

Risk Factors for Anorexia Nervosa: A National Cohort Study

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Abstract: **Objective:** To identify possible risk factors for anorexia nervosa through national registers. **Method:** The study includes the entire Swedish population of 989,871 individuals born between 1973 and 1982. Patients with anorexia nervosa were identified through the Swedish Hospital Discharge Register from November 1990 to December 1999. Information about sociodemographic, perinatal, and psychosocial variables was obtained from different national registers. Attributable risk (AR) was calculated for potential risk factors. **Results:** Females had the highest AR for hospital admission because of anorexia nervosa (89.2%). Another important risk factor was having parents born in northern, central, or eastern Europe (AR: 49.3%). Psychosocial risk factors also were associated with an increased risk for anorexia nervosa (AR: 7.6%), whereas perinatal complications had an AR of only 3.6%. **Discussion:** The most important risk factors were related to the sociocultural context of the individual, thus supporting hypotheses of a sociocultural etiology of anorexia nervosa. © 2003 by Wiley Periodicals, Inc. *Int J Eat Disord* 34: 397–408, 2003.

Key words: risk factors; anorexia nervosa; national registers; Swedish population

INTRODUCTION

Although anorexia nervosa is an uncommon disorder, with an estimated prevalence of 0.3%–1% (De Filippo, Signorini, Bracale, Pasanisi, & Contaldo, 2000; Kaye, Klump, Frank, & Strober, 2000), the consequences are burdensome for the individual as well as for the society. The disorder is associated with a high risk of mortality, a low recovery rate, high comorbidity, physical complications, and with a high risk of relapse (Kaye et al., 2000; Mizes & Palermo, 1997; Vitello & Lederhendler, 2000).

The onset of anorexia nervosa usually occurs during adolescence, at a mean age of 17 years (Willi, Giacometti, & Limacher, 1990). The disorder is more common among females than among males (Götestam, Eriksen, Heggstad, & Nielsen, 1998; Szmukler, McCance, McCrone, & Hunter, 1986; Turnbull, Ward, Treasure, Jick, & Derby, 1996).

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A risk of psychiatric disorders within families of patients with anorexia nervosa has not been demonstrated definitively (Lilenfeld et al., 1998). Perinatal factors such as cephalhematoma and premature birth were associated with anorexia nervosa in a population-based study (Cnattingius, Hultman, Dahl, & Sparén, 1999). The association between geographic location of residency and the prevalence of anorexia nervosa has not yet been demonstrated (Hoek et al., 1995; Rathner & Messner, 1993). Clinical observations that anorexia nervosa is more common in a higher socioeconomic class compared with other socioeconomic strata have not been supported convincingly by epidemiologic studies (McClelland & Crisp, 2001; Rogers, Resnick, Mitchell, & Blum, 1997). An important role for factors related to ethnicity has been suggested by some U.S. studies that showed a lower prevalence among African Americans compared with Caucasians (Andersen & Hay, 1985; Rhea, 1999; Striegel-Moore, Schreiber, Lo, Crawford, & Obarzanek, 2000). Adoption has also been mentioned in one study as a risk factor for eating disorders (Holden, 1991).

Studies of the epidemiology of anorexia nervosa are contradictory because of different selection criteria for populations and use of methods. Epidemiologic research has focused mainly on studies of prevalence and incidence of anorexia nervosa or on a single epidemiologic risk factor whereas a more complete survey of different epidemiologic factors in one sample is still lacking. The objective of the current study was to employ the unique characteristics of the Swedish national registers to describe different epidemiologic factors such as gender distribution, familial risk, perinatal factors, settings, socioeconomic status (SES), adoption, and ethnicity in a nationwide sample of hospital cases of anorexia nervosa.

METHODS

Study Population

The current study was based on data from the national registers of the Swedish National Board of Health and Welfare and Statistics Sweden, which are linked through each individual's unique personal identification number. The study population consisted of the entire Swedish population born between 1973 and 1982 ($N = 989,871$) and documented in the Swedish Population and Housing Census of 1990 (Statistics Sweden, 1998).

Sociodemographic Variables

The Swedish Population and Housing Census of 1990 was used to create variables about year of birth, SES, housing, and geographic location of the home (residency). SES was defined according to a classification used by Statistics Sweden, which is based on occupation, educational level, type of production, and position at work of the head of the household (Statistics Sweden, 1989). Social welfare benefits received by the head of the household in the 1990 census were identified in the 1990 Total Enumeration Income Survey (The Swedish National Board of Health and Welfare, 1994). The ethnicity of the subjects included in the current study was classified according to the country of birth of the adults in the household in the census of 1990. When the adults in the household had diverse ethnicity, the child was classified according to the ethnicity of the oldest female. If there were no female adults in the household, the child was classified according to the ethnicity of the oldest male in the household. If at least one, but not all adults in a household were born in Sweden, the child was classified in an intermediate group (e.g., Finland-Sweden, eastern Europe/Sweden).

Perinatal Variables

The 921,419 individuals in the study population who were born in Sweden were identified in the Swedish Birth Medical Register. This register provides maternal demographic data as well as prenatal and perinatal factors for all hospital births in Sweden. Ninety-nine percent (915,250) of these individuals had complete records that were used in the analysis of prenatal and perinatal determinants. Potential risk factors were chosen according to those described by Cnattingius et al. (1999) and Dalman, Allebeck, Cullberg, Grunewald, and Köster (1999). The variables included maternal age (in completed years at the time of the infant's birth), gestational age (in completed gestational weeks based on the last menstrual period), birth weight (in grams), birth weight for gestational age (in standard deviations below or above the mean birth weight for gestational age according to the Swedish birth weight curve), preterm rupture of the membranes (International Classification of Disease [ICD]-8 (World Health Organization, 1974) codes 635.95 and 661.0), Apgar score at 5 min, cephalhematoma (ICD-8 code 772.31), preeclampsia (ICD-8 code 637), and breech delivery (ICD-8 code 650.6–662.6). Birth weight for gestational age was stratified into small for gestational age (below -2 SDs), appropriate for gestational age (between -2 and $+2$ SDs), and large for gestational age (above $+2$ SDs).

Psychosocial Determinants

The Swedish Hospital Discharge Register includes data on all inpatient discharges and diagnoses. Risk factors related to parental psychiatric illness and addiction were obtained through individual record linkage to the Swedish Hospital Discharge Register for the years 1987–1990. The variables were defined according to ICD-9 (World Health Organization, 1977): any psychiatric disorder (a main diagnosis of code 290–319), drug abuse (a main or contributory diagnosis of code 292, 304, 965.0, 968.5, 969.6, 969.7), or alcohol abuse (a main or contributory diagnosis of code 291, 303, 305.0, 357.5, 425.5, 353.3, 571.0–571.3, E860, E980+980). Study subjects who were born outside of Europe, who had no biologic parents in the Swedish Parent Register, and who lived in a household where all adults were Swedish born were classified as intercountry adoptees (Hjern, Lindblad, & Vinnerljung, 2002). The Swedish Register of Children and Young Persons subjected to Child Welfare Measures was used to identify children who were placed in foster care for at least 1 day before their 13th birthday.

Patients

The outcome variable hospital admission because of anorexia nervosa was created from data on main diagnosis in the Swedish Hospital Discharge Register from November 1990 to December 1999. Anorexia nervosa was defined using the ICD-9 for the years 1990–1996 (code 307B) and ICD-10 (World Health Organization, 1992) for the years 1997–1999 (code F500 or F501).

Statistical Methods

Multivariate analyses were conducted using Cox regression of person-years with the dichotomized outcome variable anorexia nervosa as the dependent variable. Person-years were calculated with data on death from National Cause of Death Register for the years 1990–1998 and data on immigration from the Total Enumeration Income Survey during the years 1991–1998. Birth year was entered as a continuous variable in the regression models. Other sociodemographic variables were entered as dichotomized variables. Dummy variables were created for SES (six categories), residency (three categories), ethnicity (seven categories),

gestational age (four categories), and maternal age at birth of the child (six categories). Attributable risk (AR) was calculated according to Rothman and Greenland (1998) based on gender-adjusted and age-adjusted odds ratios with 95% confidence intervals.

RESULTS

Descriptive Statistics

In the whole study population of 989,871 subjects, 1,122 cases of anorexia nervosa were identified. The cumulative incidence of anorexia nervosa from November 1990 to December 1998 was 0.22% for females and 0.01% for males (Table 1). The cumulative incidence of anorexia nervosa by year of birth varied from 0.07% to 0.14%, with older subjects having a higher incidence. Children of parents with a white-collar profession (3) had a high cumulative incidence of anorexia nervosa (0.19%). The cumulative incidence for ethnicity was particularly low in children from the Middle East (0.02%) and Africa (0.03%). Children with psychosocial risk factors (e.g., parental psychiatric disorder, foster care, and inter-country adoption) had a high cumulative incidence of anorexia nervosa (0.21%–0.27%).

The cumulative incidence of maternal age at birth of the child was lowest for young mothers (Table 2). The cumulative incidence of gestational age from 23 to 32 weeks at birth was 0.42% for anorexia nervosa. Complications during delivery (e.g., premature rupture of membranes, cephalhematoma, and breech delivery) were associated with a higher cumulative incidence for anorexia nervosa compared with no complications during delivery. Conversely, complications during pregnancy were not associated with a higher incidence of anorexia nervosa compared with no complications during pregnancy.

Table 1. Cumulative incidence of anorexia for sociodemographic and psychosocial characteristics

Characteristics	N	Cases	1/10,000
Gender			
Male	507,144	61	1.2
Female	482,727	1061	22.0
Birth year			
1973	109,254	91	11.3
1974	110,139	82	7.4
1975	103,613	128	12.4
1976	98,430	121	12.3
1977	95,886	117	12.2
1978	92,884	127	13.7
1979	95,835	138	14.4
1980	96,758	123	12.7
1981	94,102	106	11.3
1982	92,970	89	9.6
Socioeconomic status			
Unclassified	192,251	185	9.6
Manual workers	269,068	239	8.9
Skilled workers	96,882	107	11.0
White collar 1	170,175	218	12.8
White collar 2	185,320	231	12.5
White collar 3	76,175	142	18.6
Received social welfare 1990			
Yes	68,496	56	8.2
No	921,375	1,066	11.6

(Continued)

Table 1. Continued

Characteristics	N	Cases	1/10,000
Ethnicity			
Sweden	824,392	966	11.7
Finland	23,595	21	8.9
Finland/Sweden	28,976	31	10.7
Eastern Europe	9,418	10	10.6
Eastern Europe/Sweden	7,709	8	10.4
Western Europe	7,530	5	6.6
Western Europe/Sweden	24,569	38	15.5
Southern Europe	11,091	6	5.4
Southern Europe/Sweden	6,905	8	11.6
Middle East	20,085	5	2.5
Middle East/Sweden	1,749	3	17.2
Africa	2,924	1	3.4
Africa/Sweden	1,703	2	11.7
Asia	3,942	3	7.6
Asia/Sweden	2,784	6	21.6
Latin America	8,351	5	9.7
Latin America/Sweden	4,112	4	6.0
Unclassified	28	0	0.0
Housing			
Unclassified	3,189	3	9.4
Rental apartment	232,400	236	10.2
Own apartment	74,009	102	13.8
Own house	680,273	781	11.3
Single adult household			
Yes	120,382	142	11.8
No	869,489	980	11.3
Residency			
Metropolitan area	273,600	310	11.3
Smaller city	504,861	583	11.5
Rural	211,410	229	10.8
Psychosocial risk factors			
Parental alcohol addiction			
Yes	17,464	22	12.6
No	971,285	1,100	11.3
Parental drug addiction			
Yes	3,238	3	9.3
No	985,511	1,119	11.3
Parental psychiatric disorder			
Yes	24,512	52	21.2
No	964,237	1,070	11.1
Foster care			
Yes	28,153	73	25.9
No	960,596	1,049	10.9
Intercountry adoption			
Yes	12,165	34	27.9
No	977,706	1,000	11.1
All	989,871	1,122	11.3

Sociodemographic Risk Factors

Female gender was identified as the most important sociodemographic risk factor with an age-adjusted odds ratio (OR) of 18.2 (Table 3). There was a gradual reversed social gradient for SES. For example, children of skilled workers had higher ORs than children of manual workers. Children of white-collar parents had an even higher OR whereas children in families receiving social welfare during 1990 had a lower OR for anorexia nervosa.

Table 2. Prenatal and perinatal characteristics of anorexia nervosa

Characteristics	N	Cases	1/10,000
Maternal age at birth of child (years)			
12–15	773		
16–17	10,474	6	5.7
18–19	40,921	36	8.8
20–24	263,196	267	10.1
25–28	284,014	343	12.1
29–32	196,229	236	12.0
33–36	87,549	124	14.1
≥37	32,094	34	10.6
Gestational age at birth (weeks)			
23–28	841	2	23.7
29–32	5,826	11	18.8
33–36	39,720	56	14.1
37–41	831,705	949	11.4
42–45	37,158	28	7.5
Indicators of complications during pregnancy			
Preeclampsia	19,651	20	10.2
	895,599	1026	11.4
Small for gestational age	44,056	54	12.2
	871,194	992	11.4
Complications during delivery			
Premature rupture of membranes			
	13,739	25	18.2
	901,511	1021	11.3
Cephalhematoma			
	16,906	30	17.7
	898,344	1016	11.3
Oxygen treatment			
	18,402	20	10.9
	896,848	1026	11.4
Low Apgar at 1 or 5 min			
	10,439	10	9.6
	904,811	1036	11.4
Neonatal distress			
	8,412	8	9.5
	906,838	1,038	11.4
Ablatio placentae			
	3,259	5	15.3
	911,991	1,041	11.4
Breech delivery			
	21,692	35	16.1
	893,558	1,011	11.3
All			
	915,250	1,046	11.4

Children in families in which all adults in the household were born in Southern Europe or outside Europe had a lower OR (OR = 0.4) for anorexia nervosa compared with children of parents born in Sweden or other parts of Europe (Table 3). Social and ethnic gradients changed marginally when both categories of variables as well as psychosocial risk factors were included in the multivariate analysis (Table 3, Model 2).

Psychosocial Risk Factors

Adolescents in families in which at least one of the parents had been discharged from the hospital with a psychiatric diagnosis during the years 1987–1990 had an increased risk for developing anorexia nervosa (OR = 1.9). The same finding was evident for

Table 3. Cox regression models of sociodemographic and psychosocial risk factors of anorexia ($N = 989,871$)

Characteristics	Model 1 ^a	Model 2 ^b
Gender		
Male	1	1
Female	18.4 (14.2–23.8)	18.4 (14.2–23.8)
Socioeconomic status		
Unclassified	1.1 (0.9–1.3)	1.1 (0.9–1.3)
Manual workers	1	1
Skilled workers	1.3 (1.0–1.6)	1.3 (1.0–1.6)
White collar 1	1.4 (1.2–1.7)	1.4 (1.2–1.7)
White collar 2	1.4 (1.2–1.7)	1.4 (1.2–1.7)
White collar 3	2.1 (1.7–2.6)	2.1 (1.7–2.6)
Ethnicity		
Sweden	1	1
Finland	0.8 (0.5–1.2)	0.8 (0.5–1.2)
Finland/Sweden	1.0 (0.7–1.4)	1.0 (0.7–1.4)
Western and eastern Europe	0.9 (0.5–1.4)	0.9 (0.5–1.4)
Western and eastern Europe/Sweden	1.3 (1.0–1.7)	1.3 (1.0–1.7)
Non-European and southern Europe	0.4 (0.2–0.6)	0.4 (0.2–0.6)
Non-European and southern Europe/Sweden	1.2 (0.8–1.8)	1.2 (0.8–1.8)
Housing		
Unclassified	0.8 (0.2–2.6)	*
Rental apartment	0.9 (0.8–1.0)	*
Own apartment	1.2 (0.9–1.5)	*
Own house	1	*
Received social welfare 1990		
Yes	0.7 (0.5–0.9)	*
No	1	*
Single adult household		
Yes	1.0 (0.9–1)	*
No	1	*
Residency		
Metropolitan area	1	*
Smaller city	1.0 (0.8–1.2)	*
Rural	1.0 (0.8–1.1)	*
Psychosocial risk factors		*
Parental alcohol addiction		*
Yes	1.1 (0.7–1.1)	*
No	1	*
Parental drug addiction		*
Yes	0.8 (0.5–1.1)	*
No	1	*
Parental psychiatric disorder		
Yes	1.9 (1.4–2.5)	1.8 (1.3–2.3)
No	1	1
Foster care		
Yes	2.4 (1.9–3.1)	2.5 (1.9–3.2)
No	1	1
Intercountry adoption		
Yes	2.0 (1.5–2.9)	1.9 (1.3–2.6)
No	1	1

^aVariables adjusted for year of birth and gender (gender only adjusted for age).^bAll variables in the model except those marked with an asterisk.

intercountry adoption (OR = 2.0) and for adolescents who had experienced foster care before the age of 13 years of age (OR = 2.4; Table 3). These ORs changed marginally when socioeconomic and ethnic characteristics were included in the multivariate analysis (Table 3, Model 2).

Prenatal and Perinatal Characteristics

Adolescents with mothers who were young at the time of birth had lower risk of developing anorexia compared with the adolescents of mothers who were 25–28 years old at birth (Table 4). Premature children with a gestational age 23–32 weeks had an increased risk for developing anorexia nervosa (OR = 1.9), as were children with a gestational age of 33–36 weeks. Conversely, children with a gestational age of at least 42 weeks had a lower risk of developing anorexia nervosa compared with children with a gestational age of 37–41 weeks. Cephalhematoma was associated with an increased risk of developing anorexia nervosa (OR = 1.9), as was the premature rupture of membranes.

Interaction of Perinatal, Psychosocial, and Sociodemographic Factors

In the final analysis, the most important risk factors from all categories of variables were entered into one model (Table 5). The adjusted ORs in this combined model differed marginally from those in the separate models (Tables 3 and 4).

AR

Female gender had the highest AR (89.4%), which was calculated from age-adjusted ORs of all determinants (Table 6). Children with parents born in northern (including Sweden), central, and eastern Europe had an AR of 49.3% and a white-collar household had an AR of 20.2%. Psychosocial determinants (parent in psychiatric care, intercountry adoption, and foster care) had an AR of 7.6% and perinatal determinants (premature birth, cephalhematoma, breech delivery, and premature rupture of membranes) had an AR of 3.6%.

Table 4. Cox regression models of prenatal and perinatal risk factors of anorexia (N = 915,250)

Risk Factors	Model 1 ^a	Model 2 ^b
Maternal age at birth of child (years)		
12–19	0.7 (0.5–0.9)	0.7 (0.5–0.9)
20–24	0.9 (0.7–1.0)	0.8 (0.7–0.9)
25–28	1	1
29–32	1.0 (0.9–1.2)	1.0 (0.8–1.2)
33–36	1.2 (0.9–1.4)	1.1 (0.9–1.4)
≥37	0.9 (0.7–1.3)	0.9 (0.6–1.3)
Gestational age at birth (weeks)		
23–32	1.9 (1.2–3.3)	1.7 (0.9–2.9)
33–36	1.3 (1.0–1.7)	1.3 (0.9–1.6)
37–41	1	1
42–45	0.6 (0.4–0.9)	0.7 (0.4–0.9)
Indicators of complications during pregnancy		
Preeclampsia	0.9 (0.6–1.4)	*
Small for gestational age	1.0 (0.8–1.3)	*
Complications during delivery		
Premature rupture of membranes	1.7 (1.1–2.5)	1.4 (0.9–2.2)
Cephalhematoma	1.9 (1.3–2.7)	2.0 (1.4–2.8)
Low apgar, oxygen treatment, and or neonatal distress	1.0 (0.7–1.4)	*
Breech delivery	1.4 (1.0–0.8)	1.3 (0.9–1.8)

^aVariables adjusted for year of birth and gender.
^bAll variables were included in the model except those marked with an asterisk.

Table 5. Cox regression model of sociodemographic, psychosocial, prenatal and perinatal risk factors of anorexia ($N = 915,250$)

Characteristics	Model 1 ^a
Gender	
Male	1
Female	18.5 (14.2–23.8)
Socioeconomic status	
Unclassified	1.1 (0.9–1.3)
Manual workers	1
Skilled workers	1.3 (1.0–1.6)
White collar 1	1.4 (1.1–1.7)
White collar 2	1.4 (1.1–1.7)
White collar 3	2.0 (1.6–2.5)
Ethnicity	
Sweden	1
Finland	0.8 (0.5–1.3)
Finland/Sweden	1.0 (0.7–1.4)
Western and eastern Europe	0.8 (0.4–1.5)
Western and eastern Europe/Sweden	1.3 (1.0–1.8)
Non-European and southern Europe	0.4 (0.2–0.9)
Non-European and southern Europe/Sweden	1.2 (0.8–1.9)
Psychosocial risk factors	
Parental psychiatric disorder	
Yes	1.8 (1.3–2.3)
No	1
Foster care	
Yes	2.6 (2.0–3.3)
No	1
Maternal age at birth of child (years)	
12–19	0.7 (0.5–0.9)
20–24	0.9 (0.7–1.1)
25–28	1
29–32	1.0 (0.8–1.1)
33–36	1.1 (0.9–1.3)
≥37	0.9 (0.6–1.1)
Gestational age at birth (weeks)	
23–32	1.7 (1.0–2.9)
33–36	1.3 (1.0–1.6)
37–41	1
42–45	0.7 (0.5–0.9)
Complications during delivery	
Premature rupture of membranes	1.4 (0.9–2.2)
Cephalhematoma	2.0 (1.4–2.8)
Breech delivery	1.3 (0.9–1.8)

^aAdjusted for year of birth. All variables were entered in the model.

DISCUSSION

A study based on national population registers offers several important methodologic advantages. It offers possibilities to create a nationally representative sample that is sufficiently large to allow multivariate analyses of a large number of possible determinants. Registers also provide opportunities to gather information and to study retrospectively different aspects over a long time span. An important limitation of the current study is that it is based only on inpatients, a selected group that probably consists of the most severe cases (Cnattingius et al., 1999).

The most prominent risk factors for anorexia nervosa were gender, ethnicity, SES, and psychosocial and perinatal factors. The male-to-female ratio for anorexia nervosa was

Table 6. Attributable risk of different categories of risk factors

Category	AR
Gender	0.894
SES	0.202
Ethnicity	0.493
Psychosocial risk	0.076
Perinatal	0.036

AR = attributable risk; SES = socio-economic status.

5.5% in this study. These findings support earlier studies that reported gender ratios for inpatients with anorexia ranging as being 4% in Japan (Suematsu, Ishikawa, Kuboki, & Itoh, 1985), 6% in Norway (Götestam et al., 1998), and 8% in Great Britain (Szmukler et al., 1986) and Denmark (Møller-Madsen & Nystrup, 1992).

The overrepresentation of white-collar households for patients with anorexia nervosa is consistent with a study based on the most severe cases of anorexia in Great Britain (McClelland & Crisp, 2001) and with a study based on psychiatric inpatients in Scotland (Szmukler et al., 1986). The higher prevalence of patients with anorexia nervosa in higher socioeconomic groups has been questioned in an extensive review conducted by Gard and Freeman (1996). They suggested referral bias as a possible explanation for the higher prevalence of anorexia nervosa among higher SES groups. We cannot exclude the possibility of referral bias in our sample of hospital cases, although the Swedish tax-funded health care system in general offers hospital care in a fairly equal manner to individuals from different socioeconomic living conditions (Whitehead, Evandrou, Haglund, & Diderichsen, 1997).

Rasmussen, Johansson, and Hansen (1999) demonstrated a higher rate of overweight in male adolescents in low SES families in the general Swedish population. A lower degree of acceptance of obesity may be an important factor in explaining the higher incidence of anorexia nervosa in families with a higher SES compared with families with a low SES.

Having non-European parents or parents from southern Europe was a protective factor in the current study. This finding supports earlier observations of large differences in the incidence of anorexia nervosa among different cultures. Studies from Italy and from Arab and Asian cultures have indicated a lower prevalence of anorexia nervosa compared with studies from northern and western Europe (Abou-Saleh, Younis, & Karim, 1998; Khandelwal, Sharan, & Saxena, 1995; Nasser, 1994; Santonastaso et al., 1996; Tsai, 2000). Studies of immigrant adolescents with Greek or Arab heritage in northern Europe have shown a higher prevalence of anorexia nervosa among these immigrants compared with adolescents in their country of origin, thus indicating the importance of sociocultural context rather than biologic factors (Fichter, Elton, Sourdi, Weyerer, & Koptagel-Ilal, 1988; Nasser, 1986). Psychosocial risk factors that were significant for anorexia nervosa were parental psychiatric disorder, foster care, and intercountry adoption. The correlation between parental psychiatric disorders and anorexia nervosa in the offspring in the current study is supported by the findings of Lilenfeld et al. (1998) based on a smaller sample. Anorexia nervosa and obsessive-compulsive disorders (Bellodi et al., 2001) or affective disorders share a common genetic transmissible factor (Gershon et al., 1984). The current study did not confirm the results of Bellodi et al. and Gershon et al. because we found a link between intercountry adoption and anorexia nervosa. Holden (1991) also

noticed this association in a survey of one hospital register. Foster care as a risk factor for anorexia nervosa has not been demonstrated in earlier research according to our knowledge, although it is considered to be a risk factor for psychiatric problems (Takayama, Bergman, & Connell, 1994).

The current study identified similar perinatal risk factors for anorexia nervosa as an earlier Swedish study (Cnattingius et al., 1999) with a similar design (premature birth, cephalhematoma, breech delivery, and premature rupture of membranes). The main contribution of the current study is that it demonstrates that the perinatal risk factors identified by Cnattingius et al. are independent of important sociodemographic confounders. Conversely, perinatal risk factors explain a marginal proportion of cases of anorexia with an AR of only 3.6%.

The use of different population registers showed that anorexia nervosa is attributed to multiple risk factors. It is not possible, however, to generalize the results of the current study to the entire population of anorexia nervosa, because the study represents only inpatients. The findings are relevant in a clinical context. Replication of this study on an outpatient register merits further investigation.

In summary, we identified a number of risk factors for anorexia nervosa, namely, gender, SES, non-Western ethnicity, and perinatal and psychosocial factors, thus supporting a multifactorial etiology. The most important determinants, however, relate to the social and cultural context of the individual, supporting hypotheses of a sociocultural etiology of anorexia nervosa (Nasser, 1997).

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