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Retrospective Maternal Report of Early Eating Behaviors in Anorexia Nervosa

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Abstract

This exploratory study assessed whether maternal recall of childhood feeding and eating practices differed across anorexia nervosa (AN) subtypes. Participants were 325 women from the Genetics of Anorexia Nervosa study whose mothers completed a childhood feeding and eating questionnaire. Multinomial logistic regression analyses were used to predict AN subtype from measures related to childhood eating: (a) infant feeding (breastfed, feeding schedule, age of solid food introduction), (b) childhood picky eating (picky eating before age one and between ages one and five), and (c) infant gastrointestinal problems (vomiting and colic). Results revealed no significant differences in retrospective maternal report of childhood feeding and eating practices among AN subtypes.

Keywords

Anorexia Nervosa; Anorexia Nervosa Subtype; Feeding; Maternal Report; Infancy

The relation between early feeding problems and eating behaviors and subsequent disordered eating remains unclear (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004).

Several longitudinal studies have provided evidence that childhood feeding problems and eating behaviors are associated with the later development of eating pathology (Kotler, Cohen, Davies, Pine, & Walsh, 2001; Marchi & Cohen, 1990). For example, Marchi and Cohen (1990) found that maternal reports of picky eating and digestive problems in childhood were predictive of anorexia nervosa (AN) symptomatology in early adolescence and that maternal report of picky eating in early adolescence was predictive of AN symptomatology in later adolescence. On the other hand, maternal reports of pica and digestive problems in childhood were associated with bulimia nervosa (BN) symptomatology in later adolescence. In this same cohort, Kolter et al. (2001) found that maternal reports of eating conflicts, struggles around meals, and unpleasant meals during childhood were associated with the development of broadly defined AN (amenorrhea not required) during adolescence or young adulthood, and that maternal report of eating too little in childhood was modestly protective for the development of BN across this same interval.

Cross-sectional studies have also revealed associations between early feeding problems and eating behaviors and disordered eating (Micali et al., 2007; Nicholls & Viner, 2009; Råstam, 1992). For example, maternal report of infant feeding problems has been linked to self-reported lifetime AN by age 30 (Nicholls & Viner, 2009) and retrospective maternal report of early gastrointestinal problems has been associated with AN in adolescence (Råstam, 1992). In addition, individuals with BN have been described by their mothers as eating a lot, eating more quickly, and being less picky between the ages of six and ten compared to their healthy sisters (Micali et al., 2007).

In contrast, several investigations have failed to find an association between maternal report of early feeding problems and eating behaviors and later AN (Shoebri & Gowers, 2000) and BN (Mitchell, Boutacoff, & Wilson, 1986). Micali et al., 2007 found no evidence that childhood eating difficulties predicted AN when comparing affected and unaffected sisters. Thus, the association between early feeding problems and eating behaviors and subsequent disordered eating remains somewhat ambiguous and additional studies are needed to complete our understanding of the developmental nature of these disorders. Nonetheless, it is plausible that differential early manifestations of eating behavior may presage or influence the course and expression of later eating disorder symptoms, impacting not only diagnosis (AN vs. BN), but also behavioral symptoms characteristic of diagnostic subtypes (e.g., AN restrictive subtype vs. AN binge-purge subtype).

AN presents as either the restricting or binge-purge subtype and some individuals with AN report purging in the absence of binge eating. Diagnostic crossover between subtypes does occur, typically within the first three to five years of illness and many patients retain their initial subtype profile throughout the course of illness (Bulik, Sullivan, Fear, & Pickering, 1997; Strober, Freeman, & Morrell, 1997; Tozzi, et al., 2005). Yet, a complete understanding of diagnostic fluidity has not yet been reached.

The purpose of this exploratory study was to examine associations between AN subtype and retrospective maternal report of early feeding, picky eating, and gastrointestinal problems. In this secondary analysis, we hypothesized that childhood picky eating would be associated with the restricting subtype of AN as such early experiences could contribute to an eating avoidance pattern or a tolerance for hunger. We also hypothesized that infant gastrointestinal problems would be more commonly associated with AN subtypes characterized by purging symptomatology.

Method

Participants

Data for this study were obtained from the Genetics of Anorexia Nervosa (GAN) study, a multi-center study designed for the purpose of identifying disease susceptibility loci in AN. The GAN study design has been previously described (Kaye, et al., 2008). All probands were English or German speaking, a minimum of 16 years old, reported onset of AN prior to age 45, and met lifetime diagnostic criteria according to the Diagnostic and Statistical Manual of Mental Disorders 4th ed., text rev. (DSM-IV-TR) for AN (excluding the amenorrhea criterion) at least three years prior to study enrollment to reduce the probability of diagnostic crossover (Bulik, et al., 1997; Strober, et al., 1997; Tozzi, et al., 2005).

The threshold for low weight was defined as a body mass index (BMI) at or below 18 kg/m² for females and 19.6 kg/m² for males. This corresponds to the 5th percentile of BMIs in the National Health and Nutrition Examination Survey (Hebebrand, Himmelmann, Hesecker, Schafer, & Remschmidt, 1996). Exclusion criteria for probands included lifetime BMI above 30 kg/m², lifetime presence of regular binge eating (at least twice a week for three months), central nervous system trauma, and psychotic or developmental disability. At least one participating first, second, or third degree relative with AN (excluding parents and monozygotic twin) was required for study inclusion. The inclusion criteria for relatives were broader than for probands as the affected relative could have engaged in regular binge eating. In addition, the affected relative was not required to have met criteria for AN at least three years prior to study entry. However, she was required to have maintained a BMI below the low weight threshold for at least three months during the course of illness.

As part of this genetic study, we asked mothers of individuals with lifetime AN to complete a questionnaire retrospectively about infant feeding practices, childhood picky eating, and gastrointestinal problems (i.e., vomiting and colic). Only participants whose mothers filled out the infant and childhood feeding questionnaire were included in the study. This information was available on 333 participants (325 women and 8 men) representing 36.8% of probands and affected relatives (total participants = 904, total participants with a lifetime history of AN = 875). Data for the eight men were excluded from the analyses because the sample was too small for meaningful comparisons. The total number of families represented in the sample was 186. Of the 325 women, 158 were probands, 121 were sisters, and 46 were more distant relatives. The majority of women (62.9%) had never been married, 27.7% were currently married, 8.8% were separated or divorced, and 0.6% were widowed. The average number (SD) of years of education for the sample was 14.4 (2.8) years, with a range of 3–22 years.

The women whose mothers responded were younger (25.5 vs. 32.7 years), were more likely to be currently ill (72.4% vs. 64.5%), reported lower minimum eating disorder related BMIs (14.3 vs. 14.9 kg/m²), and reported a younger age of onset (16.4 vs. 17.3 years) compared with the women whose mothers did not complete this questionnaire. Each participating site had approval from the local Institutional Review Board and all participants signed informed consent.

Assessments

Eating disorder psychopathology—Lifetime AN diagnoses were established by interview of the affected participant using the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1997) and confirmed by the Structured Interview for Anorexia Nervosa and Bulimic Syndromes (SIAB; Fichter, Herpertz, Quadflieg, & Herpertz-

Dahlmann, 1998). The SIAB was also used to obtain more detailed information about eating disorder symptomatology. After establishing AN diagnosis, AN subtypes were defined and applied as follows: restricting AN (RAN), characterized by restrictive behaviors, but no binge eating or purging behaviors; AN with purging and without binge eating (PAN); and a third group comprised of individuals who had lifetime histories of both AN and binge eating—either at the time of low weight or during a period of normal weight, with or without purging (AN-B).

Childhood assessment—Mothers of affected individuals were asked to answer an infant and early childhood feeding questionnaire developed for the European Healthy Eating Project about their participating child or children. The questionnaire assessed early feeding and eating practices and gastrointestinal problems. Neither psychometric information nor population norms are available. Nonetheless, these questions are of relevance to an eating disorders population. However, given the absence of information on validity and reliability and normative data, our results must be viewed as preliminary and hypothesis generating. Infant feeding practices included the presence/absence of breastfeeding, infant feeding schedule, and introduction of solid food. Feeding schedule was determined by each mother's response to the following question: "Did you feed your baby on demand or did you follow a schedule," with the following response options: "I fed the baby on demand; I tried to feed every 3 hours; I tried to feed every 4 hours; or I tried not to feed the baby at night." Mothers were asked when the affected child began eating solid food once a day, response options being: "under 3 months; between 3–5 months; between 5–7 months; between 7–9 months; or over 9 months." In order to overcome small cell size, "7–9 months" and "over 9 months" were combined.

Picky eating was assessed for two age ranges: between birth and age one and between age one and age five. Mothers were asked to describe which option best described their affected child: "During the first year, your baby: would eat almost everything you fed them; refused to eat some foods, but generally had a good appetite; had a strong preference for a few foods; it was very difficult to get my baby to eat solid food." Since the options "had a strong preference for a few foods" and "it was very difficult to get my baby to eat solid food" were rarely endorsed, they were combined for analysis.

For the assessment of picky eating between ages one and five, mothers were asked: "How often was your child a 'picky' eater?" The response options were: "never/once a month or less; several times a month; once a week or more; and most mealtimes." The responses "once a week or more" and "most mealtimes" were combined due to small cell sizes.

A description of colic was provided to each mother and the mother was asked how often the affected child suffered colic in the first six months. Response options were: "never or less than once a month; several times a month; once a week or more; and most days." The responses "once a week or more" and "most days" were combined due to small cell sizes. To assess vomiting, mothers were asked how often their baby vomited or regurgitated food (excluding spitting up milk), with response options being: "never/once a month or less; several times a month; once a week or more; and most days." This variable was dichotomized (once a month or less vs. greater than once a month) due to small cell size for some response categories.

Statistical Analyses

All statistical analyses were two-tailed and performed using SAS/STAT® 9.2 software (SAS Institute Inc., 2004). Analysis of variance was used to determine if differences across AN subtype existed for age at interview, age at AN onset, and duration of eating disorder at interview. Using PROC GENMOD, the following multinomial logistic regression models

were used to predict AN subtype: (a) infant feeding: AN subtype = breastfed, feeding schedule, and age solid food was introduced; (b) childhood picky eating: AN subtype = picky eating between birth and age one and picky eating between ages one and five; and (c) infant gastrointestinal problems: AN subtype = infant vomiting and colic. We were unable to account for non-independence of the data because the outcome measure, AN subtype, was polynomial and generalized estimating equation (GEE) corrections cannot be applied to categorical data with more than two groups.

Results

Of the 325 women included in this study, 154 (47.4%) were classified as RAN, 93 (28.6%) as PAN, and 78 (24.0%) as AN-B. The mean (standard deviation) age of eating disorder onset was 16.4 (3.2) years and mean duration of AN up to the time of enrollment was 7.2 (6.1) years. At the time of interview, the average age of participants was 25.5 (8.0) years. No across group differences existed for age ($\chi^2 = 3.48$; $p < .07$) or age of eating disorder onset ($\chi^2 = 3.62$; $p < .06$). Duration of eating disorder was different across AN subtypes ($\chi^2 = 8.06$; $p < .005$) with the RAN group having the shortest duration, 6.1 (5.6) years, followed by the AN-B group, 8.2 (6.3) years and the PAN group, 8.3 (6.3) years.

Table 1 presents the frequencies of the variables from the childhood feeding questionnaire. The majority (77.7%) of the women in this sample was breastfed and 86.5% of individuals were introduced to solid food prior to seven months of age. Overall, 11.6% of women in this sample were described by their mothers as picky eaters at least once a week between the ages of one and five and 14.5% of individuals were reported to have experienced infant vomiting. Table 2 presents the results of the multinomial logistic regression models. No measure of infant feeding, childhood picky eating, or infant gastrointestinal problems predicted AN subtype.

Finally, as we were unable to account for the non-independence of the data due to the inclusion of affected relatives in the multinomial logistic regression analyses, we randomly selected a subsample of unrelated participants ($n = 165$) and applied the analyses to this subset. The results remained unchanged (not shown).

Discussion

In this sample of women with RAN, PAN, and AN-B, neither infant feeding, childhood picky eating, nor infant gastrointestinal problems were significantly associated with later AN subtype. An extensive literature has identified factors that distinguish across individuals presenting with different AN subtypes including temperament, comorbidity patterns, and outcomes (Garner, Garner, & Rosen, 1993; Halmi, Brodland, & Loney, 1973; Herzog, Schellberg, & Deter, 1997; Jordan, et al., 2008; Klump, et al., 2000; Pryor, Wiederman, & McGilley, 1996; Root, et al., 2010). Additionally, depression, substance abuse, higher levels of parental criticism, and low self-directedness have been associated with the emergence of bulimic symptomatology in individuals with RAN (Castellini, et al., 2011; Nishimura, et al., 2008; Tozzi, et al., 2005). Although early eating and feeding practices have been associated with AN symptomatology in previous studies (Kotler et al., 2001; Marchi & Cohen, 1990; Nicholls & Viner, 2009; Råstam, 1992), they do not seem to be robust in distinguishing across subtypes of AN—at least as assessed by retrospective maternal report.

This study is based on secondary analysis of a genetic study and should be viewed within the context of several limitations. First, as noted above, the questionnaire on which maternal report was based has not been validated and population norms are not available for comparison. Second, maternal report of infant feeding and early childhood eating patterns

was retrospective and could reflect multiple biases inherent in such accounts. Third, all participants may not have reached the “steady state” of illness. It is possible that individuals could still cross over to another AN subtype during the course of illness; however, the similarity across groups on all relevant measures suggests that such migration would have little effect on the outcome. Fourth, although we were unable to account for the non-independence of the data, this did not appear to affect results. Fifth, it is possible that families with multiple individuals with AN differ from families with one affected individual; thus, these results might not generalize to non-multiplex families.

Conclusion

Although early eating and feeding problems may be a harbinger of risk for later AN symptomatology, in the present study they do not appear to represent critical, underlying dimensions that contribute to specific AN subtype presentations. Other factors, including comorbid psychopathology, temperament, learning history, specific genetic polymorphisms mediating reward deficiencies or addiction proneness, or complex epigenetic mechanisms may be more powerful determinants of AN subtype.

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Table 1

Frequencies, n (%), for responses to infant and childhood questionnaire items by anorexia nervosa subtype

Item Response	Restricting Anorexia Nervosa (n=154)	Purging Anorexia Nervosa (n=93)	Anorexia Nervosa with Binge Eating with or without Purging (n=78)
Breastfed			
Yes	123 (82.0%)	66 (71.7%)	58 (76.3%)
No	27 (18.0%)	26 (28.3%)	18 (23.7%)
Feeding Schedule			
On Demand	99 (64.3%)	47 (50.5%)	48 (61.5%)
Every 3 Hours	15 (9.7%)	16 (17.2%)	10 (12.8%)
Every 4 Hours	33 (21.4%)	23 (24.7%)	18 (23.1%)
Tried Not to Feed at Night	7 (4.6%)	7 (7.5%)	2 (2.6%)
Start Solid Food Regularly Once a Day			
Under 3 Months	8 (7.0%)	7 (9.3%)	8 (12.7%)
3 to 5 Months	54 (47.4%)	42 (56.0%)	21 (33.3%)
5 to 7 Months	33 (29.0%)	17 (22.7%)	28 (44.4%)
Over 7 Months	19 (16.7%)	9 (12.0%)	6 (9.5%)
Picky Eating during First Year			
Ate Almost Everything	94 (62.3%)	56 (61.5%)	44 (57.1%)
Refused Some Foods	47 (31.1%)	27 (29.7%)	26 (33.8%)
Strong Preference for a Few Foods	10 (6.6%)	8 (8.8%)	7 (9.1%)
Picky Eating Ages 1–5			
Once a Month or Less	120 (79.0%)	77 (85.6%)	49 (64.5%)
Several Times a Month	16 (10.5%)	6 (6.7%)	13 (17.1%)
Once a Week or More	16 (10.5%)	7 (7.8%)	14 (18.4%)
Colic-First 6 Months			
Less than Once a Month	103 (68.7%)	63 (70.0%)	57 (73.1%)
Several Times a Month	20 (13.3%)	13 (14.4%)	7 (9.0%)
Once a Week or More	27 (18.0%)	14 (15.6%)	14 (18.0%)
Infant Vomiting			
Yes	18 (12.0%)	13 (14.3%)	15 (19.7%)
No	132 (88.0%)	78 (85.7%)	61 (80.3%)

Table 2

Results, χ^2 (p-value), from the multinomial logistic regression models predicting anorexia nervosa subtype from measures of infant feeding, childhood picky eating, and infant gastrointestinal problems.

Retrospective Maternal Feeding Measure	χ^2 (p-value)
Infant Feeding	
Breastfed	1.90 (.17)
Feeding Schedule	0.94 (.82)
Introduction of Solids	5.85 (.12)
Childhood Picky Eating	
Picky eating before 1 year of age	0.01 (.99)
Picky eating between ages 1 and 5	3.03 (.22)
Infant Gastrointestinal Problems	
Colic	1.55 (.47)
Infant Vomiting	2.75 (.10)