HHS Public Access

Author manuscript

Eat Weight Disord. Author manuscript; available in PMC 2015 December 18.

Published in final edited form as:

Eat Weight Disord. 2010 September ; 15(3): e186–e189.

Is season of birth related to disordered eating and personality in women with eating disorders?

Nicole K. Shuman[1], **Isabel Krug, Ph.D.**[2], **Millie Maxwell, Ph.D.**[3], **Andrea Poyastro Pinheiro, M.D., Ph.D.**[3], **Timothy Brewerton, M.D.**[4], **Laura M. Thornton, Ph.D.**[3], **Wade H. Berrettini, M.D.**[5], **Harry Brandt, M.D.**[6], **Steven Crawford, M.D.**[6], **Scott Crow, M.D.**, **Manfred M. Fichter, M.D.**[8,9], **Katherine A. Halmi, M.D.**[10], **Craig Johnson, Ph.D.**[11], **Allan S. Kaplan, M.D.**[12], **Pamela Keel, Ph.D.**[13], **Maria LaVia, M.D.**[3], **James Mitchell, M.D.**[14,15], **Alessandro Rotondo, M.D.**[16], **Michael Strober, Ph.D.**[17], **D. Blake Woodside, M.D.**[12], **Walter H. Kaye, M.D**[18], and **Cynthia M. Bulik, Ph.D.**[3,19]

[1]Maggie L Walker Governor's School for Government and International Studies, Richmond, VA

[2]Department of Psychiatry, Bellvitge University Hospital, Barcelona and Ciber Fisiopatologia de la Obesidad y Nutricion (CIBERobn), Instituto Salud Carlos III, Spain

[3]Department of Psychiatry, University of North Carolina at Chapel Hill, NC

[4]Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina at Charleston, SC

[5]Center of Neurobiology and Behavior, University of Pennsylvania, Philadelphia, PA

[6]St. Joseph's Medical Center, Towson, MD

[7]Department of Psychiatry, University of Minnesota, Minneapolis, Minnesota

[8]Department of Psychiatry, University of Munich (LMU), Germany

[9]Roseneck Hospital for Behavioral Medicine, Prien, Germany

[10]New York Presbyterian Hospital-Westchester Division, Weill Medical College of Cornell University, White Plains, NY

[11]Laureate Psychiatric Clinic and Hospital, Tulsa, OK

[12]Department of Psychiatry, Toronto General Hospital, University Health Network, Toronto, Canada

[13]Department of Psychology, Florida State University, Tallahassee, Florida

[14]Neuropsychiatric Research Institute, Fargo, ND

[15]Department of Clinical Neuroscience, University of North Dakota School of Medicine and Health Sciences, ND

[16]Department of Psychiatry, Pharmacology and Biotechnologies, University of Pisa, Pisa, Italy

Correspondence to: Dr Bulik, Department of Psychiatry, University of North Carolina at Chapel Hill, 1st floor Neurosciences Hospital, 101 Manning Drive, CB #7160, Chapel Hill, NC 27599-7160, Voice: (919) 843 1689 Fax: (919) 966-5628, cbulik@med.unc.edu.

[17]Department of Psychiatry and Biobehavioral Sciences, David Geffen School of Medicine, University of California at Los Angeles, Los Angeles, CA

[18]Department of Psychiatry, University of California at San Diego, San Diego, CA

[19]Department of Nutrition, University of North Carolina at Chapel Hill, Chapel Hill, NC

Abstract

We assessed the relation between season of birth and eating disorder symptoms and personality characteristics in a sample of 880 women with eating disorders and 580 controls from two Price Foundation Studies. Eating disorder symptoms were assessed using Structured Interview of Anorexic and Bulimic Disorders and the Structured Clinical Interview for DSM-IV. Personality traits were assessed using the Temperament and Character Inventory and the Frost Multidimensional Perfectionism Scale. Date of birth was obtained from a sociodemographic questionnaire.

No significant differences were observed 1) in season of birth across eating disorder subtypes and controls; nor 2) for any clinical or personality variables and season of birth. We found no evidence of season of birth variation in eating disorders symptoms or personality traits. Contributing to previous conflicting findings, the present results do not support a season of birth hypothesis for eating disorders.

Keywords

anorexia nervosa; bulimia nervosa; eating disorders; season of birth

---

The relation between season of birth and eating disorders is of considerable interest, although results are inconsistent. Occasional studies report that eating disorders occur more frequently in those born from February to June (1–6). One noted stronger restrictive eating attitudes in a non-clinical population in those born between May and August (7). Other studies of anorexia (AN) (8, 9), bulimia (BN) and eating disorders not otherwise specified (9, 10) have not replicated these associations.

Associations may exist between environmental factors and personality phenotypes. Specifically, season of birth has been associated with novelty seeking, harm avoidance, and cooperativeness (11, 12). Personality may be responsive to environmental and developmental influences of birth season.

Discrepancies in methodology, season of birth and eating disorders definitions, and sample characteristics complicate comparisons. A common season of birth definition incorporates birth month and temperature at assumed conception. Most studies used a restricted number of measures to assess eating problems and failed to examine personality constructs. To date no study has examined season of birth in eating disorders in a case-control design employing carefully screened controls.

We assessed seasonal effects on eating disorder diagnoses, symptoms, and personality characteristics in a large, well-characterized sample of women with eating disorders and

healthy controls. We hypothesized women born in February through May in the northern hemisphere would have more severe eating disorders, reflected by higher scores on pathological indices.

METHOD

Participants

Participants were probands from Price Foundation multisite international studies: the BN Affected Relative Pairs Study (13) and the AN Trios Study (14). All sites received Institutional Review Board approval; all participants gave consent.

Criteria for BN study probands included: DSM-IV (15) diagnosis of BN, with at least six months of binge eating and vomiting at least twice weekly, and age between 13 and 65 years. AN Trios proband criteria included modified DSM-IV (15) lifetime diagnosis of AN, amenorrhea not required; low weight that is/was $<5^{th}$ percentile of BMI for age and sex; onset before age 25; age between 13 and 65; and criteria met at least three years prior to assessment.

Unrelated healthy women 18–65 years old; with adult BMI between 19 and 27; and matched with affected women on site, age, ancestry, and education served as controls. Exclusion criteria were history of an eating disorder or related behaviors, defined by a score of 20 or higher on the Eating Attitudes Test (16); a first degree relative with an eating disorder; or any disorder defined by the Structured Clinical Interview for DSM-IV(SCID) Screen Patient Questionnaire (17).

Eating Disorder Diagnoses—History of eating disorders, minimum and maximum BMI, age of onset, eating disorder duration, binge eating, fasting, excessive exercise, use of various compensatory behaviors were assessed with the SIAB (18). An expanded version of Module H of the SCID (19) was administered to validate diagnosis and determine symptoms and recovery status.

Personality and Symptom Assessments—Participants completed the Temperament and Character Inventory (TCI) (20) and the Frost Multidimensional Perfectionism Scale (MPS) (21).

Season of birth—Participants were assigned to groups by birth date two ways. First, solstices and equinoxes determined seasons e.g., spring (March 21–June 20). Second, northern hemisphere insolation criterion (measure of solar radiation at the earth's surface) defined insolar seasons, with summer (May 6–August 5) being the quarter of the year with the greatest insolation, winter (November 6–February 4) with the least, and spring (February 5–May 5) and fall (August 6–November 5) with midrange amounts of light (22).

Analysis

Literature suggests more patients with AN restrictive subtype (RAN) are born in spring (23), thus we compared controls with women with RAN. We also compared controls with a larger sample with "any eating disorder" including AN and/or BN (Any ED). The number of

controls born in both traditional and insolar seasons were compared with women with RAN and then with women with Any ED using a chi-square analysis.

Differences between season of birth groups, eating disorders behaviors, and personality traits were assessed with logistic regression or analysis of variance. Significance tests were two-tailed; p-values were adjusted to correct for multiple testing using false discovery rate (24). All analyses were conducted using SAS v9.1 (25).

RESULTS

Women missing birth date information were excluded (n=391, including all German participants) resulting in 580 controls and 880 probands (264 RAN; 616 other AN and/or BN). Lifetime lowest and highest BMI were significantly lower for RAN and Any ED groups relative to controls (all p-values<.001).

For traditional season analysis, no significant differences emerged between controls and women with RAN (χ^2=0.70, df=3, p<0.87) or women with Any ED (χ^2=1.12, df=3, p<0.77). Similarly, insolar season analysis yielded no significant differences between controls and women with RAN (χ^2=4.68, df=3, p<0.20) or women with Any ED (χ^2=2.63, df=3, p<0.45). No significant associations were found for clinical or personality variables using either season definition among women with eating disorders.

DISCUSSION

We found no evidence of seasonal variation of birth for RAN or Any ED. Additionally we found no association between eating disorders symptoms and season of birth. The lack of differences questions the etiological relevance of season of birth in eating disorders. Several possibilities exist for these discrepant findings

The relation between seasonality and eating disorders does not match calendar months precisely and might differ from traditional three-month seasons commonly used [e.g. (5)]. We reduced uncertainty by determining birth date from the middle/end of the month (traditional season dates) and the beginning (insolation dates) diminishing the probability of miscalculation and focusing implications of results. This approach enabled a comparison of studies from distinct geographical locations using traditional seasons and an assessment of climatic variation using insolation criterion (23). Both appropriate, complementary techniques found no effect of seasonality.

Small sample sizes posed problems in previous studies [e.g., (23)], which may undermine statistical methods and power. By ignoring missing birth date data, most studies [e.g., (1, 2, 8)] did not account for exactness of birth dates. We excluded participants missing these data while employing a sample large enough to make meaningful comparisons.

In some studies, eating disorder samples were compared to the general population (1, 5, 6). Often control participants' birth years only partly overlapped with affected participants' (3, 5, 6). As birth rates differ across time, control and eating disorders groups should assess the same birth years. Differing diagnostic systems and sample selection (1, 3, 5) have made

comparative interpretations difficult. We clearly defined diagnostic criteria and used experienced assessors. Furthermore, we used a control group comprised of local and same-sex participants; compared the sample in two ways, both RAN and Any ED diagnosis versus controls; and entered age in all analyses. This design demonstrated greater diagnostic specificity and control than previous studies.

Limitations remain. First, findings may not generalize to other individuals with eating disorders because Price Foundation studies required participation of family members. However, no known reason suggests season of birth would differ in families with more than one affected person. Second, we did not account for other Axis I diagnoses, but did include an investigation of personality not previously explored. Finally, while participants were from countries in the northern hemisphere, climate and precise location at birth were unavailable thus could not be assessed.

Conclusions

The present study improved methodological control yet failed to show any meaningful relation among seasonality, personality, and eating disorders. Although intriguing, based on results from this large and well-characterized sample, season of birth does not appear to differ significantly between women with eating disorders and controls, nor does it contribute to differences across eating disorder subtypes.

Acknowledgments

The authors thank the Price Foundation for the support of the clinical collection of participants and support of data analysis. The authors are indebted to the participating families for their contribution of time and effort in support of this study. This research was supported by the National Institutes of Health Grant (MH66117). Dr. Strober was supported in part by the Franklin Mint Endowed Chair in Eating Disorders.

References

1. Nielsen S. Seasonal variation in anorexia nervosa? Some preliminary findings from a neglected area of research. Int J Eat Disord. 1992; 11:23–35.
2. Rezaul I, Persaud R, Takei N, Treasure J. Season of birth and eating disorders. Int J Eat Disord. 1996; 19:53–61. [PubMed: 8640203]
3. Eagles JM, Andrew JE, Johnston MI, Easton EA, Millar HR. Season of birth in females with anorexia nervosa in Northeast Scotland. Int J Eat Disord. 2001; 30:167–175. [PubMed: 11449450]
4. Waller G, Watkins B, Potterton C, Niederman M, Sellings J, Willoughby K, Lask B. Pattern of birth in adults with anorexia nervosa. J Nerv Ment Dis. 2002; 190:752–756. [PubMed: 12436015]
5. Watkins B, Willoughby K, Waller G, Serpell L, Lask B. Pattern of birth in anorexia nervosa. I: Early-onset cases in the United Kingdom. Int J Eat Disord. 2002; 32:11–17. [PubMed: 12183938]
6. Jongbloet PH, Groenewoud HM, Roeleveld N. Seasonally bound ovopathy versus “temperature at conception” as cause for anorexia nervosa and other eating disorders. Int J Eat Disord. 2005; 38:236–243. [PubMed: 16211635]
7. Waller G, Meyer C, van Hanswijck de Jonge L. Early environmental influences on restrictive eating pathology among nonclinical females: the role of temperature at birth. Int J Eat Disord. 2001; 30:204–208. [PubMed: 11449454]
8. Crisp A. Collaborators: Section 1: Seven Studies 1.1. Anorexia nervosa and season of birth. Eur Eat Disord Rev. 2006; 14:144–146.
9. Button E, Aldridge S. Season of birth and eating disorders: patterns across diagnoses in a specialized eating disorders service. Int J Eat Disord. 2007; 40:468–471. [PubMed: 17726770]

10. Morgan JF, Lacey JH. Season of birth and bulimia nervosa. Int J Eat Disord. 2000; 27:452–458. [PubMed: 10744852]
11. Chotai J, Lundberg M, Adolfsson R. Variations in personality traits among adolescents and adults according to their season of birth in the general population: further evidence. Person Individ Diff. 2003; 35:897–908.
12. Chotai J, Forsgren T, Nilsson LG, Adolfsson R. Season of birth variations in the temperament and character inventory of personality in a general population. Neuropsychobiology. 2001; 44:19–26. [PubMed: 11408788]
13. Kaye WH, Devlin B, Barbarich N, Bulik CM, Thornton L, Bacanu SA, Fichter MM, Halmi KA, Kaplan AS, Strober M, Woodside DB, Bergen AW, Crow S, Mitchell J, Rotondo A, Mauri M, Cassano G, Keel P, Plotnicov K, Pollice C, Klump KL, Lilenfeld LR, Ganjei JK, Quadflieg N, Berrettini WH. Genetic analysis of bulimia nervosa: methods and sample description. Int J Eat Disord. 2004; 35:556–570. [PubMed: 15101071]
14. Reba L, Thornton L, Tozzi F, Klump KL, Brandt H, Crawford S, Crow S, Fichter MM, Halmi KA, Johnson C, Kaplan AS, Keel P, LaVia M, Mitchell J, Strober M, Woodside DB, Rotondo A, Berrettini WH, Kaye WH, Bulik CM. Relationships between features associated with vomiting in purging-type eating disorders. Int J Eat Disord. 2005; 38:287–294. [PubMed: 16261604]
15. American Psychiatric Association. Diagnostic and Statistical Manual for Psychiatric Disorders. 4. Washington, DC: American Psychiatric Press; 1994.
16. Garner D, Olmsted M, Bohr Y, Garfinkel P. The Eating Attitudes Test: psychometric features and clinical correlates. Psychol Med. 1982; 12:871–878. [PubMed: 6961471]
17. First, M.; Gibbon, M.; Williams, J.; Spitzer, P.; Staff, M. SCID Screen Patient Questionnaire (SSPQ) and SCID SCREEN Patient Questionnaire-Extended (SSPQ-X), Computer Program for Windows TM, Software Manual. Washington, D.C: American Psychiatric Press, Inc; 1999.
18. Fichter M, Herpertz S, Quadflieg N, Herpertz-Dahlmann B. Structured interview for anorexic and bulimic disorders for DSM-IV and ICD-10: updated (third) revision. I Int J Eat Disord. 1998; 24:227–249.
19. First, M.; Spitzer, R.; Gibbon, M.; Williams, J. Structured Clinical Interview for DSM-IV Axis I Disorders, Research Version, Patient Edition. New York: Biometrics Research, New York State Psychiatric Institute; 1997.
20. Cloninger CR, Svrakic DM, Przybeck TR. A psychobiological model of temperament and character. Arch Gen Psychiatry. 1993; 50:975–990. [PubMed: 8250684]
21. Frost R, Marten P, Lahart C, Rosenblate R. The dimensions of perfectionism. Cogn Ther Res. 1990; 14:449–468.
22. Pidwirny, M. Daily and Annual Cycles of Temperature. In: Pidwirny, M., editor. Fundamentals of Physical Geography. 2. 2006.
23. Winje E, Willoughby K, Lask B. Season of birth bias in eating disorders--fact or fiction? Int. J Eat Disord. 2008; 41:479–490.
24. Benjamini Y, Hochberg Y. Controlling the false discovery rate: a practical and powerful approach to multiple testing. J Royal Stat Soc Ser B. 1995; 57:289–300.
25. SAS Institute Inc. SAS/STAT® Software: Version 9. Cary, NC: SAS Institute, Inc; 2004.