PEDIATRICOBESITY
ORIGINALRESEARCH
doi:10.1111/ijpo.12122

WIC mothers' depressive symptoms are associated with greater use of feeding to soothe, regardless of perceived child negativity

Jennifer S. Savage[1] and Leann L. Birch[2]

[1]Department of Nutritional Sciences, Center for Childhood Obesity Research, The Pennsylvania State University, State College, USA, [2]The University of Georgia, Athens, USA

Address for correspondence: Assistant Professor JS Savage, Nutritional Sciences, Center for Childhood Obesity Research, The Pennsylvania State University, 129 Noll Laboratory, University Park, PA 16802, USA. E-mail: jfs195@psu.edu

Recieved 12 March 2015; revised 02 December 2015; accepted 10 December 2015

Summary

Background: Maternal symptoms of depression are related to suboptimal parenting practices and child well-being; women with elevated symptoms tend to be less responsive to their children.

Objective: The objective is to explore how maternal depressive symptomatology is related to childhood obesity-promoting parenting behaviours, and whether depressive symptomatology moderates the association between perceived child negativity and the use of food to soothe among low-income mothers.

Methods: There is a cross-sectional sample of 60 mothers and their formula fed infants/toddlers participating in the Special Supplemental Woman, Infants and Children Program. Measures included the Infant Behaviors Questionnaire, Baby's Basic Needs Questionnaire, the feeding problem assessment form and Center for Epidemiological Studies Depression Scale.

Results: Depressive symptoms exceeded the clinical screening cut-off for 38% of women. Mothers with depressive symptoms perceived their child to be more negative and were more likely to use food to soothe, add cereal to the bottle and put baby to bed with bottle than mothers without depressive symptoms. Generalized linear models revealed that child negativity was associated with greater use of food to soothe but that this effect was moderated by maternal depression: negativity was positively associated with food to soothe among non-depressed but not depressed mothers.

Conclusions: A high proportion of low-income mothers reported elevated depressive symptoms; depressive symptomatology was positively associated with perceived child negativity and greater reported use of controlling feeding practices. Screening for maternal depressive symptoms may help in providing more individually tailored counselling on responsive feeding.

Keywords: low-income, children, psychosocial factors, feeding behaviour, temperament.

Address for correspondence: Assistant Professor JS Savage, Nutritional Sciences, Center for Childhood Obesity Research, The Pennsylvania State University, 129 Noll Laboratory, University Park, PA 16802, USA. E-mail: jfs195@psu.edu
© 2016 The Authors. Pediatric Obesity © 2016 International Association for the Study of Obesity

Introduction

Responsive parenting, which involves prompt, contingent and appropriate interaction with the child, has been associated with positive outcomes ranging from cognitive and psychosocial development to protection from disease and mortality (1). Responsive feeding practices (2) (i.e. feeding behaviours that occur in response to child hunger and fullness cues that are not intrusive or controlling) are an aspect of parenting that is associated with child weight (2–5). Parents who perceive their child to be more difficult or fussy (i.e. temperamental negativity) (6,7) are more likely to use controlling feeding practices, which may influence the child's developing ability to self-regulate, placing those infants at greater risk for obesity (6).

Depressive symptomatology, particularly among low-income mothers, is a major public health problem (8) associated with negative health outcomes (9) including childhood obesity (10,11). Depressed mothers are more likely to exhibit reactive, hostile, negative, disengaged, non-interacting or withdrawn behaviours (12,13), be less sensitive to their infant's needs including distress (14), use controlling feeding practices (7,15) and perceive their child to be more negative or fussy (16,17). However, the extent to which perceived infant negativity is associated with the use of feeding to soothe a distressed child among low-income WIC mothers of infants and toddlers with elevated depressive symptoms is unknown.

The first objective of this study is to explore how maternal depressive symptomatology is related to the use of non-responsive feeding practices (e.g. putting baby to bed with a bottle), using food to soothe and sleep among low-income mothers. Maternal reports of inadequate mother infant sleep and more frequent night waking have been associated with higher infant weight (18) and perceptions of infant negativity (19). The second objective is to examine the relation between perceived child negativity and use of food to soothe, and whether this association differs for mothers who do and do not report elevated depressive symptoms. Based on previous data (6,7,15,20), we hypothesized that (i) mothers with elevated depressive symptoms will report greater use of food to soothe infant/toddler distress, be more likely to report putting the child to bed with a bottle and adding cereal to the bottle and perceive their infants to be more negative; (ii) infant/toddler negativity will be positively associated with controlling, non-responsive feeding practices and (iii) maternal depressive symptomatology will moderate the positive association previously reported (6) between child temperamental negativity and the use of food to soothe.

Methods

Participants

Participants were from a larger cross-sectional study that included focus groups, interviews and surveys designed to identify correlates of feeding practices among ethnically diverse low-income, rural and urban, formula-feeding mothers who were enrolled in Pennsylvania Special Supplemental Women, Infants and Children (WIC) program. For the purpose of this study, only survey data are reported. Flyers were posted in WIC clinics, and participants were also recruited in person by research staff on-site from clinics located in Central Pennsylvania between June 2010 and February 2011. To be eligible, mothers had to be at least 18 years old, have a child less than age 2 years, introduced formula by 1 month of age and fluent in English. Written informed consent to participate was obtained. Sixty mothers consented and completed a packet of questionnaires about their child's behaviours, including meal time behaviours, sleeping and eating activities. Mothers received a $20 gift card to a local grocery store for completing the questionnaire. The Pennsylvania State University Institutional Review Board approved all study procedures before the first participant was consented.

Survey measures

Background characteristics

Maternal characteristics including age, educational level, race/ethnicity, income, marital status, employment history and family health history, including questions about sleep, 'Do you feel that you are getting enough sleep?' and 'How often do you have difficulty settling/quieting your infant/toddler at night?' were assessed. Self-reported height and weight prior to pregnancy were used to calculate maternal body mass index [BMI; weight {kg}/height {m} {2}]; overweight (BMI = 25–29.9) and obese (BMI $>$ 30) (21).

Maternal depressive symptoms

Depressive symptomatology was assessed using the 20-item self-report Center for Epidemiological Studies Depression Scale (CES-D) (22). Individuals with a CES-D score of 16 or greater were coded with 'elevated depressive symptoms' (22). The internal consistency coefficient was 0.81.

Parent feeding practices

Food to soothe. The Baby's Basic Needs Questionnaire includes items that assess the following

© 2016 The Authors. Pediatric Obesity © 2016 International Association for the Study of Obesity ••, ••–••

Table 1 Items on questionnaire assessing the use of food to soothe child distress[†]

Subscale item	*M*	*SD*
Maternal context: Use of food to soothe in response to maternal demand?	2.64	0.89
How often did you offer food or beverage to soothe your child?	3.10	1.12
How likely are you to use food to soothe…		
in the doctor's waiting room?	2.43	1.35
in the grocery store?	2.54	1.49
in church?	2.87	1.76
in car?	2.68	1.39
when getting ready to leave the house?	2.06	1.33
when preparing meals?	2.60	1.36
when attending to another person?	2.06	1.14
when you are on the phone?	1.98	1.23
when your child wakes at night?	2.55	1.57
when you are stressed?	1.80	1.12
when you are tired?	1.94	1.30
when nothing else works?	3.00	1.65

[†]Food to soothe infant/toddler distress was assessed using a 20-item scale developed by Stifter and colleagues (1). Response options included not likely (1), somewhat likely (3) and very likely (5).
Abbreviations: M, mean; SD, standard deviation.

information: (i) food to soothe child distress; (ii) feeding history; (iii) non-responsive feeding behaviours (e.g. putting cereal in the bottle and putting child to bed with the bottle) and (iv) maternal sleep behaviour (6). The food-to-soothe subscale was created by calculating the mean of 13 items as described in Stifter *et al.* (6); α =0.86. Higher food-to-soothe scores indicate greater use of food to soothe to quiet, or manage a distressed child in response to a variety of contexts, without regard for whether hunger is the source of infant distress (e.g. I use food to soothe my child… when in the grocery store, when tired, when on the phone). These contexts occur on a daily (e.g. talking on the phone, preparing meals) or weekly basis (e.g. going to grocery store and church). Being more likely than 'never' to use food to soothe across several different contexts on average could contribute to overfeeding and excessive dietary intake (Table 1**)**.

Mother–infant feeding interactions. The feeding assessment form (23), a clinical screening tool that identifies feeding problems, was used to assess mother–child feeding interactions. Mothers were asked to rate how stressful, hectic and pleasant feeding times are with their child. Parents were also asked, 'Do you think your child eats enough?' and 'Is your child difficult to feed?' Response options ranged from 0 to 10.

Temperamental negativity. Infant/toddler temperament was obtained using the Infant behaviour questionnaire-revised very short form (24) (37 items), adapted from the well-established behaviour questionnaire-revised (191 items and 14 scales) (25). The negativity subscale was included in this study. A median split was calculated: low and high temperamental negativity (Median = 3.8). The internal consistency coefficient for negativity was 0.81.

Statistical analyses

Data were analyzed using SAS software (SAS Version 9.2: Statistical Analysis Software, 2001). Descriptive information was generated for all variables of interest, and variables were assessed for normality. To address our first objective, chi-square tests and *t*-tests were used to examine differences in maternal feeding practices, and infant/toddler temperamental negativity, meal time feeding interactions and sleep among women with and without elevated depressive symptoms. To address our second objective, Pearson correlations were used to examine relationships between negativity and parent feeding practices. Next, a general linear model (PROC GLM, SAS) was used to examine the effects of maternal depressive symptomatology and child temperamental negativity on the use of food to soothe to manage child behaviour, adjusting for significant predictors of using food to soothe. Based on previous research, potential covariates included maternal race, education, employment status, pre-pregnancy BMI, infant age and infant sex; (26,27) however, maternal race and infant sex and age were

© 2016 The Authors. Pediatric Obesity © 2016 International Association for the Study of Obesity ••, ••–••

excluded from the final model because they were not associated with the use of food to soothe ($p > 0.10$). Mothers with infants less than 3 months of age were excluded from these analyses ($n = 3$) because the scale used to assess infant negativity has not been validated for infants younger than 3 months.

Results

Sample characteristics are shown in Table 2. The majority of mothers were not married, did not complete high school, were unemployed and reported an annual income at or below $15 000. The majority of mothers were overweight or obese, and many reported smoking during pregnancy. While ethnic diversity existed, a majority of mothers were Caucasian. Average child age was 11.5 months (±6.7); 58% were female. Average birth weight was 6.9 lb (±1.1). The majority of babies were never breastfed (55%); however, an eligibility criterion was that formula was introduced by age 1 month.

Among the 60 mothers who completed the CES-D, 23 mothers (38%) were classified with elevated depressive symptoms. Elevated depressive symptoms were significantly more prevalent in mothers who were not living with a partner (74%) than mothers who were married or living with a partner (26%); only 21% of mothers living with a partner reported elevated depressive symptoms ($p < 0.05$). There was no difference in elevated depressive symptom status for marital status, maternal age, race, education, income, employment, pre-pregnancy BMI or smoking status.

Table 1 presents the frequency of using food or beverage to soothe infant/toddler distress in general and in specific situations. The majority of mothers, 71% and 62%, reported using food and beverage to soothe their child 'sometimes' or more often, respectively. When asked about specific situations, mothers were more likely to endorse the use of food to soothe when nothing else worked, when in public, when preparing meals and when child woke at night.

Objective 1. Childhood obesity-promoting parenting behaviours associated with elevated depressive symptom among low-income mothers

Mothers with elevated depressive symptoms reported greater use of food to soothe, including putting baby to bed with a bottle and adding cereal to the bottle. Mothers with elevated depressive symptoms ($M = 2.91$, $SD = 0.71$) reported using food to soothe infant distress more often than mothers without elevated depressive symptoms ($M = 2.33$, $SD = 0.78$; $p < 0.05$). Adding cereal to the bottle (68% of the total sample) also differed for mothers with versus without elevated depressive symptoms; 83% of mothers with elevated depressive symptoms put cereal in the bottle compared with 58% of mothers without symptoms. Among those that did not add cereal to the bottle, the majority (78%) were mothers without elevated depressive symptoms ($p < 0.05$). Among the 48% of mothers who put their child to bed with a bottle, mothers with elevated depressive symptoms were significantly more likely to do this (70%) than mothers without symptoms (33%) ($p < 0.01$). Age of introduction of solids did not differ by depressive symptom status. As shown in Fig. 1, mothers with elevated depressive symptoms reported meal/feeding time interactions with their child to be significantly more stressful ($p < 0.01$) and hectic/rushed ($p < 0.01$) than mothers without elevated depressive symptoms ($p < 0.01$). There was a trend for mothers with elevated depressive symptoms to report greater concern that their child does not eat enough ($p = 0.06$) and to perceive their child to be more difficult to feed ($p = 0.08$) compared with mothers without symptoms. Lastly, mothers with elevated depressive symptoms reported higher child temperamental negativity scores ($M = 4.45$, $SD = 1.00$) than mothers without symptoms ($M = 3.76$ $SD = 1.22$; $p < 0.05$).

Self-reported inadequate sleep (49% of total sample) differed by elevated depressive symptom status. Mothers with elevated depressive symptoms were significantly more likely to report not obtaining enough sleep (76%) compared with mothers without symptoms (32%); among those that reported obtaining enough sleep, the majority (82%) were mothers without elevated depressive symptoms ($p < 0.001$). For infant/toddler sleep habits, 44% of mothers reported that they had problems settling/quieting their infant/toddler at least one night a week; significantly more of these mothers (62%) reported elevated depressive symptoms. Among these mothers, 73% reported trouble settling or letting their infant/toddler to sleep one or more nights per week ($p < 0.01$).

Objective 2. The moderating effect of maternal depressive symptoms on the association between perceived child negativity and the use of food to soothe

Greater temperamental negativity was significantly associated with greater use of food to soothe in response to maternal context or situation ($r = 0.32$, $p < 0.05$) that is not contingent on child hunger cues (i.e. non-responsive). However, there was a significant interaction between depressive symptom status and negativity on the use of food to soothe in response to maternal context or situation, explaining 53% of the variance (F value = 2.95, $p < 0.05$), after

© 2016 The Authors. Pediatric Obesity © 2016 International Association for the Study of Obesity ••, ••–••

Table 2 Maternal characteristics and demographics[†] ($N = 60$)

	Percent	*M*	*SD*	Range
Maternal age		25.6	6.1	18–43
Maternal pre-pregnancy weight (pounds)		165.6	47.4	100–281
Maternal pre-pregnancy BMI		29.2	7.8	19–47
Non-overweight	39.7			
Overweight	19.0			
Obese	41.8			
Marital status[†]				
Not married	43.3			
Married	28.3			
Not married, living with partner	18.3			
Divorced	5.0			
Common law	3.3			
Other	1.7			
Education				
8th Grade or less	1.8			
Some high school	19.3			
High school graduate	42.1			
Some college/tech school	24.6			
Completed college	8.7			
Post graduate training/degree	3.5			
Race				
Asian	3.5			
African American	19.3			
White	75.4			
Mixed	1.8			
Income				
≤ $5000	24.1			
$5000–$9999	11.1			
$10 000–$14 999	11.1			
$15 000–$24 999	16.7			
$25 000–$34 999	22.2			
$35,000–$49 000	11.1			
$50,000–$74 999	3.7			
Employment status				
On maternity leave: no benefits	3.5			
Working full time	15.5			
Working part time	25.9			
Unemployed	50.0			
Other	5.2			
Cigarette use during pregnancy	39.7			
Currently smoke cigarettes	49.2			

[†]Maternal demographic characteristics and demographics did not differ by maternal elevated depressive status with the exception of the probability of living with a partner; only 26% of mothers with depressive symptoms reported living with a partner compared with 59% of mothers without depressive symptoms ($p < 0.05$).
Abbreviations: BMI, body mass index; M, mean; SD, standard deviation.

adjusting for significant independent predictors of using food to soothe including maternal education, employment status and pre-pregnancy BMI. As shown in Fig. 2, among mothers with elevated depressive symptoms, there was no association between infant/toddler negativity and using food to soothe in response to maternal demand (i.e. a non-responsive feeding practice) ($b = 0.05$, SE = 0.18, $p = 0.83$). Among

© 2016 The Authors. Pediatric Obesity © 2016 International Association for the Study of Obesity ••, ••–••

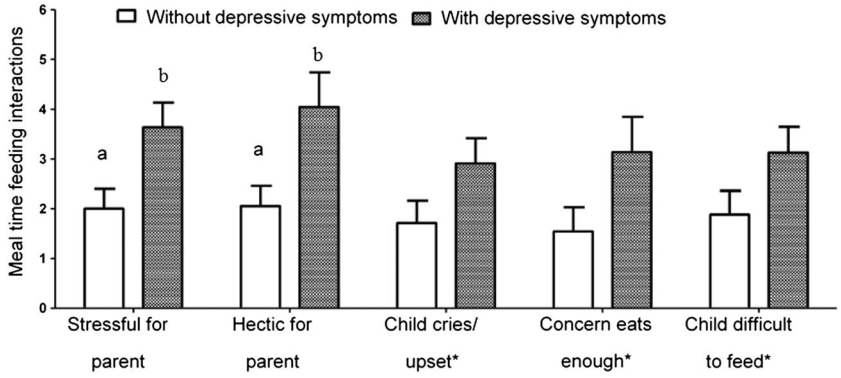

Figure 1 Perception of parent–child meal time feeding interaction assessed using an adapted version of the feeding assessment form by elevated depression status. (Mean + SE) *Notes*: Response options ranged from 0 to 10. Different subscripts indicate significant group differences ($p < 0.01$); *****Indicates a trend ($p < 0.10$).

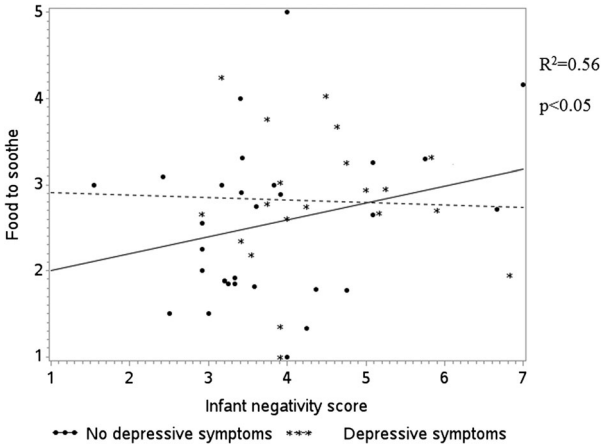

Figure 2 The predictive model showing the positive association between infant/toddler negativity and use of food to soothe in response to maternal context is moderated by maternal depressive symptom status, adjusting for covariates ($n = 49$). Dashed line represents depressed mothers; solid line represents not depressed mothers. Models estimated using generalized linear models (SAS PROC GLM). Model adjusted for maternal education, employment and pre-pregnancy body mass index. Food to soothe was assessed using a measure developed by Stifter and colleagues (6).

mothers without depressive symptoms, there was a significant positive association between infant/toddler negativity and contextual use of food to soothe (i.e. non-responsive) ($b = 0.44$, SE = 0.16, $p < 0.05$).

Discussion

Findings from this study indicate that low-income WIC mothers with elevated depressive symptoms were more likely to use food to soothe in a variety of contexts, to use controlling bottle-feeding practices and to report not having enough sleep, than mothers without symptoms. Findings also indicate mothers with elevated depressive symptoms reported using food to soothe more often than mothers without symptoms regardless of how fussy they perceived their child. In contrast, among women without depressive symptoms, there was greater use of food to soothe among mothers who perceived their child to be higher in temperamental negativity (i.e. more fussy), consistent with other reports in the literature (20). Although directionality cannot be established, other studies report that mothers with depressive symptoms tend to be less sensitive, less attuned to their infant's needs and tend to react more negatively in response to child distress, using food to soothe as a default (14). In summary, maternal depressive symptoms may interfere with maternal responsiveness in feeding, thereby promoting excessive intake and interfering with the development of self-regulation (1).

The first aim of this study was to characterize the relationship between maternal depressive symptoms and childhood obesity-promoting behaviours. In this sample, elevated depressive symptoms were common among WIC mothers; 38% were above the cut-off for depressive symptomatology using the CES-D. As hypothesized, and consistent with previous research (15), WIC mothers with elevated depressive symptoms perceived their child's temperament to be more difficult (fussy) and reported using food to soothe and other non-responsive, inappropriate bottle-feeding practices such as putting cereal in the bottle and putting baby to bed with a bottle more often than mothers without depressive symptoms. This was expected as feeding is an effective strategy to soothe, calm or distract a fussy child. One hypothesis in the literature is that mothers tend to use these strategies to let their child to fall to sleep or to increase sleep duration. In the current study, a higher percentage of mothers with elevated depressive symptoms reported

© 2016 The Authors. Pediatric Obesity © 2016 International Association for the Study of Obesity ••, ••–••

not having enough sleep in the past month and having difficulty letting their infant/toddler to sleep at night compared with mothers without elevated depressive symptoms. Although these results were exploratory, more research is needed to better understand how infant sleep duration, perceptions of child temperament and parent mental health interact to influence parent feeding practices and infant weight. This may help to develop more efficient tailored interventions to prevent overfeeding and excessive weight gain during the early years of life.

The second aim of this study was to examine whether maternal depressive symptomatology moderates associations between perceived infant/toddler negativity and the non-responsive feeding practice of using food to soothe. As hypothesized, compared with mothers without depressive symptoms, mothers with elevated depressive symptoms were more likely to use food to soothe across a variety of contexts and situations (i.e. when in public, when mother is busy, tired and stressed), regardless of how fussy they perceived their child (i.e. negativity). This finding highlights the greater exposure of children raised by mothers with elevated depressive symptoms to the use of food to soothe, which may be associated with the development of child self-regulation and later obesity risk (28,29). In contrast, fussier children of mothers without depressive symptoms may be more vulnerable to non-responsive overfeeding practices. Similarly, other studies conducted among mothers without depressive symptoms indicate that greater child negativity is associated with higher infant weight status and more frequent non-responsive feedings (6). In addition, a cross-sectional study of Australian mother–infant dyads from the NOURISH randomized controlled trial study reported that mothers of infants with more difficult temperament reported lower awareness of infant cues and were more likely to use food to soothe (30). Together these findings indicate that mothers with elevated depressive symptoms as well as mothers without symptoms, especially those with a fussy child, appear to need training in alternative parenting strategies to using food to soothe and manage infant/toddler behaviour. Longitudinal research is needed to examine how associations among temperamental negativity, elevated maternal depressive symptoms and child feeding practices predict child self-regulation and weight status over time.

There are several limitations to this study, including a small sample size and lack of ability to assess ethnic differences in this small sample. However, our findings are robust, as we observed significant findings in a relativity small sample size. Additional longitudinal research is needed to confirm our findings in a large, more diverse WIC sample. Further, the exclusive use of self-report measures is an additional study limitation. Further, infant/toddler weight status was not objectively assessed in this study. Future studies with larger samples using approaches such as structural equation modelling are needed to examine how maternal and child characteristics impact controlling maternal feeding practices, including the use of food to soothe, and child weight status as an outcome.

In conclusion, results from the present study reveal that maternal depressive symptoms, as well as mothers' perception of their infant's or toddler's temperamental negativity, were associated with the use of non-responsive feeding practices of low-income mothers of infants and toddlers. Mothers without depressive symptoms appear to be more likely to use food to soothe as negativity increases; whereas mothers with elevated depressive symptoms are more likely to use food to soothe regardless of how fussy they perceive their toddlers and are also more likely to use non-responsive bottle-feeding practices to soothe an infant that are inconsistent with WIC guidance. Whether all of these behaviours are 'obesogenic', the behaviours of mothers with elevated depressive symptoms are less likely to be consistent with current responsive feeding practices that are developmentally appropriate (i.e. adding cereal to the bottle) and contingent on infant cues (i.e. putting baby to bed with a bottle). These findings suggest that the WIC program and other healthcare providers should consider screening for maternal depressive symptoms when counselling on responsive feeding practices. In addition, interventions may need to be individually tailored to address maternal mental health and perceptions of temperament to promote responsive feeding and healthy weight gain.

Conflict of interest

The authors have declared that there is no conflict of interest.

Acknowledgements

We appreciate the important contribution of Shirley Sword, Chief, Nutrition Services at the Pennsylvania Women, Infants and Children Program, for providing guidance when designing and implementing this study. The authors also extend their sincere appreciation to the Pennsylvania WIC Nutrition Program staff that assisted with recruitment for WIC participant focus groups. Lastly, we especially appreciate the insight of the many WIC mothers, without whose

© 2016 The Authors. Pediatric Obesity © 2016 International Association for the Study of Obesity ••, ••–••

willingness to share their experiences this project would not have been possible. Support for this work has been provided by the Pennsylvania (PA) Department of Public Welfare through PA Nutrition Education Tracks, a part of USDA's Supplemental Nutrition Assistance Program (SNAP) and the Children, Youth, & Families Consortium at the Pennsylvania State University.

References

1. Eshel N, Daelmans B, de Mello MC, Martines J. Responsive parenting: interventions and outcomes. *Bull World Health Organ* 2006; 84: 991–8.
2. Black MM, Aboud FE. Responsive feeding is embedded in a theoretical framework of responsive parenting. *J Nutr* 2011; 141: 490–4.
3. Hurley KM, Cross MB, Hughes SO. A systematic review of responsive feeding and child obesity in high-income countries. *J Nutr* 2011; 141: 495–501.
4. Brown A, Lee MD. Early influences on child satiety-responsiveness: the role of weaning style. *Pediatric obesity* 2015; 10: 57–66.
5. Hawley NL, Johnson W, Nu'usolia O, McGarvey ST. The contribution of feeding mode to obesogenic growth trajectories in American Samoan infants. *Pediatric Obesity* 2014; 9: e1–e13.
6. Stifter CA, Anzman-Frasca S, Birch LL, Voegtline K. Parent use of food to soothe infant/toddler distress and child weight status. An exploratory study. *Appetite* 2011; 57: 693–9.
7. Goulding AN, Rosenblum KL, Miller AL, *et al.*. Associations between maternal depressive symptoms and child feeding practices in a cross-sectional study of low-income mothers and their young children. *The International Journal of Behavioral Nutrition and Physical Activity* 2014; 11: 75.
8. Ertel KA, Rich-Edwards JW, Koenen KC. Maternal depression in the United States: nationally representative rates and risks. *J Womens Health* 2011; 20: 1609–17.
9. Riley AW, Coiro MJ, Broitman M, *et al.*. Mental health of children of low-income depressed mothers: influences of parenting, family environment, and raters. *Psychiatr Serv* 2009; 60: 329–36.
10. Gross RS, Velazco NK, Briggs RD, Racine AD. Maternal depressive symptoms and child obesity in low-income urban families. *Acad Pediatr* 2013; 13: 356–63.
11. Gibbs BG, Forste R. Socioeconomic status, infant feeding practices and early childhood obesity. *Pediatric Obesity* 2014; 9: 135–46.
12. Weinberg MK, Tronick EZ. Emotional characteristics of infants associated with maternal depression and anxiety. *Pediatrics* 1998; 102: 1298–304.
13. Lovejoy MC, Graczyk PA, O'Hare E, Neuman G. Maternal depression and parenting behavior: a meta-analytic review. *Clin Psychol Rev* 2000; 20: 561–92.
14. Murray L, Fiori-Cowley A, Hooper R, Cooper P. The impact of postnatal depression and associated adversity on early mother–infant interactions and later infant outcome. *Child Dev* 1996; 67: 2512–26.
15. Hurley KM, Black MM, Papas MA, Caulfield LE. Maternal symptoms of stress, depression, and anxiety are related to nonresponsive feeding styles in a statewide sample of WIC participants. *J Nutr* 2008; 138: 799–805.
16. Natsuaki MN, Ge X, Leve LD, *et al.*. Genetic liability, environment, and the development of fussiness in toddlers: the roles of maternal depression and parental responsiveness. *Dev Psychol* 2010; 46: 1147–58.
17. Kochanska G, Kim S. Difficult temperament moderates links between maternal responsiveness and children's compliance and behavior problems in low-income families. *J Child Psychol Psychiatry* 2013; 54: 323–32.
18. Taveras EM, Rifas-Shiman SL, Oken E, Gunderson EP, Gillman MW. Short sleep duration in infancy and risk of childhood overweight. *Arch Pediatr Adolesc Med* 2008; 162: 305–11.
19. Palmstierna P, Sepa A, Ludvigsson J. Parent perceptions of child sleep: a study of 10,000 Swedish children. *Acta Paediatr* 2008; 97: 1631–9.
20. Anzman-Frasca S, Stifter CA, Birch LL. Temperament and childhood obesity risk: a review of the literature. *Journal of Developmental and Behavioral Pediatrics : JDBP* 2012; 33: 732–45.
21. Organization WH. Obesity: preventing and managing the global epidemic. *Report of a WHO Consultation on Obesity. June 3–5*. World Health Organization: Geneva, Switzerland, 1997, pp. 1998.
22. Radloff LS. The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement* 1977; 1: 385–401.
23. Harris G, Booth IW. The nature and management of eating problems in pre-school children. In: Cooper PJ, Stein A (eds). *Childhood Feeding Problems and Adolescent Eating Disorders New York*. Routledge: NY, 2006, pp. 92–122.
24. Rothbart MK. Measurement of temperament in infancy. *Child Dev* 1981; 52: 569–78.
25. Gartstein MA, Rothbart MK. Studying infant temperament via the revised Infant Behavior Questionnaire. *Infant Behav Dev* 2003; 26: 64–86.
26. Yu Z, Han S, Zhu J, Sun X, Ji C, Guo X. Pre-pregnancy body mass index in relation to infant birth weight and offspring overweight/obesity: a systematic review and meta-analysis. *PLoS One* 2013; 8: e61627.
27. Haycraft E, Blissett J. Predictors of paternal and maternal controlling feeding practices with 2- to 5-year-old children. *J Nutr Educ Behav* 2012; 44: 390–7.
28. Wehrly SE, Bonilla C, Perez M, Liew J. Controlling parental feeding practices and child body composition in ethnically and economically diverse preschool children. *Appetite* 2014; 73: 163–71.
29. Birch LL, Fisher JO, Davison KK. Learning to overeat: maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *Am J Clin Nutr* 2003; 78: 215–20.
30. Adler NE, Boyce T, Chesney MA, *et al.*. Socioeconomic status and health. The challenge of the gradient. *Am Psychol* 1994; 49: 15–24.

© 2016 The Authors. Pediatric Obesity © 2016 International Association for the Study of Obesity ••, ••–••