenbeck et al., 2009; Maiano et al., 2018; Reilly & Kelly, 2011; Storch et al., 2007) and its prevalence has increased excessively (Nutrition and Health Survey of Turkey, 2014; WHO, 2018), it is of great importance to identify the precursors of obesity and develop obesity intervention/prevention programs. Current review aims to compile national and international research regarding maternal child feeding behaviors and cognitions, parenting styles, and child temperament as important precursors of obesity. The main aim is to provide a review of the state of the art on childhood obesity to inform further research and obesity intervention programs.

### Child Feeding Behaviors and Obesity

Parental child feeding behaviors play an important role in shaping children's early eating behaviors. Research has demonstrated that there is a significant relationship between children's body mass index (BMI) and parental child feeding behaviors (Hughes et al., 2005; Rhee ve ark., 2006; Yavuz & Selçuk, 2018). Child feeding behaviors are commonly examined under three main categories: pressure to eat, restriction, and monitoring. Pressure to eat involves forcing the child to eat everything on his plate or pressuring the child to eat certain food. Restriction refers to restricting the child from consuming certain food either overtly or covertly. Overt restriction includes forbidding the child to eat certain food in a way that s/he can notice (e.g. verbally or by taking away the food). Covert restriction on the other hand, includes behaviors like not buying foods that the child should not consume and keeping these foods out of child's reach (Ogden, Reynolds, & Smith, 2006). Lastly, monitoring involves keeping track of child's food intake.

Among parental feeding behaviors especially restriction has detrimental effects on children's subsequent weight status (Faith et al., 2004b). As cross-sectional and longitudinal studies have shown, restriction is usually associated with higher child BMI (Clark et al., 2007; Patrick & Nicklas, 2005; Shloim et al., 2015). It was argued that food restriction harmed children's self-regulation abilities and reliance on satiety cues (Birch et al., 2003; Savage & Fischer, 2007). Therefore, children adopt unhealthy eating behaviors which may place them under higher risk of obesity.

Pressuring children to eat more or to consume certain types of food is generally associated with lower BMI in childhood (Hurley et al., 2011; Shloim et al., 2015). Although seems counterintuitive, there are possible theoretical explanations for this link. For example, it was argued that parental pressure to eat may cause negative attitudes about food and eating in general and therefore decrease child's general food consumption (Batsell et al., 2002; Galloway et al., 2006). Parental pressure to eat has also been associated with children's greater consumption of fruit/vegetables, indicating that pressuring may actually promote healthier diet (Bourcier et al., 2003). However, research also demonstrated that children who are pressured to eat, may reject to consume the pressured foods, and may have a preference for high-fat, calorie-dense snacks instead (Brown et al., 2008; Lee et al., 2001). Therefore, the findings in the literature did not show direct evidence even if pressure to eat has generally been associated with lower child BMI.

Monitoring is rather less studied compared to other child feeding behaviors. Most studies did not find a significant association between parental monitoring and child BMI (Shloim et al., 2015). However, some researchers suggested that monitoring may be beneficial for children to adopt healthy eating behaviors (Faith et al., 2004a; Gubbels et al. 2011). For example it was found that children make healthier food choices when they were informed that parents would know what they eat (Klesges et al., 1991). Moreover, longitudinal research confirms that parental monitoring may be asso-

ciated with lower BMI and healthier diet (Faith et al., 2004a; Gubbels et al., 2011). Yet, given the scarcity of studies, the results are not conclusive.

### **Parenting Styles and Obesity**

Parenting styles refer to parental behaviors and attitudes towards the child and general emotional atmosphere in home environment (Darling & Steinberg, 1993). Parenting styles are commonly examined under four main dimensions: authoritative, authoritarian, permissive, and neglecting parenting (Baumrind, 1978; Maccoby & Martin, 1983). In this review, neglecting parenting was not included because of the scarcity of research based on its association with childhood obesity.

Authoritative parenting style is characterized by high parental demandingness and high warmth/responsiveness (Power, 2013) and is generally associated with lower BMI (Sleddens et al., 2011). When compared to authoritarian and permissive styles, authoritative parenting is related to increased consumption of healthy food and lower risk for obesity (Chen & Kennedy, 2004; Kremers et al., 2003). On the other hand, authoritarian parenting style, which involves high demandingness but low responsiveness to the child (Spera, 2005), is mostly found to be associated with children's low ability to self-regulate (Francis & Susman, 2009; Grolnick & Farkas, 2002), higher risk for obesity (Kakinami et al., 2015) and lower levels of positive health-related behavior such as good nutrition and physical activity (Lohaus et al., 2009).

Research about permissive parenting (high warmth/responsiveness and low demandingness; Power, 2013), are less in quantity and the findings are not well-established. While some research cannot find a significant association with child BMI (Agras et al., 2004; Blissett & Haycraft, 2008), some argue that permissive parenting may be a precursor of childhood obesity (Humenikova & Gates, 2008; Olvera-Ezzell & Power, 2009). Yet, other research suggests that it may promote a healthier diet in children in terms of more fruit/vegetable consumption (Berge et al., 2010; Kremers et al., 2003). The discrepancy in the findings may point out the importance of positive parenting behaviors, such that showing high levels of warmth/responsiveness to children may facilitate a healthier diet. However, further research needs to be conducted to explore the parental behavioral mechanisms affecting children's dietary intake and BMI.

### **Maternal Cognitions on Child Weight and Obesity**

Besides maternal feeding practices, maternal cognitions that affect mothers' feeding may also play a crucial role in early childhood overweight/obesity. For instance, when parents are concerned about their child

being overweight they tend to show more restrictive behaviors (Hidalgo-Mendez et al., 2019) and encourage their child to diet and do physical activity (Min et al., 2017). Similarly, when mothers think that their child is underweight, they pressure them to eat more (Gregory et al., 2010).

A crucial problem about maternal cognitions of children's weight status is that mothers are generally not aware that their children are overweight (Chamberlin et al., 2000; Carnell et al., 2005). In fact, in many cultures including Turkey, being chubby is considered as a health sign among children (Agadayı et al., 2019; Savaşhan et al., 2015). Research confirms that mothers tend to not realize their children are overweight and they may nevertheless pressure their children to eat (Chang et al., 2017). Therefore, it is of greater importance to plan prevention programs and create awareness in parents about childhood obesity.

### **Child Temperament and Childhood Obesity**

Parental child feeding behaviors, parenting styles and parental perceptions play a significant role in early childhood obesity, yet some children have a higher tendency to become overweight/obese. In-born temperamental characteristics of children may affect their eating behaviors, therefore create a risk factor for obesity (Anzman-Frasca et al., 2012). Research has examined temperamental characteristics in mainly three dimensions, which are positive and negative affectivity, and inhibitory control (Rothbart et al., 2000).

High level of negative affectivity was generally associated with higher risk for obesity in children (see Bergmeier et al., 2014 for a review). Research suggests that children who are high in negative affect are fed with unhealthy foods more by their mothers, and mothers tend to use food for soothing their children with negative affectivity (Agras et al., 2004; Stifter et al., 2011). This situation may have subsequent negative effects on children's eating, such that in following years they may have a tendency to eat more in response to negative emotions as opposed to satiety cues (Anzman-Frasca et al., 2012; Braden et al. 2014; Stifter et al., 2011).

Low levels of inhibitory control in children is pointed out as another risk factor for childhood obesity (see Anzman-Frasca et al., 2012 for a review). Children who have low inhibitory control tend to have difficulties in regulating their food intake. Especially when they are exposed to obesogenic environments in which high calorie dense foods are always accessible, these children may be under higher risk for obesity (Francis & Susman, 2009; Johnson & Birch, 1994). Research confirms that by showing children with higher inhibitory control tend to make healthier food choices, have healthier dietary

and physical activity habits (Van den Heuvel et al., 2017; Zhou et al., 2019).

Lastly, research about positive affectivity reveals discrepant findings. Although most of the research cannot detect a significant association between positive affectivity and child BMI (Bergmeier et al., 2014), some research suggests that children with high positive affectivity tend to eat more, be more willing to eat and eat in the absence of hunger (Leung et al., 2014). In fact, recent research reveals that when positive affectivity is combined with other temperamental traits such as low inhibitory control, it may have detrimental effects on children's eating behaviors, making them more open to external stimuli and more impulsive at the same time (Zhou et al., 2019).

Further research suggests that when difficult temperament in children is combined by neglectful parenting behaviors, children are placed under higher risk for obesity (Wu et al., 2011). Thus, the findings indicate that a more integrative approach is needed to examine the effect of temperamental traits on childhood obesity. Examining temperamental characteristics of children in combined forms and in relation to parenting behaviors might facilitate a more comprehensive understanding of the subject.

### Conclusion

Obesity is a widely increasing health problem, which is associated with detrimental effects on individuals' lives, both during the childhood and adulthood (Magarey et al., 2003; Reilly et al., 2003). Obesogenic eating behaviors are generally acquired during childhood years and affected by childhood experiences including parental behaviors and cognitions (Olvera-Ezzell et al., 1990; Scaglioni et al., 2008; Gahagan, 2012). Therefore, it is of great importance to determine early childhood precursors of obesity and develop intervention programs. Previous research has shown that parental child feeding behaviors, parenting styles, parental perceptions and child temperament are the most important precursors of obesity in early years. Specifically, restrictive feeding, authoritarian parenting style, inaccurate maternal cognitions and child temperamental traits such as negative affectivity and low inhibitory control were found to be associated with higher risk for obesity; while monitoring children's food intake and authoritative parenting style can play a protective role. Overall, longitudinal research generally confirmed these findings as well, however the amount of research that revealed conflictual or invalidating results cannot be underestimated.

The general discrepancy among the findings may arise from methodological variances among studies. For

example, studies generally differ in their outcome variable. Some research regards child BMI as the outcome (e.g. Jansen et al., 2016) while some others measure dietary habits such as consumption of unhealthy foods or fruits/vegetables (e.g. Brown et al., 2008). Moreover, while some studies control for demographic variables such as parent BMI, parental education and child age (e.g. Rhee et al., 2006), some others do not (Rodgers et al., 2013). In fact, research shows different effects of parental feeding behaviors for different age groups of children (Campbell et al., 2010). Furthermore, lack of longitudinal data results in ambiguity in the findings, such that the direction of causation between the risk factors and child obesity remains unclear. Therefore, standardized methodology and further longitudinal research are needed in order to have a thorough understanding of early childhood obesity and its precursors.