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Eating Disorders: Epidemiology and Risk Factors

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I would like to thank….

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1. Introduction

Why do magazine articles about eating disorders attract public attention much more that those about depression, schizophrenia or spider phobia? Is it because eating disorders offer an unflattering mirror image of the western industrialized societies? So what is the reflection like? We see the abundance of food refused or thrown up. We see the thin beauty ideal changed into a skeletal body. We see control that does not appear to equate with victory anymore. We see a 'successful' defeat of body needs. But most of all, we see young people who could have it all but went couple of steps too far on the glorified path of beauty, success and control. So is it a guilty pleasure of seeing ourselves in the Petřín mirror maze, what attracts us to eating disorders?

Eating disorders seem to have spread hand in hand with the modern way of life: While in the first half of 20th century there were only isolated reports on anorexia nervosa, eating disorders have become a public health concern in the latter half of the century. However, the increase of eating disorders sufferers presenting to service occurred before the modern statistical and diagnostic methods enabled us to distinguish a real increase from our impression. Countries that went through a socio-cultural transition after the development of the diagnostic criteria offer a unique opportunity to explore the extent of influence of western life style on what seems to be an eating disorders epidemic.

People in Central and Eastern Europe experienced a major socio-cultural transition following the Berlin Wall Fall in 1989 and the transformation from dependants of the former Soviet Block to independent western democracies. It brought them freedom and opportunities, but also widespread advertising, size-zero models on billboards, and drinks with no calories. It appears that this is an ideal environment for eating disorders to flourish. On the other hand, is there any evidence that western culture influences onset and maintenance of eating disorders? And if so, is it the

westernised environment per se or could it be the stress related to the cultural change? Moreover, eating disorders once thought to be an illness of the West are now spreading to the East, so maybe it is not culture after all. Maybe we are just better in identifying them? Or could it be a better publicity that inspires people to seek help?

Thesis aim

This thesis explores epidemiology and risk factors for eating disorder. Its central aim is to describe the epidemiology of eating disorders in the Czech Republic before and after the Velvet Revolution and to discuss possible explanation for any changes with a specific focus on experiences related to migration and acculturation as one of the possible risk factors for eating disorders.

Thesis outline

This thesis consists of three major parts. In the 'Background section', current knowledge on the topic is summarized. The data section consists of three papers, which are given in the form for publication. In the first paper (Time trends in hospital admissions for eating disorders in the Czech Republic 1981-2005) time trends in hospital admissions for eating disorders in the Czech Republic are explored. The second paper (Time trends in hospital admissions for anorexia nervosa in the Czech Republic 1994-2005) looks specifically at first time hospital admissions for anorexia nervosa during the 1994-2005 period and considers those an approximation of incidence of severe anorexia nervosa in the Czech Republic. Both papers focus on the relationship between the findings and the socio-cultural change that occurred in Central and Eastern Europe in the early 1990s. The third paper (It would not have happened to me at home: Qualitative exploration of sojourns abroad and eating disorders in young Czech women) explores the importance of migration and acculturation experiences in the onset and maintenance of eating disorders. The final section contains the summary of

the main findings and directions for the future research on eating disorders' epidemiology and risk factors.

2. Background

2.1. Eating disorders: classification

'Eating disorders' is an umbrella term for illnesses that are characterized by 'disturbances in eating behaviour' (American Psychiatric Association, 2000). Anorexia nervosa (AN) and bulimia nervosa (BN) are the two main types of eating disorders. The eating disorders that do not fulfil criteria for either, but are clinically significant, fall into the 'eating disorder not otherwise specified (EDNOS)' category.

While the two main diagnostic systems DSM IV, Diagnostic and Statistical Manual of Mental Disorders, fourth edition (American Psychiatric Association, 2000), and ICD-10, International Classification of Diseases, tenth edition (World Health Organization, 1992), both use the AN and BN categorization, they differ in their classification of EDNOS-like disorders. DSM IV describes three types of eating disorders: AN, BN and EDNOS. ICD 10 divides eating disorders into nine categories. In ICD 10 AN and BN have each an 'atypical' sister diagnosis; atypical anorexia nervosa and atypical bulimia nervosa indicate disorders with a typical AN/BN profile but not all criteria met. An example of an atypical AN case would be a young woman with all (but one) symptoms of AN, who, for example, does not report a fear of gaining weight or becoming fat. In the DSM IV, atypical AN and atypical BN fall into the EDNOS category together with further four ICD 10 eating disorders (vomiting with psychological disturbances, overeating with psychological disturbances, other eating disorders and eating disorders not otherwise specified).

In both DSM-IV and ICD 10, AN is characterized by a refusal to maintain body weight at or above 85% of expected weight, intense fear of gaining weight or becoming fat, disturbance in body image and by the absence of at least three consecutive menstrual cycles (in postmenarchal females). In DSM-IV, AN is classified either as a binge-purge subtype or a restrictive subtype. People suffering from the binge-purge subtype of the disorder

engage into the cycle of overeating and purging that are typical of BN, however their weight remains low enough to fall into the AN category; i.e., weight is a crucial criterion in diagnosing AN. Restrictive AN, often seen as a separate disorder, is characterised by strict dieting only. The main features of BN are recurrent episodes of binge eating and recurrent inappropriate compensatory behaviours (self-induced vomiting, misuse of laxatives, diuretics, fasting, and excessive exercise). Moreover, BN sufferers' self-evaluation is extremely influenced by their body shape and weight (DSM-IV) or they fell fat and worry about becoming fat (ICD 10). They also report thinking excessively about food (ICD 10). DSM IV specifies that bingeing and purging should occur at least twice a week for three months for the diagnostic criteria to be met. ICD 10 specifies this time criterion for bingeing only. The DSM IV EDNOS category is formed by atypical variants of AN and BN and also binge eating disorder (BED), currently not recognized as a separate diagnostic category. BED is characterized by recurrent episodes of binge eating, but the compensatory behaviours typical for bulimia nervosa are absent. In the ICD 10, the remaining categories (overeating with psychological disturbance, vomiting with psychological disturbance, other eating disorders and EDNOS) include disorders where the eating problem seems to be connected to psychological factors. The binge eating disorder (BED) is not a separate diagnostic category yet. Nevertheless, DSM IV includes research criteria for BED. BED is characterized by recurrent episodes of binge eating, which are not followed by the inappropriate compensatory behaviour typical of BN. To meet the diagnostic criteria for BED, binges must occur at least twice a week for a period of minimally 6 months (DSM IV). Purging disorder has been also suggested as a separate eating disorder category (Keel *et al*, 2005). While women with a purging disorder were similar to women with BN in many respects (in eating disorder severity, body image disturbance or dietary restraint), they reported less disinhibition around food.

AN and BN are sometimes called a 'tip of the iceberg' (Keel et al, 2005), suggesting that there are many more people suffering from subclinical types of those two disorders or EDNOS and even more people with pathological eating behaviour (e.g., dieting), who can't be seen as suffering from a disorder.

While obesity appears in the ICD 10 (as a general medical condition), it is not regarded a an eating disorder and is absent from the DSM IV psychiatric classification, because it is 'not consistently associated with a psychological or behavioural syndrome' (American Psychiatric Association, 2000) and is not discussed in this thesis.

Though for the purposes of diagnostic classification and epidemiology it would be practical if each type of eating disorder had a unique profile, quite distinct from the others, from the description above it is apparent that different types of eating disorders share many features, e.g., AN is often distinguished from BN on basis of the BMI criterion only. As inadequate compensatory behaviours (vomiting, using laxatives, excessive exercise) may occur in both type of disorders, those who are 'successful' enough and 'reach' a BMI of 17.5 or less are given a diagnosis of AN binge-purge subtype. Those who in their own eyes fail and exceed the magic limit of 17.5 have BN. Moreover, while an 'eating disorder' as a category is relatively stable, the stability of specific eating disorder diagnoses (AN, BN, EDNOS) is low (Milos *et al*, 2005; Fairburn and Harrison, 2003); in a Swiss study (Milos et al, 2005) only a third of participants maintained the same diagnosis for 30 months. For example, a substantial minority of females with BN experienced a previous episode of AN (Favaro *et al*, 2003). This overlap led to a hypothesis that EDs might have common aetiological factors related to their onset and maintenance (Milos *et al*, 2002).

2.2. Why do eating disorders matter?

Eating disorders are often seen as difficult to treat. While we have got relatively effective medical and psychological treatments for some other

psychological disorders (antidepressants and cognitive behavioural therapy for depression, antipsychotic medication for schizophrenia, or mood stabilizers for bipolar disorder), we have not been very successful in treating eating disorders. This applies most to AN, where medication and cognitive behavioural therapy (CBT) badly failed and the only evidence-based treatment is family therapy for adolescent AN. There is, unfortunately, no treatment of choice for adult AN. Stable remission is unusual in eating disorders sufferers. For example, Milos et al (Milos et al, 2005) found that only 13% of study participants achieved stable remission despite 89% of participants receiving treatment for their condition.

Eating disorders are not only a therapeutic challenge, but are associated with significant morbidity and mortality. A metaanalysis (Nielsen, 2001) found that people suffering from AN and BN are 4 and 1.5 times (respectively) more likely to die compared to healthy people of the same age and sex. There are no mortality data available for people suffering from EDNOS.

Women aged 10-24 (van Hoeken *et al*, 2003) are most at risk and their eating disorder, being a chronic illness, may prevent them from fulfilling their potential: Receiving adequate education, obtaining a job, have relationships.

Eating disorders are also associated with high comorbidity; in a prevalence study from the USA (Hudson *et al*, 2007), 56.2% of participants with AN, 94.5% with BN, and 78.9% with BED met criteria for at least one more DSM IV disorder. Lewinsohn (Lewinsohn *et al*, 2000) found that 89.5% of eating disorder sufferers had at least one comorbid condition during adolescence, which suggests that additional diagnoses cannot be fully accounted for by chronicity of the condition.

2.3. Eating disorders: epidemiology

2.3.1. Terminology

Epidemiology is defined as a 'study of the distribution and determinants of health events in population' (Page *et al*, 1995a). Population is a group that shares a similar feature. Epidemiology describes a disease in terms of 'prevalence' and 'incidence'. The prevalence is a 'measure of the number or proportion of cases or events, or conditions in a given population' (Page et al, 1995a). The information about point prevalence (prevalence at a particular point in time) is essential for service planning as they estimate demand for care for a particular disorder. The lifetime prevalence indicates rate of people who have ever suffered from a studied disease. The incidence is the number of new cases in the population in a specified period of time, typically one year. Incidence rates are usually given per 100,000 population. Incidence rates are crucial for understanding disease aetiology.

2.3.2. Different types of studies; their strengths and limitations

Different epidemiological studies use different sources of data.

Register based studies (using general practitioner or hospital registers) have an advantage of easier and cheaper data collection process, however represent only treated cases. This could lead to underestimation of true prevalence/incidence, as only minority of cases appear to receive treatment (Keski-Rahkonen *et al*, 2007). Furthermore, register data also rely on the medical officer in charge to establish correct diagnosis. However, misdiagnosis is common; for example, British general practitioners tend to misdiagnose AN as BN (Currin *et al*, 2007).

Population studies require high number of subjects and can be expensive and time consuming. While some studies have used only questionnaire screening, it is more usual to employ a two-stage approach. First, a

population is screened (usually by a questionnaire) for possible eating disorders. Next, a face-to-face interview is conducted with people scoring above a threshold and thus having a possible eating disorder. Moreover, a randomly selected sample of people who score below the threshold is also interviewed. Two-stage epidemiological studies can be compromised by low response rates, mainly because people who suffer from an eating disorder might want to avoid diagnosis and treatment. Moreover, eating disorders are rare disorders, for example it is not unusual for population studies of AN to fail to discover a single AN case (Pike, 2004b). This is even more truth for men with eating disorders who form a minority of cases (Hoek and van Hoeken, 2003) and are often excluded from epidemiological reports completely. Furthermore, the stigma associated with eating disorders might prevent the sufferers from admitting their symptoms (Hsu, 1996); anorexia nervosa was described as a 'valued' illness (Schmidt and Treasure, 2006) and the sufferers might want to avoid receiving diagnosis and treatment to keep the disorder as a desirable part of themselves.

There is also a question of diagnostic criteria used. Different diagnostic criteria employed in different studies complicate their comparability, e.g., ICD 10 or DSM IV based diagnosis may bring different prevalence/incidence. Longitudinal studies, which are needed to identify time trends, can be complicated by revisions in the major diagnostic systems (DSM IV and ICD 10), as this changes influence a number of cases detected (Nielsen, 2001). In summary, different types of epidemiological studies have different strengths and limitations (depending on the method of cases ascertainment) and produce different incidence/prevalence rates. Consequently, the rates should be always interpreted cautiously with regards to the source of data and should not be viewed as final truths about the 'true and only' number of disorder sufferers but as useful pointers in service planning and incidence estimation.

2.3.3. Epidemiology of eating disorders in Western Europe and the USA

Anorexia nervosa

Prevalence

The most recent prevalence rates come from a Finnish study (Keski-Rahkonen et al, 2007) that explored epidemiology of AN in women born between 1975-1979. The estimated lifetime prevalence of AN was 2.2%. However, when a 'broad' definition of AN (i.e., not meeting all the required criteria) was considered, the lifetime prevalence rate rose to 4.2%. This is in agreement with the earlier prevalence studies from Australia and the USA (Klump *et al*, 2001; Wade *et al*, 2006). Also, in northern Italy (Favaro et al, 2003), lifetime anorexia nervosa was diagnosed on 2% of a sample of young females. Those estimates are somewhat higher than those from some other studies. For example, Hudson et al (Hudson et al, 2007) found a 0.9% lifetime prevalence for women; Walters & Kendler (Walters and Kendler, 1995) and Garfinkel (Garfinkel *et al*, 1996a) report a lifetime prevalence of AN in the USA and Canada ranging between 0 .5% and 0.6%. A Swedish study (Bulik *et al*, 2006) found a lifetime prevalence of AN among women 1.20%. In a metaanalysis Hoek (Hoek and van Hoeken, 2003) estimates that the of AN in young women is about 0.3%.

Lucas et al (Lucas *et al*, 1991) found a point prevalence of AN 149.5/100,000 in Rochester (Minesotta, USA). While this figure is higher than those from other prevalence studies (Hoek, 1991), this might be due to various sources of data used in the study and large proportion (61%) of cases being 'probable'.

The prevalence rates for men are substantially lower. In register-based studies (Hoek and van Hoeken, 2003) and some population studies (Garfinkel et al, 1996a) men comprise 10-15% of identified cases. However, in a recent population study in from the USA (Hudson et al, 2007), men represented approximately one fourth of all identified cases of AN; the

lifetime prevalence of AN in men was 0.3%. Similarly, a Swedish population study estimated the overall prevalence of AN among males at 0.29% (Bulik et al, 2006).

In summary, estimates of AN lifetime prevalence from population studies from Western Europe and the USA range between 0.5-2.2% for women. Estimates based on registers tend to be lower. Men tend to account for 10-25% of cases, with numbers close to 10% being more usual.

Incidence

General practice register based studies from Western Europe show incidence ranging between 4.7/100,000 (Currin *et al*, 2005) and 7.7/100,000 (van Sonn *et al*, 2006). This is in line with an earlier study from Netherlands (Hoek *et al*, 1995), which yielded an incidence rate of 8.1/100,000. In Switzerland, a hospital register was used to estimate incidence of severe anorexia nervosa (i.e., severe enough to require hospital admission); the data from the sampling period 1993-1995 show an incidence of severe anorexia nervosa of 1.17/100,000 for the whole population (Milos *et al*, 2004).

Many studies explored incidence rates specifically for the high-risk group of young females. In a hospital register based study Milos et al. (Milos et al, 2004) found an incidence rate of 9.72 for females aged 12-25. In a general practitioner register based study Currin et al (Currin et al, 2005) report the highest incidence rates (34.6/100,000) for females aged 10-19. A recent incidence study from Sweden (Keski-Rahkonen et al, 2007) showed an incidence rate of 270/100,000 in the group of females aged 15-19. This is twice as many as in the other incidence studies (van Sonn et al, 2006). Interestingly, this difference disappeared after taking into account detected cases only. While this is an isolated report, it might suggest that the epidemiological studies based on help seeking samples grossly underestimate the true incidence of AN.

In summary, general practice studies show an incidence rate of AN ranging around 5/100,000. While estimates from hospital registers are lower, population based studies suggest that there is a substantial proportion of AN sufferers, who might not seek treatment. Anorexia nervosa usually starts in teenage years.

Time trends

Historical records describe anorexia-like presentations dating back to ancient Egypt and Babylon, where fasting was meant to support religious activities (Vandereycken and van Deth, 1994). Anorexia nervosa was first described by William Gull and Charles Lasgue, who in the early 1870s independently published papers on cases of self-starvation (Gordon, 2000). Nevertheless, it is impossible to establish an extent of this problem in the 19th century, as first incidence studies begun to emerge in 20th century.

Most studies conclude that the incidence of AN in Western Europe increased until the 1970s and remained stable since (Hoek and van Hoeken, 2003). The increase was most substantial for females aged 10-24 (van Hoeken et al, 2003). This conclusion corresponds with reports from various west European countries. For example, a hospital register based study from Switzerland (Milos et al, 2004) showed that following a significant increase in 1960s and 1970s, the incidence of severe anorexia nervosa remained stable. Findings from general practices in the United Kingdom (Currin et al, 2005; Turnbull *et al*, 1996) show that the incidence of anorexia nervosa remained stable between 1988 and 2000. This was generally confirmed in a Dutch study (van Sonn et al, 2006), which demonstrated that the overall incidence of AN remained stable between 1985 and 1999. Nevertheless, this study also showed that the increase in the incidence rates of anorexia nervosa continued until the end of the 20th century. In the USA, the incidence of AN among females aged 15-24 was increasing until 1989 (Hoek, 2006). While Hudson et al (Hudson et al, 2007) did not find a significant increase in the incidence rates of anorexia nervosa

in the USA, they emphasise that they did not have sufficient power to detect such trend. The notion of increasing rates of AN during the 20th century are indirectly supported by a finding (Wade et al, 2006) that prevalence of AN is greater among Swedes born after 1945 than among those born later; this applied for both, men and women.

In summary, it appears that in Western Europe, the incidence of AN was increasing until 1970s and has remained stable since. The incidence rates in the USA might have been increasing until the end of 1980s. Nevertheless, isolated reports suggest that AN incidence might be increasing among specific age groups.

Age of onset

The peak age of onset of AN is 15-19 years (Lucas et al, 1991; Turnbull et al, 1996).

Bulimia nervosa

Prevalence

The estimates of lifetime prevalence of BN in women in the USA and Canada range between 1.1 -2.8% (Garfinkel *et al*, 1995; Hudson et al, 2007; Kendler *et al*, 1991; Bushnell *et al*, 1990). In northern Italy, BN was diagnosed in 4.6% of young women (Favaro et al, 2003), but the authors emphasise that the higher rate might be due to a limited age range (18-25) of females in their study.

Prevalence rates of BN for men are considerably lower than those for women. Most studies report that men account for 8-10% cases of BN (Bushnell et al, 1990; Garfinkel et al, 1995); prevalence rates between 0.1 and 0.2%. The above mentioned study from the USA (Hudson et al, 2007). which yielded surprisingly high proportion of men suffering from AN, showed similar results for BN – men comprised one fourth of identified cases of BN.

Incidence

Recent general practice register based studies from the Netherlands (van Sonn et al, 2006) and the United Kingdom (Currin et al, 2005) showed similar incidence rates 6.1 (1995-1999) and 6.6 (2000) respectively.

Time trends

The studies on time trends in BN cover a shorter time period than those concerned with AN, as BN was first described only in 1979 (Russell, 1979). The publication of the diagnostic criteria led to a sharp increase in the incidence rates of BN in the USA; from 7.4/100,000 females in 1980 to 49.7/100,000 females in 1983. Primary care based studies in Great Britain (Currin et al, 2005; Turnbull et al, 1996) showed a threefold increase in the incidence of bulimia nervosa between 1988 and 1997 and subsequent stagnation. There were different findings for different age groups. While the incidence rates for females aged 10-19 were stable, the incidence rates for women aged 20-39 decreased between 1996 and 2000. The results from the individual studies have been confirmed by the metanalysis (Keel and Klump, 2003). However, a Dutch study showed a stagnation of the incidence of AN from the 1985-1989 period until the 1995-1999. The insignificant decrease in BN rates found in the UK at the end of the 20th century (Currin et al, 2005) are in line with a decreasing point prevalence of BN among American college students between 1982 and 2002 (Keel, 2006, psychol med). Hudson et al (Hudson et al, 2007) found a cohort effects for bulimia nervosa: people aged 18-44 were more likely to receive the diagnosis than people aged 60 and over.

Age of onset

Turnbull et al (Turnbull et al, 1996) report an average age of onset 20-39. Van Son et al (2006) report a decreasing age of onset for BN.

Eating disorders not otherwise specified

Although BED is not considered to be a 'proper' eating disorder yet, the research criteria enabled several studies to estimate prevalence of this problem. In Austria the point prevalence found in telephone surveys was 3.3% for women and 0.8% for men (Kinzl *et al*, 1999). An Australian study (Hay, 1998) found a point prevalence of BED of 1%. However, when wider criteria (Fairburn and Cooper, 1993) were used, the point prevalence was estimated to be 2.5%. A population study from the United States (Hudson et al, 2007) estimated prevalence of BED to be 3.5% among females and 2% among males.

The lifetime prevalence of atypical eating disorder and BED in a females sample from northern Italy (Favaro et al, 2003) was 4.7% and 0.6% respectively. The prevalence of subclinical bulimia nervosa was estimated at 5.4% (Whitehouse *et al*, 1992). It seems that similarly to BN, there is a cohort effect for BED and any binge eating with people aged 18-49 having higher lifetime prevalence of these disorders.

Many studies also explored prevalence of eating disordered behaviour not reaching the significance of a diagnostic entity. For example, Hudson et al (Hudson et al, 2007) found a lifetime prevalence of subthreshold BED 1.2% and of any binge eating 4.5% in the American population sample.

Abnormal eating attitudes and behaviour

A metaanalysis of self-report studies on eating behaviour (Fairburn and Beglin, 1990) estimated a prevalence of dieting to be over 25%, binge eating (at least once a week) 15.7%, self-induced vomiting (at least weekly) 2.4% and laxative misuse (at least weekly) 2.7%. In females, the peak age of onset of binge eating and purging occurs at age 16 and 18 respectively.

2.3.4. Epidemiology of eating disorders in non-western countries

Epidemiology of eating disorders in people living in their native countries

Eating disorders were long thought of as typical western ills. However, recent findings from non-western countries suggest otherwise. For example, in Africa the levels of subclinical eating problems appear to be comparable to the West (Le Grange *et al*, 1998). In a recent study from Tanzania (Eddy *et al*, 2007), 1.9% of females aged 13-30 met criteria for anorexia nervosa and 4.7% met criteria for EDNOS. Similarly, in a student sample in Ghana (Bennett *et al*, 2004), 10 out of 668 students had BMI lower than 17.5 (a result of self-starvation in all cases). Self-starvation was viewed positively and in terms of religiousness and self-control; the fear of fatness typical for western presentation of AN was absent. However, none of the sufferers reported amenorrhoea and therefore their diagnostic status is uncertain.

In China, a 1% prevalence of BN among medical students was reported (Chun *et al*, 1992).

It has been hypothesised that the findings of eating disorder symptomatology in non-western countries may be related to westernization of those countries. For instance, findings from Fidji show an increase in body dissatisfaction and pathological eating behaviours following an exposure of television on this island (Becker *et al*, 2002). This would suggest that people living in communities strictly separated from the western style of life don't suffer from disordered eating. This was confirmed in a study conducted on the Old Order Aimish (Platte *et al*, 2000), a community living separately from the western industrialized society, which showed that young people of normal weight showed no dissatisfaction with their bodies; this is in sharp contrast to body dissatisfaction found among young people in western countries with around half young people of normal weight being unhappy about their bodies (Parnell *et al*, 1996).

In summary, eating disorders are not exclusively western syndromes and appear throughout the world. One possible explanation of this phenomenon is westernization.

Epidemiology of eating disorders in migrants from non-western countries

A survey conducted in the United Kingdom in the 1980s (Mumford and Whitehouse, 1988) found higher prevalence (3.4%) of bulimia nervosa among Asian schoolgirls than in Caucasians. Moreover, Dolan et al (Dolan *et al*, 1990) showed that Asians had a higher level of disordered eating attitudes than Caucasians or Afro-Caribbeans. Nevertheless, some other studies (Button *et al*, 1998) found no difference in eating attitudes of Asian and non-Asian subjects. Moreover, Japanese women living in the USA are more likely to develop an eating disorder than Japanese women living in their native country (Furukawa, 1994). The apparently low incidence of AN on the Caribbean island of Curacao (Hoek *et al*, 2005; Katzman *et al*, 2004) was redefined when it transpired that all women identified in the study had a history of living abroad.

In summary, acculturative stress may play a role in the aetiology of eating disorders.

2.3.4. Epidemiology of eating disorders in Central and Eastern Europe

A common perception is that eating disorders emerged together with the Berlin Wall Fall. However, reports have begun to appear long before the widespread changes of 1990s (Janota, 1946). Moreover, even in the early 1980s, hospital admissions for eating disorders seemed to be on the increase (Faltus, 1985). There are no epidemiological studies on eating disorders prior to 1989, with one exception: In 1988, Rathner et al (Rathner *et al*, 1995) conducted a two stage epidemiological study in East Germany, Hungary and Austria, which showed comparable prevalence rates of eating disorders in the three countries. While it would be tempting to conclude that

prevalence rates of eating disorders in the Central and Eastern Europe did not differ from prevalence rates in western countries, it needs to be emphasised that this is the only study available and it was based on a selected student population.

After the 1989 numerous small-scale questionnaire and two stage screening studies appeared that were mostly based on student samples.

A Hungarian study (Tury *et al*, 1994) did not find any AN cases among 538 medical students screened in his study, but the rates of sublinical AN were 0.4% among males and 0.3% among females. There were no cases of bulimia nervosa identified among males, though 1.2% males suffered from subclinical bulimia nervosa. The rates among females were 0.3% and 3.8% for bulimia nervosa and subclinical bulimia nervosa respectively.

A Hungarian questionnaire study on a mixed population of student and non-student females aged 15-24 revealed a point prevalence of AN and BN 0.03% and 0.41% respectively. The rates for subclinical eating disorders were higher: 1.09% of women were thought to suffer from subclinical AN and 1.48% from subclinical BN (Szumska *et al*, 2005). This study also explored different eating behaviours and showed that that 6.3% of women were dieting daily, 2.7% reported bingeing at least twice a week and different types of purging at least twice a week were reported by 0.2-0.7% women, depending on the method used with laxatives being the most common and vomiting the least common method.

Westenhoefer (2001) found women in East Germany engaged into following behaviours at least twice a week: 13.3% dieting, 1.6% self-induced vomiting, use of laxatives 2.2%, use of diuretics 4.7%. This data is closely comparable to data from West Germany. Unfortunately, the data on prevalence of pathological eating behaviours prior to the Wall coming down is not available.

In a two-stage survey among schoolgirls in Poland (Wlodarczyk-Bisaga and Dolan, 1996), no cases of AN or BN were identified, but there was a 2.34% point prevalence for subclinical eating disorders and 28.6% for dieting

Russian women showed greater drive for thinness and lower actual and ideal weight than British young women (O'Keefe and Lovell, 1999).
Questionnaire screenings in the Czech Republic (Krch and Drabkova, 1996) showed a widespread body dissatisfaction and a wish to loose weight among high school students in the Czech Republic. In this study, 5.7% of females fulfilled criteria for bulimia nervosa. In a later study, Krch (Krch, 1997) estimated that 0.5-0.8% of 16 year olds suffered from AN and 1.2-3.4% from BN.
In summary, although an isolated study (Rathner et al, 1995) suggests that the prevalence of eating disorders in Central and Eastern Europe prior to 1989 might have been comparable to western countries, the true extent of the problem remains unknown. Questionnaire and two-stage epidemiological studies mostly conducted on student population suggest rates comparable to western countries. Nevertheless, large-scale epidemiological studies are still missing in Central and Eastern Europe. Moreover, there are literally no incidence studies in this region.

2.4. Eating disorders: risk factors

Epidemiological studies have inspired a number of hypotheses about specific risk factors for eating disorders. Indeed, research on risk factors is of a great interest to the public who rightly ask questions as 'Why me? Why my daughter? Why now?' and possibly 'Is it my fault?'. Information about risk factors is also crucial for professionals, as they hope to find out which aspects shall they focus on in prevention and most of all, which groups to target. Unfortunately, there is not one 'because' that would help us to use our resources for a hundred percent successful prevention (as cure won't be needed anymore…). At present, we can only talk about a series of risk factors that may contribute to the illness.

2.4.1. What is a risk factor?

Risk factor is a characteristic or an event, which (when present) heightens the risk of a particular disorder (Kazdin *et al*, 1997). Risk factor is not a cause; while being a female is a definite risk factor for EDs, most females do not become unwell with an ED.

2.4.2. Changing times, changing risk factors?

Collier & Treasure (Collier and Treasure, 2004) give an overview of our shifting understanding of 'causes' of eating disorders: Shortly after its discovery they were seen as a result of dysfunctional family upbringing. By 1980s the societal influences and the cult of thinness were blamed. In the 1990s men and the power imbalance between genders was held responsible. At the same time genes also came to the story and we can only begin to appreciate the multifactorial aetiology of eating disorders.

2.4.3. Demographic variables: sex, age, ethnicity

Sex

Women become unwell with AN or BN ten times more often than men (Wittchen *et al*, 1998) and binge eating was shown to be 2.5 times more common in men than women (Spitzer *et al*, 1992).

Age

As discussed in the section on epidemiology of eating disorders, the onset of eating disorders is most often in adolescence and early adulthood (Hoek and van Hoeken, 2003; Stice, 2002; Wittchen et al, 1998). The age of onset appears to be lower for AN than for BN (Currin et al, 2005; Turnbull et al,

1996). Similarly, subclinical eating problems increase during puberty (Bulik, 2002).

Ethnicity

Eating disorders have often been viewed as a disease of white middle-class females. As is apparent from the section on eating disorders among non-western nations, this opinion has been largely abandoned (Shaw *et al*, 2004).

Urbanicity

Hoek at al (Hoek et al, 1995) found higher incidence rates of BN (but not AN) in urbanized than in rural areas. This was confirmed by a later study (van Sonn et al, 2006) that found a dose-dependent relationship between urbanicity and eating disorders. While it could be argued that people from rural areas that at risk from eating disorders are moving to cities to seek anonymity and possibly also treatment for their illness, this explanation was rejected, when the differences remained significant after adjusting for age. Living in urban areas can be perceived as a risk factor for BN; the important factor might be the greater pressure to be thin in the cities with all the thin model adverts around. However, anonymity of urbanized areas that lead to decreased social control might also play a role.

Nevertheless, those studies did not find a relationship between urbanicity and AN. Conversely, a study from northern Italy (Favaro et al, 2003) found a difference between prevalence of both AN and BN in urban and suburban area of Padova.

2.4.4. Personality factors

There is a tendency to associate different types of eating disorders with different forms of personality traits/disorders: AN with perfectionism/ obsessive compulsive traits and cluster C personality disorders and BN

with impulsivity/cluster B personality disorders, mainly borderline personality disorder (Wonderlich and Mitchell, 1997). However, this distinction does not apply to all cases. As discussed in the chapter on classification of eating disorders, there is a great degree of overlap in symptoms of different eating disorders and some studies did not find any difference in the types of personality disorders comorbid with AN/BN.

Impulsivity

One of the possible explanations of binge eating is a low impulse control. Although some questionnaire studies do not support this theory (Wonderlich *et al*, 2004), a strong association of eating disorders with conditions like substance misuse or borderline personality disorder (Zanarini *et al*, 1998) would suggest otherwise. Functional and structural abnormalities are associated with an increased risk of eating disorders and substance misuse. However, it is also possible that substance misuse leads to disinhibition and thus to disordered eating.

Perfectionism

Dieting is a common eating behaviour in adolescence. But what makes this unfortunate minority of girls and young women stick to it, while others sooner or later return to a reasonable diet? Perfectionist traits are characteristic not only for AN sufferers (Halmi *et al*, 2000), but also for BN sufferers and people who have recovered from their eating disorder (Fairburn *et al*, 1997; Fairburn *et al*, 1998; Fairburn *et al*, 1999). Perfectionism is also a prospective risk for AN and BN (Bulik *et al*, 2003). In women who later develop an eating disorder (both AN and BN) perfectionism is apparent since childhood (Anderluh *et al*, 2003).

Neuroticism

Neuroticism is a prospective predictor of later development of AN (Bulik et al, 2006). This suggests that people prone to anxiety might carry higher risk

of developing AN. However, neuroticism might be also a trait connected to psychopathology in general, not exclusively to eating disorders.

2.4.5. Life events

It appears that the difference between healthy people and people with eating disorders is not whether they experience a negative life event (Schmidt *et al*, 1997; Troop and Treasure, 1997), but whether they experienced more than one (Hoersh *et al*, 1995; Schmidt *et al*, 1997). However, people with eating disorders experienced a number of negative life events comparable to people with other psychiatric diagnoses. Some studies even found that eating disorders sufferers experienced less negative events than people with other psychiatric problems (Gowers *et al*, 1996; Hoersh *et al*, 1996).

When looking at a type of a negative life experience rather than quantity, Schmidt et al (Schmidt *et al*, 1997) found that when compared to BN sufferers, negative life events of people with AN more often threatened their chastity. They give an example of a girl who had a relationship with a married man, which was against her religion, or a girl whose boyfriend never called her back after she made love with him for the first time. This findings are in line with the early theories, that emphasised the role of sexuality in the development of AN.

It has been also suggested that the onset of AN is preceded by chronic family problems (Gowers et al, 1996; Hoersh et al, 1995). Recurrent fights among parents or chronic illness in the family are equally or more frequent in families of people with eating disorders or in people with other psychiatric conditions (Gowers et al, 1996; Hoersh et al, 1996).

Sexual abuse

The victims of childhood sexual abuse have an increased risk of bulimia nervosa (Waller *et al*, 1993; Wonderlich *et al*, 2001). One study found that

sexual abuse in women with BN was three times more common that in healthy controls (Garfinkel *et al*, 1996b). The risk is increased even more if the perpetrator was a family member and/or if violence was involved (Wonderlich *et al*, 1997; Waller, 1992). The importance of sexual abuse as a risk factor was eating disorders was confirmed in a longitudinal study (Johnson *et al*, 2002), which shows that sexual abuse and neglect predict eating disorders and pathological eating behaviours (e.g., strict dieting). Women who were sexually abused in childhood and adolescence experience most serious eating problems (Wonderlich et al, 2001).

Nevertheless, there are studies that do not confirm the relationship between sexual abuse and eating disorders (Folsom *et al*, 1993) or find it only for bulimia and binge purge anorexia (Steiger and Zanko, 1990). However, it is unclear whether sexual abuse is a specific factor for exclusively for eating disorders (Vize and Cooper, 1995) or for psychiatric conditions in general (Hoersh et al, 1995; Webster and Palmer, 2000).

One of the possible explanations is that the relationship between an eating disorders and sexual abuse is moderated by a personality disorder; for example, people with bulimia nervosa who were sexually abused before 13 years of age suffer from a borderline personality disorder more often (Steiger *et al*, 2000). Furthermore, feelings of shame might mediate the connection between sexual abuse and bulimic symptoms: the disorder not only provides distraction from bad feelings connected to the abuse, but it also enables the sufferer to change the body parts that might be perceived as responsible for the abuse (Murray and Waller, 2002). It was also hypothesized that sexual abuse leads to feelings of depression and/or anxiety that are dealt with by bulimic symptoms

In summary, sexual abuse is a risk factor for eating disorders, but also a risk factor for number of other psychiatric disorders. Longitudinal studies are needed to disentangle the complex relationship between sexual abuse, eating disorder and other psychiatric illnesses.

Separation events

Marsden (Marsden, 1997) claims that separation from the family of origin might be one of the factors that contribute to the onset of anorexia nervosa. There is some indirect evidence for this hypothesis: The body dissatisfaction increase during the first year at the university (Heatherton *et al*, 1997). An experimental study that explored the role of separation in eating behaviour showed that subliminally presented stimuli with a topic of separation increased consumptions of biscuits in subjects suffering from eating disorders (Patton, 1992).

2.4.6. Negative emotionality

Negative emotionality is a risk factor for eating problems, but also a causal risk factor for binge eating (Stice, 2002). However, negative emotionality is a risk factor for a wide range of psychiatric disorders and therefore it is not a specific risk factor for eating disorders (Jacobi *et al*, 2004).

2.4.7 Body & weight: Are diets to blame?

Body mass index

It is well known that obese children are often being ridiculed and insulted by their peers. Thus, we would expect them to attempt to loose weight and possibly get into a vicious circle of dieting and bingeing. However, results of studies exploring relationship between high BMI and eating disorders are ambiguous.

Retrospective studies show that, compared to psychiatric patients, people suffering from BN and BED were more often obese in childhood. Even though high body mass index (BMI) predicts dissatisfaction with own body (Cattarin and Thompson, 1994; Field *et al*, 2001), many studies did not confirm association between BMI or percentage of body fat and eating disorders. (Patton *et al*, 1999; Killen *et al*, 1996).

Thus at present, the evidence for the role of high BMI in childhood is not strong.

Dieting

Stice & Shaw (Stice and Shaw, 2002) give several explanations as to why dieting might result into episodes of binge eating. First, starvation leads to lowering levels of tryptophan, a serotonin precursor, and subsequent binge may be just an attempt to restore balance. Second, dieting leads to impairment of physiological control over eating with cognitive control, which easily lapses. Third, dieting leads to low mood and bingeing might be an attempt to improve one's mood.

In a famous experiment from 1950s (Keys *et al*, 1950) healthy men agreed to eat only a half of their usual food portions over a period of six months. They lost on average 25% of their original weight. Towards the end of the experiment, they lost interest in most things that they previously enjoyed and were preoccupied with food. When the experiment was over many begun overeating, thought they had never done so before. In his classic description of BN, Russell (1979) mentions that 73% of the identified cases lost weight prior to the onset of the illness. It is difficult to assess influence of dieting on the onset of AN, as it is unclear where dieting ends and the illness starts.

2.4.8. Cultural influences: Migration and acculturation experiences

Cultural influences

While in the first two thirds of the 20th century eating disorders were limited to few cases of anorexia nervosa, modern world seems to be full of young women unhappy about their bodies and in many this unhappiness reached a disordered level. This naturally leads to a hypothesis that eating disorders are culture dependent: Western culture has been repeatedly blamed for the epidemics of eating disorders in the 20th century. But does exposure to thin

models and diet food adverts increase the risk of eating disorders? Even though intuitively the relationship seems to be clear, it is difficult to explore this phenomenon in research studies.

A Spanish prospective study (Martinez-Gonzalez *et al*, 2003) showed that reading magazines and listening to radio programmes for women increased a risk of an eating disorder. However, studies exploring influence of mass media on body dissatisfaction and pathological eating behaviour are mostly experimental. A metaanalysis of those studies (Groesz *et al*, 2002a) confirmed that body dissatisfaction rises following the exposure to pictures of ideal bodies. Leafing through magazines also leads to low mood and feelings of guilt (Stice and Shaw, 1994). Younger women (Groesz et al, 2002a) are more prone to feeling unhappy about themselves following an exposure to beautiful people pictures.

Peer influence has also been shown to play a role in body dis/satisfaction and eating behaviours. Perceived attitudes of their peers influence adolescents' body attitudes and eating behaviours (Lieberman *et al*, 2001; Wertheim *et al*, 1997). When the real (not only perceived) differences are taken into account, the data is less convincing. The actual differences in their peers' behaviour seem to influence younger girls more than the older ones (Hutchinson and Rapee, 2007) suggesting that there might be specific periods when peer pressure is more dangerous (Pike, 1995). This is in line with a recent genetic study (Klump *et al*, 2007) suggesting that while pre-pubertal girls' eating disorders are more influenced by environmental variables, in older girls genes might play a more important role. The peer pressure has been also explored in experimental studies. For example, Stice et al (Stice *et al*, 2003) tested an influence of a 'fat talk' on body dissatisfaction. In young women sharing a waiting room with a beauty with a BMI barely over 18, who spoke about how fat she was, the body dissatisfaction increased. However, the satisfaction with their own body did not change in young women from a control group, who shared a waiting room with an identical beauty who spoke about her plans for the weekend.

Eating disorders and ethnic minorities

It has been suggested that people from ethnic minorities in western countries are protected from eating disorders by a different beauty ideal that associates higher weight with affluence and fertility (Gray et al, 1987). However, recent epidemiological studies have identified increasing eating disturbances in non-white population in western and non-western countries (see the section on epidemiology). It has been hypothesised that this increase might be due to acculturation or 'adaptation to foreign culture and its acceptance' (Padilla *et al*, 1985). Acculturative stress leads to increased psychological vulnerability (Ritsner & Ponizovsky, 1999) and increased risk of depression (Miranda and Umhoefer, 1998) and suicide attempts (Hovey, 1998). Interestingly, the need to adapt to new cultural environments arises not only as a result of migration but also in cultures in transition. The first phase of acculturation, a cultural shock, is the most stressful phase of the process and acculturation is an attempt to come to terms with the initial feelings of insecurity and anxiety. Socio-cultural transitions (like the one in the 1990s in Central and Eastern Europe or the one brought by television to the island of Fidji) might leave people feeling like foreigners in their own countries.

The notion of anorexia nervosa as a culture bound syndrome dates back to 1990s (Prince, 1983; Prince, 1985), but it has also been hypothesised that AN is a 'culture change' syndrome (Di Nicola, 1990) a sensitive indicator of societal changes.

Those findings have been often explained in terms of 'westernization', acculturation process, in which one accepts the values and rules of the rich western world, with all its advantages and ills: Success, beauty, independence, they all have become associated with slimness. In the ideal world of advertisement and beautiful slim people, being different equals being a failure.

It has been emphasised that the 'fear of fatness', as a criterion for eating disorders, might not apply to sufferers from non-western countries (Suematsu, 1985; Pike & Borovoy, 2004). For example, in a sample from Hong Kong that otherwise strongly resembled people with AN from the West, 59% did not report any fat phobia.

The notion of eating disorders as culture bound syndromes was reappraised towards the end of the last century with a widespread view that while BN was a culture bound syndrome, AN is culture independent (Keel and Klump, 2003). This view is supported by data from epidemiological studies that show stable incidence of AN in times of increasing incidence of BN (Currin et al, 2005). Nevertheless, cross-cultural research (Hoek et al, 2005; Katzman et al, 2004) suggests otherwise.

In summary, the extent of the role cultural influences play in the onset and maintenance of eating disorders is unclear and studies from cultures in transitions might help to disentangle this complex relationship.

2.4.9. Biological factors

Genes

Twin studies estimate heritability around 0.5 (Bulik *et al*, 2000) for bulimia nervosa and 0.56 for bulimia nervosa (Bulik et al, 2006). In summary, there is a similar influence of genetic and environmental factors on eating disorders.

Prenatal and perinatal complications

Premature birth has been shown to increase the risk of AN up to three times. Birth complications are risk factors for both, AN and BN (Foley *et al*, 2001; Cnattingius *et al*, 1999). Nevertheless, pre- and perinatal complications also increase risk of other psychiatric disorders, e.g., schizophrenia (Jacobi et al, 2004).

Early menarche

The relationship between early menarche and eating disorders has been confirmed by some (Hayward *et al*, 1997; Wichstrom, 2000), but not all (Graber *et al*, 1994; Smolak *et al*, 1993) studies.

3. Paper 1

Time trends in hospital admissions for eating disorders in the Czech Republic 1981-2005

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This paper is currently under review.

Abstract

Background: Socio-cultural factors may play a role in the aetiology of eating disorders.

Aims: To test the hypothesis that the socio-cultural transition which occurred in the 1990's in Central and Eastern Europe was associated with an increase in hospital admissions for eating disorders.

Method: All cases of ICD-9 and ICD-10 defined eating disorders were retrieved from the Czech Republic national register of hospital admissions for the years 1981, 1986 and 1992-2005. Age and sex adjusted admission rates (per 100,000) were calculated and time trends were tested by Poisson regression.

Results: The admission rate for eating disorders in females aged 10-39 quadrupled from 2.6 (95%CI 2.1-3.0) in 1981 to a maximum of 10.6 (95%CI 9.8-11.5) in 2001, and remained elevated till 2005.

Conclusions: Temporal association of a marked increase in admissions for eating disorders with socio-cultural transition is consistent with an aetiological role of a 'westernised' environment.

Declaration of interest: None.

3.1. Introduction

Eating disorders (ED) were relatively rare until the mid 20th century, but have become a common diagnosis among young women over the last 50 years (Vandereycken and van Deth, 1994). This led to the hypothesis that ED are determined by factors associated with modern western culture (Keel and Klump, 2003). However, as the apparent increase in ED occurred simultaneously with the development of diagnostic criteria (Russell, 1979), the evidence of an increase in ED is based on retrospective reports (Hudson *et al*, 2007). Countries where elements of western culture were introduced more recently provide an opportunity to explore the contribution of socio-cultural factors (Becker *et al*, 2002). The Czech Republic underwent a transition in the 1990s when it changed from a socialist Eastern Block country to a western-type democracy. The transition included rapid introduction of western values, change in media presentations of the female body, and an invasion of the fashion and diet industries (Papezova, 2002). We hypothesised that the socio-cultural transition was accompanied by an increase in hospital admissions for ED.

3.2. Method

Population

The population of the Czech Republic was 10,303,208 in 1981 and, in terms of total numbers, has changed little since (10,234,092 in 2005). As is typical of the Central and Eastern European Region, the age composition has shifted substantially with the average age of the population increasing from 34.9 (S.D. 22.6) in 1981 to 39.4 (S.D. 21.7) in 2005 (Czech Office of Statistics, 2007). Therefore, all analyses in the present report are adjusted for age and sex. In the Czech Republic, most psychiatric care is provided in hospitals and, to date, transition to community psychiatry has not occurred. Most people with clinically significant ED who present to services are referred for specialist inpatient treatment. The health insurance coverage is comprehensive.

Hospital Register

All hospital admissions in the Czech Republic were registered by the national Office of Statistics in Health Care in 1981, 1986 and from 1992 onwards annually. The register is routinely completed by every hospital in the country for general statistical and audit purposes. The register entries include age, gender, and the International Classification of Diseases (ICD) diagnosis as established by the medical officer in charge. Crucially, the ICD diagnostic criteria were adopted before the socio-cultural transition occurred. ICD –9 was used in 1981-1993 and ICD-10 was used since 1994. For the present study, we searched the register for all hospital admissions with ICD-9 diagnosis of eating disorder and ICD-10 diagnosis of anorexia nervosa, atypical anorexia nervosa, bulimia nervosa, atypical bulimia nervosa, overeating with psychological disturbances, vomiting with psychological disturbances, other and unspecified eating disorder. In the present report we analyse hospital admission for all types of eating disorders. Longitudinal studies have demonstrated that transitions between the specific diagnoses of anorexia nervosa, bulimia nervosa and other

eating disorders are very common and consequently it has been suggested that a 'transdiagnostic' approach exploring the whole group of eating disorders may be more valid (Fairburn and Harrison, 2003; Milos et al, 2005). The overall group of eating disorders is also likely to be more comparable across diagnostic systems and be less influenced by the transition from ICD-9 to ICD-10. Specific diagnoses of eating disorders subtypes are not available for the years 1981-1993. However, time courses of admissions for specific diagnoses in 1994-2005 are analysed in an associated report (Pavlova *et al*, 2007b).

Hospital beds availability

Any time trend in admission rates could be explained either by changes in incidence of the disorder or by changes in the availability of hospital beds or referral practices. We therefore extracted the number of total hospital beds and psychiatric beds in the Czech Republic for 1981-2005 from the national statistics and explored whether any trends in admissions were related to changes in hospital bed availability.

Analysis

Age and sex adjusted rates of hospital admissions for ED were calculated by the direct method of rate adjustment (Page *et al*, 1995b). The incidence of ED is strongly related to age and gender, with a majority of cases in young women. Therefore, incidence and prevalence rates of eating disorders are often reported for a high-risk group of women aged 10-39 (Turnbull *et al*, 1996; Currin *et al*, 2005). To maximise comparability with other reports, we provide admission rates and 95% confidence intervals for females and males aged 10-39 and for the whole population. For a detailed description, rates were also calculated for five specific age groups of women (aged 10-14, 15-19, 20-24, 25-29, 30-39). All incidence rates are given per 100,000 person years. As hospital admissions are a count variable, the significance of time trends was tested using Poisson

regression with year as an independent variable. Additionally, negative binomial regression model was used to test the assumption of the Poisson model and to rule out overdispersion (Dean, 1992). The significance level was set at $\alpha=0.05$. To facilitate interpretation, the regression coefficients were transformed to incidence rate ratios (IRR). Analyses were performed with Stata version 10 for Windows.

3.3. Results

Admissions for eating disorders 1981-2005

The age adjusted rates of hospital admissions (per 100,000) are presented in Table 1. The rates for women aged 10-39 ranged between 2.57 in 1981 and 10.64 in 2001. The rates for the corresponding group of men were approximately seven-to-ten times lower. The age and sex adjusted admission rates for the whole population of the Czech Republic were between 1.34 in 1981 and 5.52 in 2004.

Figure 1 shows the rates for females by age group. Females aged 15-19 were most likely to be treated for eating disorders with admission rates between 15.18 (95% CI: 11.20-19.15) in 1981 and 60.43 (95% CI 52.50-68.36) in 2000. The rates for females aged 10-14 and females aged 20-24 were approximately half of those found in the 15-19 age group and the rates were substantially lower for women over 25.

----------Table 1 about here----------

Time trends in hospital admissions 1981-2005

In all age and sex categories the rates of admissions for eating disorders steeply increased in the 1990s and remained high till the end of the observation period (Figure 1). Poisson regressions confirmed that the increase was significant in each age and sex defined category (all $p < 0.001$; Table 2). If the whole period of 1981-2005 was considered, the average increase was by 6% per year. However, the increase was steepest between 1992 and 2000 when the rate of admissions increased annually by 10% on average. To rule out the possibility that increase was an artefact of the change in diagnostic system, we tested the temporal change separately for the periods where ICD-9 and ICD-10 was in use: significant increases occurred during both periods for women 10-39 and for the whole population. The pattern of increase by age group suggests that the increase in

admissions occurred earlier for younger age groups (Figure 1). This differential pattern of admission rates by age group prompted a post-hoc exploration of age at admission. The average age at admission for an eating disorder in females was 20.8 (S.D. 8.5; 95%CI 20-21.6) in the 1980s, it decreased to a minimum of 18.5 (S.D. 6.9; 95%CI 18.1-19.2) in the years 1992-1993 and then returned to 20.8 (S.D. 8.2; 95%CI 20.6-21.0) in the late 1990s and 2000s. Over the whole period, there was no significant linear time-trend of age at admission.

----------Table 2 about here----------

----------Figure 1 about here----------

Hospital beds availability

The number of hospital beds in the Czech Republic decreased over the study period from 943/100,000 in 1981 to 714/100,000 in 2005. The number of psychiatric beds was also reduced from 148/100,000 in 1981 to 109/100,000 in 2005.

3.4. Discussion

The rates of hospital admissions for eating disorders in the Czech Republic were low in the 1980s but increased considerably in the 1990s and remained high in the 2000s. Throughout the study period, the rates of admissions for eating disorders were highest in adolescent and young adult females but the relative increase in admission rates involved all age and sex groups. The sharp increase in the 1990s coincided with the rapid socio-cultural changes in the wake of the Fall of the Berlin Wall and the Velvet Revolution of 1989/1990. The trend is unlikely to have resulted from changes in admission practices, as over the same period, the general and psychiatric hospital bed availability decreased.

Eating disorders and culture

Socio-cultural factors including exposure to media presentation of slim female body ideal, high street shops offering fashion products only for the tall and slim, and diet industry propaganda may play a role in the development and maintenance of ED (Groesz *et al*, 2002b). However, in the developed western countries, the exposure to these factors is universal and long-term experimental manipulation of such exposures is impractical. Cross-cultural research provides clues on their importance. Body dissatisfaction and inaccurate perception of one's body size are common among young women in Western countries, but absent among young women in communities that are isolated from Western culture, such as the Amish (Platte *et al*, 2000). Exposure to Western life style is associated with emergence of ED-like psychopathology in individuals from non-western countries (Becker *et al*, 2002; Eddy *et al*, 2007; Katzman *et al*, 2004) and severity of ED psychopathology correlates with the level of acculturation to the western culture (Mumford and Whitehouse, 1988).

As one of the countries of the Central and East European region (CEE), the Czech Republic was relatively separated from Western cultural influences

until the 1980s. In Eastern Europe, ‘diet food’ was unheard of before 1990 (Wlodarczyk-Bisaga and Dolan, 1996). After the Fall of the Berlin Wall and the Velvet Revolution in 1989-1990, the 1990s brought dramatic changes. The presentation of the female body in the media was transformed from the socialist ‘woman worker’ to ‘woman as an aesthetic object’. Fashion retailers flooded the high street with size-zero clothes. The diet industry and beauty contests have followed suit. Slimness obtained an added value by becoming associated with the success and affluence of the Western society (Papezova, 2002). Young women from the Czech Republic who travelled abroad as au-pairs or students provide a testimony of the strong influence of the exposure to western life style on their self esteem and eating habits (Pavlova *et al*, 2007a). During the rapid changes of the 1990s, many young women might have experienced a cultural shock within their own country due to the rapid change in female body presentation in media, and increased pressure to achieve, sometimes leading to a wish to be more western than Westerners. For example, Russian women showed greater drive for thinness and lower actual and ideal weight than British young women (O'Keefe and Lovell, 1999).

The degree of urbanisation has been found to be associated with a risk of eating disorders in a dose-dependent fashion (van Son *et al*, 2006). Urbanisation has increased with some movement of especially young people to the large cities in the aftermath of the changes of the 1990s in the Czech Republic and this may have contributed to the increase in eating disorders. However, it is also possible that the specific risk factors underlying the effects of urbanisation and socio-cultural transition largely overlap. For example, the exposure to high-street fashion and advertising may be more intense in large cities. Also a loss of social cohesion is associated with both urbanisation and socio-cultural change towards a more western-individualist society.

Alternative explanations and limitations

The increase in admission coincided with the rapid changes in the society and is consistent with a strong influence of socio-cultural factors. However, a rise in hospital admissions cannot be directly equated with an increase in incidence and several alternative explanations need to be carefully considered.

First, it has been suggested that register-based studies may describe the availability of health care facilities at a particular time, rather than incidence/prevalence of the illness (Hoek, 2006). Whilst in the Czech Republic, inpatient treatment is customary for mental illness including ED, a proportion of cases is treated as outpatients and is not included in the study. To address this issue, we have explored the availability of hospital beds. The number of both general and psychiatric hospital beds decreased over the study period, and thus the increase in admissions for ED cannot be attributed to increased availability of inpatient services. It is still possible that improved awareness of ED among health professionals has contributed to the increase. However, as there is no systematic epidemiological evidence on the prevalence and incidence of ED in the CEE region in the time of transition, the exploration of the admission register presents the best available data.

Second, our study is based on a national register. It is an undisputable advantage that the register provides data on the entire population of the Czech Republic. However, it is limited by the reliance on diagnoses established by the treating physicians without the use of structured instruments. In 1994 the diagnostic system used by the register changed from ICD-9 to ICD-10 and this might have influenced the detection of ED. However, significant increases in hospital admissions for ED occurred both before and after this change and hence these cannot be simply explained by the switch to the newer ICD version.

Third, some evidence suggests that socio-cultural changes have greater effect on the incidence of bulimia nervosa than anorexia nervosa (Keel and Klump, 2003; Currin et al, 2005; van Son et al, 2006). In the years 1981-1993, the Czech register did not record separate diagnoses for anorexia and bulimia nervosa and we are unable to explore relative diagnostic composition of admissions over this period. However, the data on specific diagnoses are available from 1994 and, in a separate report, we show that the increase in admissions for ED is significant even for anorexia nervosa (Pavlova *et al*, 2007b).

Conclusion

A pronounced increase in hospital treated cases of eating disorders occurred in the 1990s and coincided with profound societal changes in Central and Eastern Europe. The increase in hospital admissions for ED is likely to reflect a true rise in number of ED cases as it occurred in spite of a decrease in general hospital and psychiatric beds. The specific causative risk factors remain to be explored and may include cultural shock, higher pressure to achieve, new presentation of female body in the media, dieting, urbanisation and travelling abroad. Longitudinal epidemiological studies in countries undergoing socio-cultural transition are needed to dismantle this complex relationship.

Figure 1: Rates of hospital admissions for eating disorders per 100,000 person years in the Czech Republic: Females by age group 1981-2005.

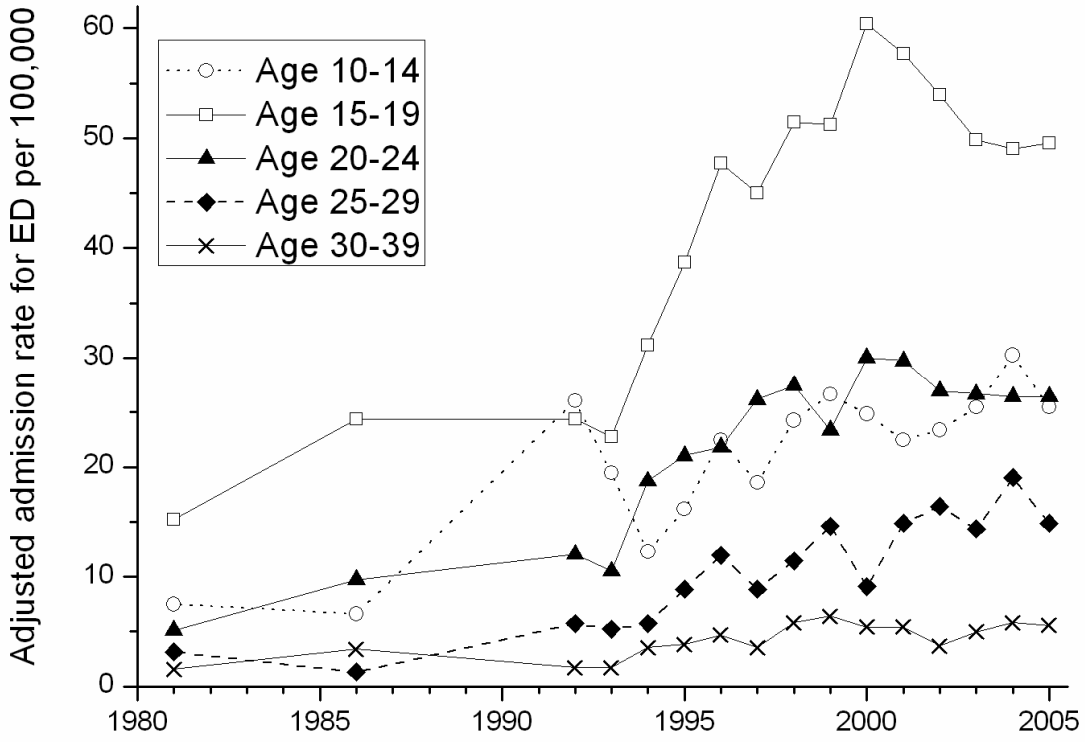

Table1: Age and sex adjusted rates of hospital admissions for eating disorders per 100,000 person years, by sex and year in the Czech Republic.

Year	Females age 10-39			Males age 10-39			Total population		
	Rate	95%CI		Rate	95%CI		Rate	95%CI	
		Lower	Upper		Lower	Upper		Lower	Upper
1981	**2.57**	2.14	3.01	**0.34**	0.18	0.50	**1.34**	1.12	1.57
1986	**3.56**	3.05	4.07	**0.26**	0.12	0.40	**1.91**	1.64	2.17
1992	**5.41**	4.79	6.04	**0.62**	0.40	0.84	**2.74**	2.42	3.06
1993	**4.37**	3.81	4.94	**0.48**	0.29	0.67	**2.36**	2.07	2.66
1994	**5.92**	5.27	6.58	**0.86**	0.60	1.12	**3.08**	2.74	3.42
1995	**7.12**	6.40	7.84	**0.72**	0.48	0.95	**3.70**	3.33	4.08
1996	**8.71**	7.91	9.50	**0.80**	0.55	1.05	**4.48**	4.07	4.89
1997	**8.08**	7.32	8.85	**0.84**	0.59	1.09	**4.25**	3.85	4.65
1998	**9.56**	8.73	10.39	**1.12**	0.83	1.41	**4.97**	4.54	5.40
1999	**9.79**	8.94	10.63	**1.38**	1.05	1.70	**5.15**	4.71	5.59
2000	**10.22**	9.36	11.08	**1.14**	0.84	1.44	**5.46**	5.01	5.92
2001	**10.64**	9.76	11.52	**0.78**	0.53	1.02	**5.35**	4.90	5.79
2002	**9.62**	8.78	10.45	**0.98**	0.71	1.25	**5.06**	4.62	5.49
2003	**9.62**	8.78	10.45	**1.52**	1.18	1.86	**5.14**	4.71	5.58
2004	**10.51**	9.63	11.38	**1.50**	1.16	1.84	**5.52**	5.07	5.98
2005	**9.77**	8.92	10.61	**1.18**	0.88	1.48	**5.03**	4.59	5.46

Table 2: Time trends in the hospital admissions for eating disorders in the Czech Republic.

	1981-2005			**1992-2000**		
	IRR	95%CI		**IRR**	95%CI	
		Lower	Upper		Lower	Upper
Females age 10-39	**1.058**	1.053	1.063	**1.102**	1.087	1.116
Males age 10-39	**1.064**	1.046	1.083	**1.116**	1.063	1.172
Total population	**1.060**	1.055	1.065	**1.102**	1.088	1.115
Females age 10-14	**1.050**	1.039	1.062	**1.035**	1.004	1.066
Females age 15-19	**1.053**	1.045	1.061	**1.120**	1.097	1.144
Females age 20-24	**1.063**	1.052	1.074	**1.112**	1.081	1.144
Females age 25-29	**1.092**	1.075	1.110	**1.104**	1.057	1.154
Females age 30-39	**1.051**	1.034	1.068	**1.149**	1.094	1.207

IRR=Incidence Rate Ratios

4. Paper 2

Time trends in hospital admissions for anorexia nervosa in the Czech Republic 1994-2005

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Preliminary results were reported at the International Eating Disorders Conference in Prague in March 2007. They were also mentioned at the 8th London International Eating Disorders Conference in London in March 2007.

Abstract

Background: The role of socio-cultural factors in the aetiology of anorexia nervosa is disputable.

Aim: To test the hypothesis that socio-cultural changes in the 1990's in Central and Eastern Europe were associated with an increase in first-time hospital admissions for anorexia nervosa.

Method: All first admissions for the ICD-10 anorexia nervosa were retrieved from the Czech Republic national register for 1994-2005. Age and sex adjusted rates (per 100,000) were calculated and time trends were tested by Poisson regression.

Results: The rate of first-time admissions for anorexia nervosa in females aged 10-39 increased from 4.5 (95%CI 3.6-5.4) in 1994 to a maximum of 7.5 (95%CI 6.3-8.6) in 1999, followed by a non-significant decrease to 6.4 (95%CI 5.3-7.4) in 2005.

Conclusions: The observed increase contrasts with reports of stable incidence from Western countries and suggests that risk of anorexia nervosa is culture-dependent.

Declaration of interest: None.

4.1. Introduction

While bulimia nervosa appears to be culturally determined, the aetiology of anorexia nervosa (AN) is considered to be largely independent of culture (Keel and Klump, 2003). This view is supported by reports of stable incidence of AN at times of increases in bulimia nervosa (Currin *et al*, 2005; Milos *et al*, 2004). However, cross-cultural research suggests a strong cultural component in the aetiology of AN (Hoek *et al*, 2005; Katzman *et al*, 2004). Socio-political transitions offer an opportunity to study the influence of cultural changes (Nasser *et al*, 2001) and steep increase in the rate of hospital admissions for all eating disorders in the Czech Republic coincided with socio-cultural changes in the 1990s (Pavlova *et al*, 2007c). To investigate whether this trend generalises to AN, we explore the more detailed data recorded since 1994. Additionally, the distinction between first-time and repeated admissions enables extrapolation from hospital admissions to incidence of clinically significant AN.

4.2. Method

Population

The sample of the present study is the entire population of the Czech Republic and is described in the associated report (Pavlova et al, 2007c). The lack of outpatient services for eating disorders applies even more to AN and most patients with clinically significant AN who present to services are admitted to hospital. Therefore, the registered first admissions can be considered as an approximation of the incidence of clinically significant anorexia nervosa in the population.

Hospital Register

The register of all hospital admissions in the Czech Republic was used for the study (Pavlova et al, 2007c). Whilst before 1994, the records include diagnosis of an eating disorder but do not distinguish between AN and bulimia nervosa, since 1994 the register data include specific ICD-10 diagnosis and information on whether this is the first or repeated hospital admission. 'First admission' is defined as a first period of inpatient treatment for the same or related disorder in any type of hospital. For the present study, we searched the register for all first-time hospital admissions with ICD-10 diagnosis of anorexia nervosa in the years 1994-2005.

Analysis

The data were complete for variables diagnosis, age at admission and gender. The data on whether hospitalisation was a first or repeated admission were missing in 10.3% of cases. The frequency of missing values did not vary by year and there was no indication of non-random missingness. Therefore, assuming 'missing at random' according to Rubin (Rubin, 1976), we have used inversed probability weights estimated in a binary logit regression from all other available variables (year, age, gender, diagnosis).

Age and sex adjusted incidence rates were calculated by the direct method of rate adjustment, effectively adjusting to the average age and gender composition over the entire study period (Page et al, 1995b). Incidence rates and 95% confidence intervals were calculated for the entire population, for the group of females aged 10-39 which includes the majority of AN cases and was reported in previous epidemiological studies (Turnbull *et al*, 1996; Currin *et al*, 2005), and the corresponding group of males aged 10-39. For a fine-grained exploration in females, we also calculated rates for six specific age groups (10-14, 15-19, 20-24, 25-29, 30-39, 40-59). All rates are given per 100,000 person years. Confidence intervals (CI) for rates were calculated using the efficient score method (Newcombe, 1998).

Significance of time trends was tested using Poisson regression models with the significance level set at $\alpha=0.05$. Negative binomial regression was used to check for overdispersion (Dean, 1992), but as the results were virtually identical and no evidence of significant overdispersion was found, the results of Poisson regression are reported. For ease of interpretation, coefficients were exponentiated to obtain incidence ratios.

We used the same procedure to calculate the rates of first hospital admission for bulimia nervosa (BN) and eating disorders not otherwise specified (EDNOS) and to compare time trends in first time hospital admissions for these disorders with those of AN.

4.3. Results

Hospital admission rates for anorexia nervosa

The age and sex adjusted rates of first hospital admissions for anorexia nervosa with two-sided 95% confidence intervals are presented in Table 1. For women aged 10-39, the rates ranged from 4.53 in 1994 to 7.48 in 1999. For the corresponding group of men aged 10-39, the rates were approximately 10 times lower. For the entire population, the incidence rates were between 1.13 in 1994 and 1.74 in 1999.

Figure 1 shows the rates of first hospital admission by age group for females. The 15-19 year old females had consistently the highest incidence rates, ranging from 11.34 (95%CI 7.86-14.81) in 1994 to 19.64 (95%CI 15.07-24.21) in 1999. Rates of first admissions were also relatively high in the 10-14 age group, reaching 13.19 (95%CI 9.20-17.18) in 2003. First admissions for AN were uncommon in women aged 30 and above.

----------Table 1 about here----------

----------Figure 1 about here----------

Trends in hospital admissions for AN 1994-2005

Over the entire 1994-2005 period, Poisson regression indicated a significant increase in hospital admissions for AN among females aged 10-39 with an average annual increase of 1.6%. The increase was driven by the two youngest age groups of females (10-19 years of age) but remained significant when the whole population was taken into account (Table 2). No significant time trend was detected for males.

An examination of the data revealed that the upward trend in hospital admissions peaked in 1999 and then declined slightly. Accordingly, addition of a quadratic term of time (year) improved the fit of the regression model. Therefore, for descriptive purposes, we also present the time trends in rates

of hospital admissions separately for the 1994-1999 and 1999-2005 intervals (Table 2). Between 1994 and 1999, first admission rates in females aged 10-39 increased annually by 7.9%. In this period, there was a marked increase in each of the three younger age groups of females (up to age 25) but again no change occurred in males.

Over the second half of the observation period (1999-2005), there were few changes. Examination of the generally non-significant coefficients indicates that the earlier increase was most sustained in the youngest age group. In the 20-24 age group, the marked increase by 12% annually across the 1994-1999 period was actually followed by a significant decrease (8% annually) in 1999-2005 (Figure 1, Table 2). There were no clear time trends in the first admissions for anorexia nervosa for women aged 25 and more.

----------Table 2 about here----------

Comparison of time trends for AN and other eating disorders

Over the whole observation period (1994-2005) Poisson regression showed a significant increase in hospital admissions for BN and EDNOS in the groups of females aged 10-39. The increase of 2% annually (IRR 1.020, 95% CI 1.003-1.037) was comparable to the trend observed for first admissions for AN over the same time period (Figure 2). Accordingly, interaction between time and diagnosis was non-significant.

Between 1994 and 1999 the rates of first hospital admissions for BN and EDNOS increased by 14.1% (IRR 1.142, 95%CI 1.086-1.200) annually followed by a significant annual decrease of 4% (IRR 0.950, 95%CI: 0.915-0.985) in the 1999-2005 interval. These results suggest that the increase in the rate of first time admission rates for AN was parallel with the increase in first time hospital admissions for BN and EDNOS over the same time period.

----------Figure 2 about here----------

Age at first admission

The patterns of admissions by age group suggest that the increase in admissions for AN was driven by the younger age groups. Therefore, we explored whether the average age at first admission has decreased. As there were significant changes in the age composition of the Czech population over the study period, we used probability weights to adjust for these changes in the calculation of average age at admission. For the adjusted female population (averaged across the study period), the mean age at first hospital admission for AN ranged between 20.46 (95% CI: 17.21-19.49) in 1994 and 18.35 (95% CI: 18.78-22.14) in 2003. There was a slight downward trend by 0.29 year of age annually (95%CI -0.589 - +0.007) that just missed the statistical significance threshold in a two sided test (p=0.055). Given the exploratory nature of this analysis, we treat this result as suggestive but non-significant.

Hospital beds availability

One possible explanation for increase in hospital admission would be increasing availability of inpatient services. However, the number of hospital beds (per 100,000 population) in the Czech Republic was steadily decreasing throughout the study period from 896/100,000 in 1994 to 714/100,000 in 2005. The number of psychiatric beds has also been reduced from 121/100,000 in 1994 to 109/100,000 in 2005 (Czech Office of Statistics, 2007).

4.4. Discussion

Judging from hospital admissions, the incidence of clinically significant anorexia nervosa in the Czech Republic markedly increased in the 1990s and has remained high since. This trend is consistent with a lasting effect of the socio-economic transition that the Czech Republic underwent in the 1990s. The trend is unlikely to be the result of changing availability of services, as over the same period, the number of general and psychiatric hospital beds decreased. This trend in AN parallels the changes in admissions for all eating disorders (Pavlova *et al*, 2007b) and for first time admissions for bulimia nervosa a and EDNOS; this suggests that all types of eating disorders including AN are under the influence of societal and cultural changes.

Incidence of anorexia nervosa

As hospital admissions are the mainstay of treatment for the large majority of clinically detected AN cases of at least moderate severity in the Czech Republic, we interpret the rates of first admissions as a proxy measure of the incidence of clinically significant AN in the population. The annual incidence rates of 1.13 to 1.74 in the Czech Republic are comparable to the figure of 1.17 per 100,000 obtained in a similar hospital register-based study in 1993-1995 in Switzerland (Milos *et al*, 2004). General practice-based studies from Western countries tend to show higher incidence (Hoek and van Hoeken, 2003; Currin et al, 2005). The systematic differences between hospital and general practice studies are likely to be due to the method of ascertainment (Pike, 2004) and possibly to the fact that general practitioners tend to misdiagnose bulimia nervosa as AN (Currin *et al*, 2007). In the Czech Republic and Central and Eastern Europe in general, a general practice-based study is not feasible as general practitioners do not act as gatekeepers to services, and self-referrals and referrals from specialists are common (Gater *et al*, 2005). Data from several small studies

suggest that the prevalence of subclinical eating disordered behaviours in the Central and Eastern Europe region are comparable to Western Europe (Tolgyes and Nemessury, 2004; Wlodarczyk-Bisaga and Dolan, 1996), but the incidence of anorexia nervosa in the CEE region has not been previously studied. Therefore, in the absence of large comprehensive population based epidemiological studies the hospital register data are the best approximation of the incidence of clinically significant AN in Central and Eastern Europe.

Time trends

In Western Europe, the incidence of AN appears to have been stable since the 1970s (Currin et al, 2005; Hoek and van Hoeken, 2003; Bulik et al, 2006). There is some evidence that in the USA the incidence of AN among females aged 15-25 might have increased until the 1980s (Hoek, 2006). However, most studies indicate stable incidence that contrasts with clear time trends in bulimia nervosa (Hudson *et al*, 2007). The relatively stable incidence of AN in developed western countries has contributed to the suggestion that AN is culture-independent (Keel and Klump, 2003). However, an incidence study on the Caribbean island of Curacao found that all women with incident AN had a history of exposure to western culture during sojourns in developed countries, indicating a strong influence of culture-specific exposures in the aetiology of AN (Hoek *et al*, 2005; Katzman *et al*, 2004). Exposure to 'western values' with an emphasis on thinness and self-control during such sojourns has been suggested to be a major determinant of this striking association. A similar "culture shock" may have occurred in the Central and Eastern Europe in the 1990s when the desired successful western way of life became associated with slimness (Papezova, 2002; Pavlova *et al*, 2007a). This rapid introduction of western cultural values presents a natural experiment that provides opportunity to study the influence of cultural elements on the incidence of AN. However, there are no previous reports of the incidence of AN in Central and Eastern

Europe. In an associated report, we show that the socio-economic transition was associated with an increase in hospital admissions for all types of eating disorders and the increase of nearly 10% annually continued throughout the 1990s (Pavlova et al, 2007c). However as cases of AN have not been distinguished from other eating disorders and the order of admission was not recorded before 1994, the increase could have been due to other eating disorders or to repeated admissions. Therefore, in the present study, we explored whether the observed increase generalises to first admissions for AN. We found that in the period of 1994-1999, the rate of first ever hospital admissions for ICD-10 defined AN increased by 8% annually, a figure comparable to the increase in first admissions for other eating disorders. This finding provides strong evidence that the increase included AN and was not an artefact of repeated admissions.

It appears that the increase in the incidence of AN that occurred in Western Europe earlier in 20th century was delayed in the CEE; and coincided with the westernization of the CEE in the 1990s. Pike (2004) hypothesised that, given that only a limited number of individuals carry vulnerability to anorexia nervosa, an increase in risk factors and public awareness will lead to increased incidence up to a certain point, where it will reach saturation. Further observation is required to establish whether plateau in the incidence of severe anorexia nervosa has been reached in the Czech Republic and other countries that have recently undergone socio-cultural transition.

Age at admission

We have found that women in their late teen-age are most likely to be treated for AN. This age composition is consistent across reports from different countries (Currin et al, 2005; Lewinsohn *et al*, 2000; Lucas et al, 1991). Young women are vulnerable to social and psychological pressures (Silberg *et al*, 1999) and young women in cultures in transition may be especially at risk for the development of eating disorders (Rathner, 2001). In the present investigation, we found some evidence that the incidence of AN

may be shifting towards the younger age group. The increase in first time admissions for AN in the Czech Republic has been most sustained in teenage females and there was a trend for decreasing age at first admission that just missed significance level. When interpreting the data, the changing structure of population and referral practices should be considered. The shift to younger age at first admission may be due to an earlier age of onset, e.g. associated with a trend for earlier puberty, or to a more efficient detection of cases hastening the admission. At present, we are unable to distinguish between these factors but further research is under way to address this question that has important implications for both aetiological research and health policy.

Alternative explanations and limitations

By design this study has methodological limitations, which are discussed in more detail in the related report (Pavlova et al, 2007c). The decrease in number of hospital beds continued between 1994 and 2005 and thus the increased rate of first hospital admissions for AN cannot be explained by greater service availability. While we were unable to control for reliability of diagnoses established by a medical officer in charge, the same ICD-10 criteria were used throughout the whole study period and there is no indication that diagnostic practices changed over time. Therefore, any unreliability of diagnosis would be expected to be randomly distributed and to weaken the significance of findings rather than producing spurious positive results.

Another explanation would be that our results reflect of world-wide trend of increasing incidence of AN. According to a recent study from Netherlands, an increase in AN incidence occurred in the 1990s specifically for young females aged 15-19 (van Sonn *et al*, 2006). Moreover, a study from Finland found a surprisingly high incidence of AN in a cohort of female twins born 1974-1979 (Keski-Rahkonen *et al*, 2007). These new findings await comparison with other Western and non-western countries.

Finally, hospital register, general-practice register and population-based studies have each their own limitations (Pike, 2004) and should ideally be used in conjunction. Clearly, not all cases of AN get admitted to hospital, even in a country where the services are organised around inpatient facilities. In the Finnish twin study, 53% of community cases of AN remained undetected by health services; compared to detected cases the undetected cases of UN had lesser degree of underweight but comparable level of psychopathology (Keski-Rahkonen *et al*, 2007). Individuals with less severe anorexia nervosa, individuals who receive treatment as outpatients and those who do not seek treatment are not included in present report. Therefore, further studies using complementary methodologies are needed to confirm the present results.

Conclusion

This is the first report on the epidemiology of anorexia nervosa in the Central and Eastern European Region. The pattern of increase in the 1990s and subsequent stagnation is consistent with a lasting effect of the socio-cultural transition. If replicated, these data support the hypothesis that cultural factors play an important role in the aetiology of anorexia nervosa.

Figure 1: Rates of first hospital admissions for anorexia nervosa per 100,000 person years by age group of females in the years 1994-2005.

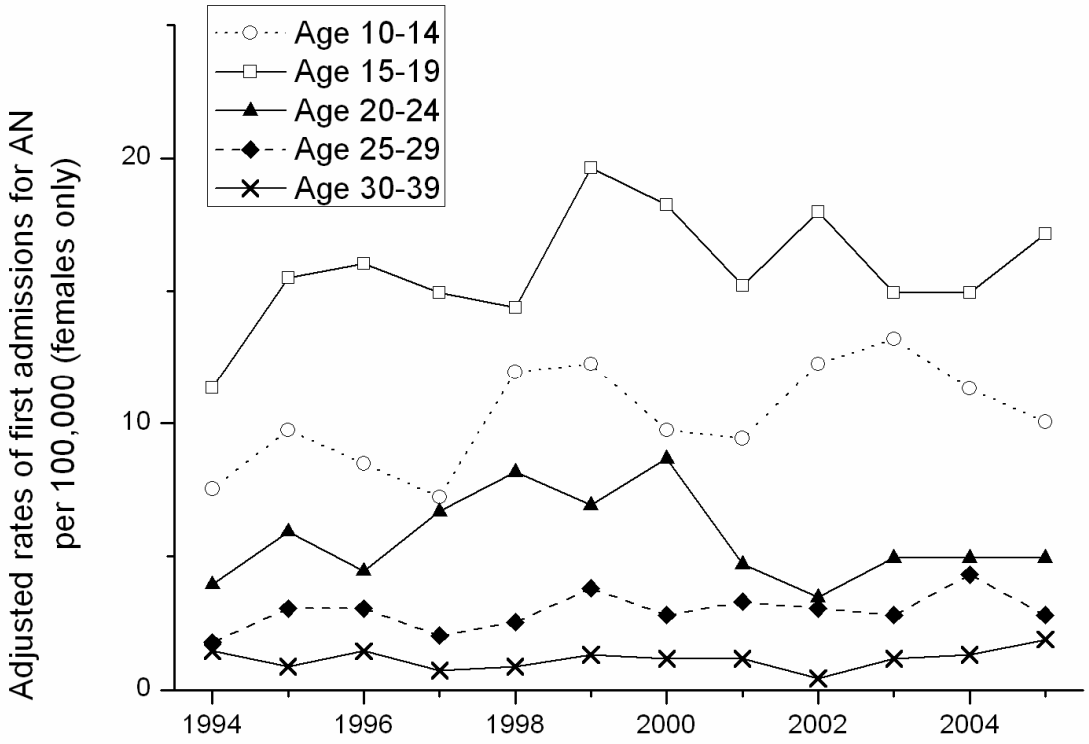

Figure 2: Comparison of rates of first hospital admissions for AN and for other eating disorders (bulimia nervosa and EDNOS) per 100,000 person years in females aged 10-39 (1994-2005).

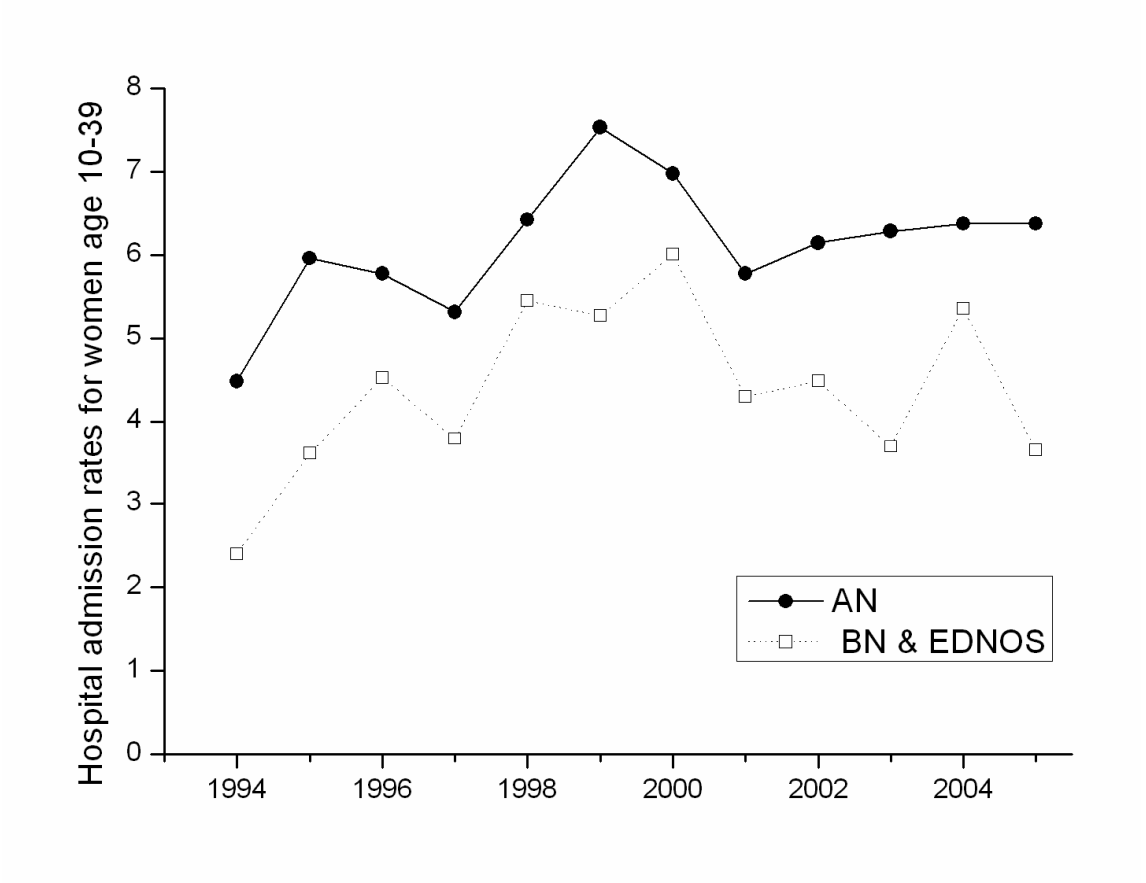

Table 1: Age and sex adjusted rates of first hospital admissions for anorexia nervosa per 100,000 person years for the total population of the Czech Republic, females aged 10-39 and males aged 10-39.

	Total population			**Females 10-39**			**Males 10-39**		
Year	**Rate**	**Lower**	**Upper**	**Rate**	**Lower**	**Upper**	**Rate**	**Lower**	**Upper**
1994	**1.13**	0.92	1.33	**4.53**	3.63	5.42	**0.53**	0.23	0.83
1995	**1.36**	1.14	1.59	**5.96**	4.93	6.99	**0.40**	0.14	0.66
1996	**1.39**	1.16	1.62	**5.78**	4.76	6.79	**0.58**	0.26	0.89
1997	**1.25**	1.03	1.46	**5.41**	4.43	6.39	**0.35**	0.11	0.60
1998	**1.48**	1.24	1.71	**6.42**	5.35	7.49	**0.44**	0.17	0.72
1999	**1.74**	1.49	2.00	**7.48**	6.33	8.64	**0.62**	0.30	0.94
2000	**1.67**	1.42	1.92	**6.98**	5.86	8.09	**0.62**	0.30	0.94
2001	**1.31**	1.09	1.54	**5.78**	4.76	6.79	**0.18**	0.00	0.35
2002	**1.49**	1.25	1.73	**6.14**	5.10	7.19	**0.75**	0.39	1.11
2003	**1.45**	1.22	1.68	**6.24**	5.19	7.29	**0.44**	0.17	0.72
2004	**1.48**	1.24	1.71	**6.28**	5.23	7.34	**0.49**	0.20	0.78
2005	**1.47**	1.24	1.70	**6.38**	5.31	7.44	**0.35**	0.11	0.60

Table 2: Time trends in the first admission rates for anorexia nervosa in the Czech Republic.

	1994-2005				1994-1999				1999-2005			
	IRR	95%CI			IRR	95%CI			IRR	95%CI		
		Lower	upper	p		lower	upper	p		lower	Upper	P
Females												
10-39	**1.016**	1.002	1.031	0.029	**1.079**	1.035	1.125	0.000	**0.977**	0.947	1.008	0.142
Males												
10-39	**0.995**	0.948	1.044	0.824	**1.010**	0.880	1.158	0.889	**0.961**	0.862	1.071	0.473
Total												
population	**1.016**	1.003	1.030	0.019	**1.066**	1.025	1.108	0.001	**0.981**	0.952	1.010	0.190
Females												
10-14	**1.031**	1.002	1.061	0.037	**1.091**	1.001	1.189	0.046	**1.001**	0.941	1.065	0.975
Females												
15-19	**1.015**	0.993	1.037	0.178	**1.072**	1.006	1.142	0.032	**0.970**	0.925	1.017	0.208
Females												
20-24	**0.988**	0.955	1.023	0.495	**1.120**	1.018	1.233	0.021	**0.918**	0.848	0.994	0.034
Females												
25-29	**1.033**	0.984	1.084	0.189	**1.084**	0.938	1.252	0.273	**0.994**	0.897	1.103	0.916
Females												
30-39	**1.018**	0.961	1.079	0.543	**0.963**	0.813	1.141	0.666	**1.062**	0.934	1.209	0.359
Males												
10-14	**0.998**	0.910	1.094	0.963	**1.000**	0.774	1.293	1.000	**1.023**	0.830	1.261	0.831
Males												
15-19	**0.992**	0.925	1.064	0.831	**1.142**	0.935	1.394	0.194	**0.848**	0.726	0.992	0.039
Males												
20-24	**0.978**	0.852	1.123	0.752	**0.690**	0.437	1.090	0.112	**1.152**	0.824	1.610	0.409
Males												
25-29	**1.043**	0.784	1.388	0.773	**1.191**	0.517	2.743	0.682	**1.302**	0.613	2.766	0.492
Males												
30-39	**0.992**	0.769	1.278	0.769	**0.690**	0.277	1.721	0.426	**1.000**	0.568	1.761	1.000

5. Paper 3

It would not have happened to me at home: Qualitative exploration of sojourns abroad and eating disorders in young Czech women

European Eating Disorders Review In press

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Preliminary results were reported at the International Eating Disorders Conference in Prague in March 2007. They were also mentioned at the 2nd Annual International Mental Health Conference in London in August 2005.

Abstract

Background: Eating disorders can be triggered by life events involving migration and acculturation.

Aim: To explore associations between sojourns abroad and the onset and course of eating disorders.

Method: Six semi-structured interviews with women with an eating disorder and history of sojourn abroad and seven first-person Internet testimonies were analysed using interpretative phenomenological analysis.

Results: We identified three trajectories relating eating disorders to sojourns abroad: I. weight-gain when abroad associated with later development of an eating disorder; II. development or worsening of an eating disorder when abroad; III. stay abroad as an attempt to escape the illness. Three topics informed on the impact of sojourns abroad on mental health: A) different food and eating habits; B) negative emotions; C) illness as attempt to achieve something valuable.

Conclusion: The importance of the identified trajectories and topics relating eating disorders to sojourns abroad needs to be estimated in an epidemiological study.

Key words: Czech Republic, course, eating disorders, onset, qualitative

5.1. Introduction

Several lines of evidence suggest that the onset of eating disorders may be triggered by life events related to leaving parental home, living abroad and adjusting to different cultural environment. First, the peak onset age of bulimia nervosa and the second peak in incidence of anorexia nervosa are between 18 and 20 years and coincide with the leaving-home transition (Halmi, Casper, Eckert, Goldberg & Davis, 1979; Hoek & Van Hoeken, 2003). Second, body dissatisfaction and prevalence of disordered eating increase in female students during the first year of university studies (Compas, Wagner, Slavin & Vannatta, 1986). Third, the prevalence of eating disorders in migrants is elevated and positively related to the degree of acculturation (Davis & Katzman, 1999; Gowen, Hayward, Killen, Robinson & Taylor, 1999). Fourth, on the island of Curacao, where the incidence of eating disorders is relatively low, all 11 women with anorexia nervosa detected in an incidence study had a history of living abroad for a year or more, usually as students; the disordered eating appeared either during the stay abroad or shortly after return (Hoek et al., 2005; Katzman, Hermans, Van Hoeken & Hoek, 2004). This striking association has been linked with subjective experiences of cultural shock, clash of western values with the family expectation and disillusion upon return home (Katzman et al., 2004). Finally, clinicians from the Czech Republic reported on high proportion of female patients, who developed an eating disorder in relation to their stay abroad as au-pairs or students (Dufkova & Kuliskova, 1999). This evidence warrants an in-depth exploration of the separation-acculturation events in the development of eating disorders.

From the available data, it is not apparent which aspects of separation-acculturation events are operational: is it the loss of security of the parental home, the need to adjust to a different cultural environment or greater exposure to peer groups and media when out of home? For example, in the

Curacao study, the effect of migration is difficult to separate from race, socio-economic class and educational factors (Katzman et al., 1994). To explore these and other possibilities, we conducted an in-depth qualitative study of subjective accounts of such events among young Czech women with eating disorders.

Over the last 15 years, the Czech Republic has undergone a major transition, from a socialist country of the 'Eastern block' closely associated to the Soviet Union, it developed into an independent central European democracy and joined the European Union in May 2004. Before 1989, the access to western-style culture and media was minimal and, due to lack of career opportunities, most people led a family and leisure oriented life. The present Czech Republic has all the advantages and ills of western society including hypermarkets, music TV, reality shows, fast food, gyms and diet industry. The population of the Czech Republic, currently 10.2 million (Czech Statistical Office, 2005), is ethnically and culturally homogeneous, secular, white and unilingual. Economically, the Czech Republic ranks below most Western European countries with a per capita gross domestic product around 60% of the European Union average.

Among young and educated people in the Czech Republic, travelling, working or studying in the rich western countries is often equated with success. For many young people, the easiest way to get abroad and learn a foreign language is to become an au-pair (Williams & Balaz, 2004). The main destinations involve the United Kingdom, Germany and the USA. E.g. between 1993 and 2003 the United Kingdom issued annually approximately 6000 au-pair visa to Czech citizens, predominantly young women (Home Office, e-mail communication, 23rd September 2005).
In the present investigation, we have used qualitative methodology to explore the links between sojourns abroad and illness in young Czech women with eating disorders. We focused on two research questions: I) Do

young women suffering from eating disorders perceive any relationship between their illness and stay abroad? II) What aspects of such life events are functional in triggering the onset or deterioration of the disorder?

5.2. Method

Sample

We used data from two sources: in-depth interviews and Internet testimonies. The participants for interviews were recruited among inpatients, day-patients and outpatients in the Eating Disorders Unit of the First Medical Faculty, Charles University, Prague. Between March 2004 and March 2005, we performed three cross-sectional questionnaire screenings (30 participants screened in total). The questionnaire comprised the Eating Disorder Examination-Questionnaire (Fairburn & Beglin, 1994), demographic items and a question about history of sojourns abroad longer than 2 months. All patients, who fulfilled a diagnosis of eating disorder according to EDE-Q and had a history of sojourn abroad, were invited for an interview. All six eligible patients agreed to participate and provided a written consent after the procedures had been explained. For characteristics of participants please see Table 1.

Table 1 about here

Semi-structured interviews

All interviews were conducted by a female interviewer (BP) in a quiet room in the same building where the participants attended treatment. Participants were encouraged to provide a narrative account not only of the illness history, but also of their life story in general. Leading questions were avoided. The funnelling technique was used, where more general topics are introduced before the specific ones, to avoid any implicit suggestions. The interviewer followed a topic list, which included common types of life events, family, relationships, as well as any factors subjectively perceived as

contributing to the onset of illness and the experience of being abroad. Each interview took between 50 and 90 minutes. Interviews were audio-recorded and transcribed verbatim. All information that could lead to the participants' identification was omitted or changed.

Internet testimonies

To triangulate the sources of data we additionally performed an Internet search to identify personal testimonies that include both eating disorders and stays abroad. Using two Czech search engines (www.seznam.cz and www.centrum.cz), we searched for combinations of words: au-pair – anorexia, au-pair – bulimia, abroad – anorexia and abroad – bulimia. Seven first-person testimonies (labelled Q,R,S,T,U,V,Z) were identified, which comprised sufficient information to assess the relationship between sojourn abroad and onset or course of the eating disorder.

Analysis

The interview transcriptions and internet accounts were analysed in several stages. First, factual information was extracted to construct the temporal trajectories of the development and course of the eating disorder in relation to the sojourn abroad. In a second stage, full transcripts were analysed following the principles of Interpretative Phenomenological Analysis [IPA, Smith & Osborn, 2003)]. We first analysed all transcripts and produced a master list of emerging themes. This master list was gradually enriched in an iterative process. The final version of the master list was then used to re-analyse all transcripts. Subsequently, the topics were clustered according to themes with shared meaning and/or hierarchical relationship. Thereafter, the passages relevant for the research questions, i.e. relating the illness to sojourn abroad or describing the experience of living abroad, were identified and selected.

The second investigator (RU) re-analysed all transcripts using the final master list and his results were compared with the first one. Reliability was formally tested at two stages: I) identifying the passages relevant to the research questions, II) attributing passages to individual topics. There was a full agreement at the first stage. On the second stage, minor differences were solved in a consensus meeting.

5.3. Results

We present the results according to the research question and topics, which emerged during the analysis. Data of the interviewed participants (J-P) are presented alongside those from the Internet testimonies (Q-Z).

Sojourn abroad and the course of eating disorders

We found three trajectories of development of eating disorders in relation to the stay abroad. The same three trajectories were found in both interviewed participants and the Internet testimonies.

Trajectory I: Initial weight gain when abroad

Two interviewed participants and four of those who posted Internet testimonies experienced weight gain during their sojourn abroad, which they viewed as a cause of their later eating problems.

J: In the beginning I gained some weight, 4 kilos maybe … I did not like it, so I started skipping evening meals and then I thought it could be even quicker and stopped eating.

N: When did I begin with dieting? It was after I had come from America. I gained a lot of weight there. Well, all Americans are fat but I felt I was the biggest one.

T: Food is different here (in the UK), it is all too chemical and not satiating at all … I have put on 10kg over the last three months. I just have to lose weight …

U: I have been suffering from bulimia for 8 years; it started when I was in Germany as an au-pair. I put on 8kg and did not know how to lose it …

V: When I was 18 I went to Germany as an au-pair and there I put on 10kg within few months.

Z: 10 years ago, I was in Germany as an au-pair. I fed myself up to 93kg.

Trajectory II: Falling ill abroad

Three interviewed participants and two of those who left Internet testimonies saw their stay abroad as an event that either caused their illness or significantly worsened its course.

*J: I think it was the change of the environment, I think it would not have happened to me at home***.**

K: The journey to America was a turning point.

M: Everybody there was thin, everybody was on diet, everybody ate healthily. And I was not fat, but I was chubby. So it was the reason I started vomiting.

Q: At first I only did some dieting and exercise, but in September I came to London as an au-pair and here it got worse. I tasted everything and my weight shot up. I have been doing it (self-induced vomiting) for 2 months now, 2 to 3 times a week …

R: It started in 1998... in August 1999 I went to the USA as an au pair...had trouble there, was homesick and felt lonely and had trouble with my host family... so overeating and throwing up was about all I did.

Trajectory III: Failed escapes from illness

Two interviewed participants went abroad hoping that the change of environment would help them recover from their illness. In both, the problems got worse when abroad. The same trajectory was also described succinctly in one Internet testimony (S).

P: By going to England I was trying to escape bulimia and start a new life

O: If I could decide again I would have not gone there, I would have started the treatment much earlier.'

S**:** *I suffered form bulimia since I was 12 … I thought that if I go to England as an au-pair, it will sort itself out. But now I'm going home with more problems with vomiting then ever before.*

How did the journey abroad influence the eating disorder?

During the in-depth interviews, more detailed information was obtained. All passages related to the experience of staying abroad were analysed in search of factors that may be impacting on mental health. Three topics were identified, which were explicitely or implicitly related to both the experience of being abroad and the disordered eating behaviour. Although there was, in general, less detailed information in the Internet testimonies, two of these topics were also saturated from these.

'The fattening foreign food': different food and eating habits

Four participants saw differences in the diet and eating regime as a factor that contributed to their problems. These differences relate to both the host country and the host family.

Food was seen as being unlike Czech food, usually as containing more fats and chemicals:

J: The food is fatter in America.

The cultural differences in eating habits were mentioned:

J: In America they don't have three meals a day as we are used to. They don't even cook. (…) It is a complete mess. And I was not used to it.

K: In America you know a caloric content of every single slice of ham. And I started to watch it really carefully.

Abundance or lack of food in the host family was viewed as a factor that influenced the participant's relationship to food.

M: There was so much food around that every time I felt stressed I just took something from the fridge. It was unlimited.

P: There was not enough food for me. So every time I got the money I made up for it: I shopped and overate.

T: Diet food is expensive in the Czech Republic but here (in the UK) it costs three times as much: so nobody buys it here and they all eat fat and unhealthy food.

'Loneliness, boredom and humiliation': negative emotions abroad

Stay in a foreign country and living-in arrangements with a host family brought many negative emotions: loneliness, boredom, stress and humiliation. In three cases these were viewed as a cause of overeating and vomiting.

J: I ate more there. It is a kind of solution for unpleasant emotions. You feel more like eating sweets then. It calms you down.

M: They did not value my work and laughed at me because of my English.

O: I was lonely all the time. In the afternoon I was on my own, I sat in my room and binged on food I bought, because there was nothing else to do. Or I went to a gym and spent three hours exercising.

P: The beginning was really awful; I did not know anybody, when I tried to say something the family did not understand me. I was alone all the time and I was miserable.

R: See Trajectory II.

Thinness as commodity to bring home

While anticipating that the stay abroad would be difficult experience two interviewed respondents felt that losing weight may be the positive gain from this 'suffering'.

K: When my boyfriend was in America before, he worked really hard and was trying to save money and he lost weight. And when we went there I thought that I want everybody to see that I worked hard. And I decided to lose weight.

O: When I was leaving for England, I thought: If nothing else I will lose some weight there and everybody will be impressed that I lost weight in England.

Furthermore, one participant highlighted the importance of feelings of inferiority (in this case not being 'slim and beautiful') to natives in the host country (see Trajectory II, participant M).

The anticlimax of return

Although it is not directly related to our research questions, we include this finding, which is relevant to the broader issue of the relationship between migration and mental health. Three interviewed participants reported mood worsening upon return, in two cases resulting in a suicide attempt.

J: To be honest the depression got worse when I came home. When I was in America and there was no one to talk to I was managing. But when I came home and I knew I could talk to mum and dad, it all came out and became worse. I did not see purpose in life, nothing mattered anymore ... I sometimes felt as if I was not there ...

K: (after return from the USA) And the states of my mind, the depressions, I always go to have some more beer, thinking it will get better, but I am only worse. Yes... And once I had some beer and suddenly I felt that life was not worth living. I just went all crazy, I took heaps of some pills.

M: In July we decided that I could not carry on like this and we went back to the Czech Republic. I found a psychiatrist and started the treatment. (...) She said it would get better but it did not and in November I tried to commit suicide.

5.4. Discussion

In the present sample, the association between going abroad and eating disorders was uniformly a negative one. Although the participants were recruited by simply asking whether they have had an experience of living abroad, neither of the participants reported a positive effect of this experience on their life or on their illness. This was true for both the interviewed women and for those who have left their testimonies on the Internet. The in depth interviews provided considerable details of the intricate relationship between sojourns abroad and the illness.

The association between the travel abroad and the onset and course of the eating disorder was not uniform. Three trajectories were identified, the validity of which was confirmed by the agreement between the samples of interviewed current patients and the anonymous Internet testimonies. Initial weight gain was the most common of these trajectories. The exposure to new types of food and eating habits of the host family led to the feeling of loss of control over eating and subsequent weight gain. Becoming heavier lead to dissatisfaction with one's own body and further symptoms of an eating disorder, either abroad or after return.

A majority of participants perceived their stay abroad as an event that either directly contributed to their illness or substantially worsened its course. This finding is in accordance with that of Katzman et al. (2004) from the island of Curacao, where almost all the incident cases of anorexia nervosa developed their disorder while studying abroad or shortly afterwards. In Curacao, the women with anorexia nervosa belonged to a distinct mixed-race and educated subpopulation, which differed form the majority population of the island, and hence the effects of going abroad were interwoven with ethnic and socio-economic factors. Our present sample is fairly representative of the Czech population and there is no racial

difference between the Czech Republic and the host countries. While the young women from Curacao found it difficult to belong and fit in the foreign country because of their mixed race, the Czech women in our sample perceived their relative inferiority because of difficulties with the foreign language and lack of financial resources. It is notable that in spite of these varied subjective reasons, taking control over their own body was an option for both Czech and Curacao young women when they were in the situation of temporal immigrants.

The development of the eating disorder abroad was often associated with negative emotional experiences related to being alone in a foreign country and to conflicts with the host families. Many of the young women working as au-pairs in a living-in arrangement felt undervalued, ridiculed or humiliated by their host families. Young women from the former Eastern Block may be more vulnerable to such feelings, as they grew up in a 'socialist' society where the 'bourgeois' institution of maids and servants were absent. Lacking clear boundaries between being an employee and being a family member, young women from the Czech Republic often felt exploited (Papezova, 2002). Similar observation was made in Slovak au-pairs in Germany (Hess & Puckhaber, 2004). Other participants felt lonely and bored. These distressing experiences were coupled with unaccustomed availability of food and exercise facilities. For these women, dieting, exercising, over-eating and self-induced vomiting became the means of coping with unbearable emotions (Heatherton & Baumeister, 1991). For others, improvement of their body became another commodity to be obtained and brought home from the difficult journey (Williams & Balaz, 2004).

The peculiarity of sojourn abroad as a life-event is that it is self-initiated: the young women in our sample made the decision to go abroad as their personal choice. Hence it is important to consider their reasons for doing

so. The motivation to become an au-pair generally differs between women who live in cities and those from deprived regions with high rates of unemployment. While the former aim to improve their language skills, escape from poverty and lack of opportunities is often the motive for the latter group. Indeed, au-pair experience attracts more girls from those deprived regions (Williams & Balaz, 2004). For several women in the present sample, a pre-existent eating disorder was part of the reason to go abroad. They hoped that their problems will resolve in the new environment and they would make a fresh start. Such hopes were not fulfilled in any of the cases and, for all of them, the problems got worse when abroad.

Some women experienced disillusion and worsening of problems after return to their home country. It was usually mood rather than disordered eating behaviour that deteriorated after return. This anticlimax of return was also noted in the Curacao study, where it was explained in terms of a clash of western values with expectations to assume the traditional female role in Curacao (Katzman et al., 2004). The expected female role in the Czech Republic is similar to Western Europe (Pecova & Von Wietersheim, 2005) and no such theme emerged in the present research. Instead, the return depression was related to the relaxation of efforts and defences on return home. In one case, disappointment with the outcome of treatment of the eating disorder played a role.

The present report is limited to a qualitative investigation of a small sample. While we have been able to provide in-depth information on the experiences of these women, the importance and generalizability of these phenomena needs to be established in an epidemiological study. The collection of such data, informed by the present investigation, is currently in progress. However, the agreement of data from two different sources, current patients and Internet testimonies, suggests a strong potential for generalizability of the current qualitative findings.

Conclusion

The accounts of women with experience of temporary migration and of eating disorder testify of the distress associated with such self-initiated events. Several participants felt that the sojourn abroad was a decisive factor in the development of eating disorder. For some, this happened in the context of loneliness and humiliation in the host families. For others, loss of control over eating under unfamiliar circumstances was a factor. Weight gain seems to be a common initial event in the development of an eating disorder in such circumstances. Sojourns abroad may be extremely distressing for those who are already ill before leaving their home country. Hopes of miraculous resolution of problems in the new country are not fulfilled and deterioration appears to be the norm. If this proves to be generalisable, women with eating disorders should be advised against such enterprises.

Tables

Table 1: Characteristics of the interviewed participants.

Participant	Age	Illness onset	Diagnosis (EDE-Q)	Reason for the journey	Age abroad
J	20	17	Anorexia nervosa	Study	17-18
K	27	21	Anorexia nervosa	Au-pair, work	21 and 23
M	23	20	Bulimia nervosa	Au-pair	20 and 21
N	25	20	Anorexia nervosa	Study	16 and 20
O	20	18	Bulimia nervosa	Au-pair	18-19
P	24	15	Bulimia nervosa	Au-pair, work	18-24, with breaks

Appendix 1: Brief vignettes of the interviewed cases:

In order to protect the participants' privacy, we are giving only a brief overview of each participant's illness trajectory with focus on their sojourns abroad.

J Before going to America at the age of seventeen J has never had any problems with her weight and she was satisfied with her body. In America she studied at a high school and lived with a host family. The food in America was heavier than she was used to and her host family had a chaotic way of eating. She gained 6 kilos during the first three months as a result of this and because being lonely made her eat more sweets. She did not like it and stopped eating suppers-it worked but she wanted it to work quicker and went on a strict diet. At times she did not eat for four days, which was usually followed by a binge. She became very low and was wondering whether her live has any purpose. She lost 14 kilos and after a year went home. At home she gained the weigh back but the depression got worse. She has found the antidepressants helpful. She has attended the Eating Disorders Unit as an outpatient.

K K has never felt comfortable in her body. When she was 15 she gained some weight, which she attempted to lose a year later. She cut down on food and started exercising. She was satisfied with the weight loss (10 kilos), however after several months problems with sleep and anxiety kicked in. She was prescribed antidepressants. When she was 21 she spent three months in England as an au pair: here she first tried to counteract the effect of eating by vomiting. However, a turning point was a stay in the USA where she spent six months working. She decided to loose weight and virtually stopped eating. She worked very hard and drank alcohol to help her sleep. She vomited several times when she felt guilty

after eating. Upon return she repeatedly tried to commit suicide. At the time of the interview she was an inpatient at the Eating Disorders Unit for three days.

M M has always envied her older sister for being ‘a model type’. When she was 20 she spent three months in Spain as an au-pair. She stopped eating and started vomiting on a daily basis, which led to the desired weight loss. She returned to a very tense situation at home and she carried on overeating and vomiting. To escape the situation she went to England as an au-pair. She was decided to diet but there was just too much food around. She overate and vomited many times a day and she felt more and more down, tearful and moody. Finally, she returned to the Czech Republic and started treatment. Following unsuccessful outpatient treatment she attempted to take her life. Later she was admitted to the Eating Disorders Unit.

N N has always known that ‘girls are slimmer’ but she ‘did not care’. When she was fifteen she started trying different diets but she has never stuck to them. In this time she came across a magazine article about bulimia and thought it might be a good way how to lose weight. She started to vomit ‘just occasionally’. When she was 17 and studying in America for a year she gained eight kilos. She did not diet but she felt fat and preferred eating alone. When she was nineteen she went for a holiday trip where she got an intestinal virus and she lost around six kilos. She wanted it to last and started to vomit first and later she began to overeat too. She kept vomiting and overeating for three years. The last year and half she was on strict diet and vomited regularly. ‘I ate 10 rolls then vomited and did not eat anything for ten days’. In the time of the interview she was an inpatient in the Eating Disorders Unit.

O When O was 13 she was being teased at school because of her ‘big backside’. Since she was 15 she started exercising and eating less but the weight loss was never ‘successful’. When she was seventeen she started dieting and lost ten kilos. In summer she went abroad take part in a sport competition, here after months of dieting she started to vomit daily. When she was eighteen she went to Germany to work as an au pair. She had nobody talk to and she was bored. She was spending her time by overeating and compulsive exercising (around four hours a day). She felt anxious, worthless and desperate like ‘I will never get out of this’. After a year she has come back and was admitted to the Eating Disorders Unit.

P When P was 13 she first attempted to fight the effects of puberty on her body and occasionally tried to skip dinner. When she was 15 her friend mentioned vomiting as a way to keep ones weight down. She started to vomit once every five days after overeating. However, the number of times when she overate and vomited was increasing: twice every day when she was sixteen and four times a day when she was eighteen. After finishing the secondary school she left for England. For the first two years she worked as an au-pair, which was giving her ‘too much freedom to eat, overeat and vomit whenever she wanted’. Later she worked in a café. She kept vomiting at least daily. She was very moody and had lots of fights with friends. She returned to the Czech Republic to start an outpatient treatment but it was not helpful. She went back to England where she was becoming more and more moody and down. She stayed for a year but felt that she could not cope anymore and went back home and was admitted to the Eating Disorders Unit.

6. Discussion

This thesis comprises of three different papers. The first two are large-scale epidemiological studies that include the whole population of the Czech Republic. The last paper uses qualitative methodology and explores association between long-term stays abroad and disordered eating.
Summary of the results is presented below.

6.1. Summary

1. The hospital admission rate for eating disorders in females aged 10-39 quadrupled from 2.6 (95%CI 2.1-3.0) in 1981 to a maximum of 10.6 (95%CI 9.8-11.5) in 2001, and remained elevated till 2005. Temporal association of a marked increase in admissions for eating disorders with socio-cultural transition is consistent with an aetiological role of a 'westernised' environment.
2. The rate of first-time admissions for anorexia nervosa in females aged 10-39 increased from 4.5 (95%CI 3.6-5.4) in 1994 to a maximum of 7.5 (95%CI 6.3-8.6) in 1999, followed by a non-significant decrease to 6.4 (95%CI 5.3-7.4) in 2005. The trend in the incidence of clinically significant anorexia nervosa was paralleled by an increased rate of first-time admissions for bulimia nervosa. The observed increase in the incidence of clinically significant anorexia nervosa contrasts with reports of stable incidence from Western countries and suggests that risk of anorexia nervosa is culture-dependent.
3. Young women with eating disorders report that their long-term stay abroad contributed to the onset or worsening of their eating disorder. They describe three different trajectories into the illness: In some the stay abroad was associated with initial weight gain, dieting and subsequent

development of an eating disorder. Other report development or worsening of an eating disorder without the initial weight gain. Lastly, for some women the stay abroad was meant to serve as an escape from their eating disorder, but worked as an exacerbation. Mechanisms of the eating disorder development/worsening included different food and eating habits, negative emotions and illness as attempt to achieve something valuable

6.2. Future directions

1. Cultural factors appear to be associated with eating disorders, including anorexia nervosa. A large-scale prospective population study in a country undergoing socio-cultural transition is needed to further explore this finding to establish whether it generalizes to other settings (primary care, two-stage screening studies).
2. The importance of acculturation and migration experiences in the development and maintenance of eating disorders needs to be established in a longitudinal prospective study.

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