

Anorexia nervosa among first- and second-generation immigrant children and adolescents in Italy: treatment and clinical outcomes

JACOPO PRUCCOLI^{1,2}, ANGELA LA TEMPÀ², VALENTINA FRANCIÀ¹, PAOLA GUALANDI¹, ELISABETTA MALASPINA¹, FILOMENA MOSCANO¹, FRANCESCA ROSSI¹, LEONARDO SACRATO¹, PAOLA RUCCI³, ANTONIA PARMEGGIANI^{1,2}

¹IRCCS Istituto delle Scienze Neurologiche di Bologna, Centro Regionale per i Disturbi della Nutrizione e dell'Alimentazione in Età Evolutiva, UO Neuropsichiatria dell'Età Pediatrica, Bologna, Italy; ²Dipartimento di Scienze Mediche e Chirurgiche, University of Bologna, Italy; ³Dipartimento di Scienze Biomediche e Neuromotorie, University of Bologna, Italy.

Summary. Purpose. Cultural and environmental factors have frequently been implicated in the pathogenesis of Eating Disorders (ED). Although ED have been considered as “Western culture-bound syndromes”, increasing rates of ED among non-Western groups are being documented. The present study aims to investigate treatment and clinical outcomes among first-generation immigrant children and adolescents (FGI) (patients born abroad) and second-generation immigrant youth (SGI, patients born in Italy) with Anorexia Nervosa (AN). **Methods.** The study retrospectively compares treatment, hospitalizations, traumatic past events, clinical features, and treatment outcome (improvement in percentual body-mass index - %BMI) between FGI and SGI young patients with AN (10-18 years). Correlations were adjusted for age and severity (%BMI) at presentation. Treatments and outcomes were investigated at the baseline (T0), 2 weeks (T1), one month (T2), 3 months (T3), 6 months (T4), and 12 months (T5). **Results.** Thirty-six patients (50% FGI) were enrolled. At T1 ($F(1,26)=6.335$, $p=0.018$), and at T2 ($F(1,30)=18.752$, $p<0.001$) FGI presented a significantly higher %BMI improvement than SGI. FGI required significantly less ($OR=0.379$, $p=0.017$), and shorter ($F(1,32)=5.827$, $p=0.022$) hospitalizations, when compared with SGI. **Conclusions.** When compared to SGI, FGI with AN required fewer and shorter hospitalizations and had a better early-treatment weight outcome. Larger nationwide studies should investigate the need for and access to treatment of immigrant populations with AN.

Key words. Eating disorders, hospitalization, immigration, treatment.

L'anoressia nervosa tra i bambini e gli adolescenti immigrati di prima e seconda generazione in Italia: trattamento ed esiti clinici.

Riassunto. Scopo. Indagare i trattamenti e gli outcome in un campione di bambini e adolescenti immigrati di prima generazione (first-generation immigrant - FGI) (pazienti nati all'estero) e di seconda generazione (second-generation immigrant - SGI) (pazienti nati in Italia da almeno un genitore nato all'estero) con anoressia nervosa (AN). **Metodi.** Studio osservazionale retrospettivo, condotto su pazienti FGI e SGI con AN (10-18 anni) in età evolutiva. Tali due sottogruppi sono stati confrontati in merito a storia di specifici eventi traumatici, sintomi, trattamenti ricevuti, ricoveri e outcome (miglioramento dell'indice di massa corporea percentuale - %BMI), attraverso regressioni logistiche e analisi della covarianza (ANCOVA). Tutte le analisi sono state controllate per età e severità clinica al ricovero (%BMI). I trattamenti e gli outcome sono stati analizzati all'accesso (T0) e in corso di follow-up a 2 settimane (T1), un mese (T2), 3 mesi (T3), 6 mesi (T4) e 12 mesi (T5). **Risultati.** Sono stati arruolati 36 pazienti (50% FGI). A T1 ($F(1,26)=6,335$, $p=0,018$) e a T2 ($F(1,30)=18,752$, $p<0,001$), gli individui FGI hanno presentato un miglioramento del %BMI significativamente più elevato rispetto a SGI. Gli individui FGI sono stati sottoposti a ricoveri significativamente meno numerosi ($OR=0,379$, $p=0,017$) e più brevi ($F(1,32)=5,827$, $p=0,022$) rispetto a SGI. **Discussione e conclusioni.** Rispetto a SGI, pazienti FGI con AN in età evolutiva sono stati sottoposti a ricoveri ospedalieri meno numerosi e più brevi, con un miglior recupero ponderale nelle prime fasi del percorso di cura. Sono necessari studi nazionali più ampi per verificare questi risultati.

Parole chiave. Disturbi dell'alimentazione, ospedalizzazione, immigrazione, trattamento.

Background

Eating Disorders (ED) are psychiatric disorders characterized by persistent disturbances of eating behaviors, which result in the altered consumption or absorption of food and significantly impair physical

health or psychosocial functioning¹. ED are associated with substantial personal and societal burdens, including alarmingly high mortality and extensive medical and psychiatric comorbidity².

Among ED, Anorexia Nervosa (AN) is characterized by significant weight loss resulting from dysfun-

ctional behavior, with as severe food restriction, physical hyperactivity, and marked preoccupation with or fear about weight gain, body image and food. Patients with experience emotional, behavioral, social, and familial impairments, implying increased mortality due to cardiovascular arrhythmias and suicide¹. A series of complex treatment regimens have been proposed for the treatment of AN, including psychological and nutritional interventions, atypical antipsychotics, and mood stabilizers^{3,4}.

Current understanding suggests that in AN, multiple pathogenetic factors are involved. Genetic and neurodevelopmental factors have been hypothesized to explain the significant comorbidities between ED and a series of psychiatric disorders, such as Anxiety Disorders, Mood Disorders, Personality Disorders and Autism Spectrum Disorder⁵⁻⁷. Additionally, cultural and environmental factors have frequently been implicated in the pathogenesis of AN. Researchers have hypothesized that an individual's heritage can influence the clinical manifestation of AN (pathoplastic effect)⁸. Several studies confirm significant links between the prevalence of ED and cultural factors in industrialized societies, including the ideal of thinness promoted as a value, increased social mobility, and changes within family structures^{9,10}.

According to this theoretical framework, socio-cultural theories have considered AN as "Western culture-bound syndromes" specific to Caucasian women from industrialized societies⁸. However, recent studies have suggested that Westernization contributes to the development of AN in non-Western cultures¹¹. Today, in Africa, South America, and the Far East, AN is emerging with rates similar or higher than those reported in the Western world⁸. This trend is confirmed by the presence of ED across different minority ethnic communities^{8,12}.

In Italy, AN has an estimated incidence rate of 22.8/100,000 among women and 2.0/100,000 among men in the 10-19 years age group. Hospitalization occurs in 24.2/100,000 person-years among women and 1.6/100,000 person-years among men¹³. Recent studies have carefully analyzed the presence in Italy of cultural factors influencing the pathogenesis of AN, such as westernized ideals of thinness¹⁴.

Immigrants may be exposed to increased risk for psychiatric disorders, possibly due to traumatic events before migration, stress caused by migration, and/or adverse circumstances in the receiving country. These circumstances may include language barriers, cultural bereavement, marginalization, isolation, discrimination, and uncertainty regarding legal status¹⁵. Nonetheless, recent studies report that immigrant populations, particularly recent immigrants, may show a lower incidence of mental disorders when compared to native populations in the receiving countries. This

is commonly referred to as the "healthy immigrant effect" and could be caused by rigorous selection and screening of prospective immigrants, or by a lower prevalence of risk factors in the countries of origin¹⁶. Therefore, research concerning the psychiatric consequences of migration has shown contradictory results, particularly concerning adolescent patients. The different impacts of migration on a child's mental health may vary according to the characteristic of the host country¹⁷.

Some Italian researchers compared mental health conditions in young native and immigrant patients in Italy. These studies evidenced that among immigrants, first-generation adolescents were more likely than second-generation immigrants and natives to present a psychiatric acute disorder¹⁸. When compared with Italian natives, immigrants were more likely to use the emergency units to access mental health services and tended to be hospitalized for an acute, previously unknown, disease. Relevant disparities exist in the provision of access to mental health interventions between natives and immigrants in Italy since previous studies have found that a similar probability of receiving any mental health intervention between immigrants and Italians, but a lower number of interventions and duration of admissions for immigrants¹⁹. Notwithstanding these data, a small body of literature exists to date on psychiatric diseases among immigrants in Italy. One study focused on differences concerning teacher-reported behavior and emotional problems between first-generation immigrants (FGI) and second-generation immigrants (SGI) in Italy²⁰. This study found that FGI reported higher levels of social problems than SGI, but no significant differences emerged between these groups concerning other behavioral and emotional problems.

A few studies have analyzed possible differences between FGI, SGI and natives concerning the field of ED. A seminal work from Mustelin et al.²¹ compared the risk of ED among FGI, SGI, and Scandinavian natives. FGI showed lower risks of all ED types than natives, but this was not evident among SGI with one foreign parent, and those with a foreign-born father showed an increased risk of AN.

The literature lacks evidence regarding AN in immigrant populations in Italy. The only recently published Italian study on this topic is a case-control study conducted by Toselli et al.²² in the Emilia-Romagna region (Italy), which showed how weight, ethnicity and gender play a role in body dissatisfaction.

The present paper aims to investigate treatment and clinical outcomes among young FGI and SGI with AN and to analyze their clinical characteristics.

Materials and methods

METHODS

A retrospective study investigating a population of children and adolescents with AN, treated in the Regional Centre for FED in children and adolescents in Bologna, from January 2016 to December 2019, born from at least one foreign parent.

Inclusion criteria were 1) age between 10-18 years at the first assessment; 2) a diagnosis of AN according to DSM-5 criteria¹; 3) the presence of at least one parent born in a country different from Italy and subsequently migrated to Italy. Patients unable to undertake a thorough clinical evaluation were excluded from the study. Diagnostic procedure for AN was carried out by clinical psychologists and child neuropsychiatrists affiliated with the same Centre where the study was conducted and included the administration of Eating Disorders Inventory-3 (EDI-3)²³, the Self Administered Psychiatric Scales for Children and Adolescents (SAFA)²⁴ and the EDQ-C (Eating Disorders Questionnaire in Childhood)²⁵.

A complete clinical evaluation of each patient encompassed family and personal history, mental status, comorbid mental psychiatric conditions, and anthropometric measures.

All patients received a psycho-nutritional treatment for AN. Clinical evaluation, as well as follow-up for all of the patients, were conducted by a team dedicated to AN, which consisted of child neuropsychiatrists, psychologists, pediatricians, and dietitians.

Data were collected through a retrospective chart review. For each patient, a period of follow-up including up to 12 months of treatment after the first evaluation in our Centre was considered. The variables included the country of origin of patients and their family members, number, education and profession of family members, and history of migration where appropriate. Past traumatic events were classified according to the National Child Traumatic Stress Network (NCTSN), encompassing the following events: Bullying, Community Violence, Complex Trauma, Disasters, Early Childhood Trauma, Intimate Partner Violence, Medical Trauma, Physical Abuse, Refugee Trauma, Sexual Abuse, Terrorism and Violence, Traumatic Grief. This classification is available at The National Child Traumatic Stress Network website²⁶. Clinical information was collected regarding the age of onset of AN, duration of untreated illness, characteristic symptoms of ED, and anthropometric measures.

Generation (identification of FGI versus SGI) was assessed by using the classification system previously

described in Mustelin et al.²¹. Specifically, the generation was classified according to the country of birth of each patient and his/her parents, into the following groups: a) FGI: patients born abroad; b) SGI: patients born in Italy with at least one parent born abroad.

Concerning treatments, for each patient the number and duration of hospitalizations, day-hospital treatments and pediatric emergency unit admissions were considered. Psychopharmacological treatments with antidepressants, antipsychotics and mood stabilizers were considered, as well as their dosage in mg/day. The use, when appropriate, of nasogastric tube (NGT) feeding, was documented.

Bodyweight and its changes were assessed as %BMI. The use of this measure is indicated by the report Junior MARSIPAN: Management of Really Sick Patients under 18 with Anorexia Nervosa. Percentage BMI is calculated as $(\text{BMI}/\text{median BMI for age and gender} \times 100)$ ²⁷. The World Health Organization BMI-for-age charts for girls and boys were used as reference values in this study²⁸.

To investigate treatment outcomes, BMI, %BMI and their change during the treatment were recorded multiple times over 12 months. For this study, we considered body measures at the first evaluation (T0), 2 weeks (T1), one month (T2), 3 months (T3), 6 months (T4), and 12 months (T5). Outcomes were measured as differences in %BMI during standardized time intervals, namely T1-T0 (2 weeks), T2-T0 (1 month), T3-T0 (3 months), T4-T0 (6 months), and T5-T0 (12 months).

A retrospective chart review considering these time intervals was possible since repeated clinical evaluations are routinely performed for pediatric patients with AN in our Centre. At each point in time, psychopharmacological and nutritional treatments and their change were assessed to document possible associations between regimes of received treatments and changes in anthropometric measures.

ETHICAL CONSIDERATIONS

The study was approved by the Ethics Committee of Bologna (protocol code: NPI-TCDC2020). Written informed consent was obtained.

STATISTICAL ANALYSIS

All statistical analyzes were conducted using JASP, version 0.14.1 for Windows. The significance level was set at 0.05, and all tests were two-tailed. Descriptive statistics for demographic and clinical variables included means and standard deviations or absolute and percentage frequencies. The patients were divided according to their generation (FGI vs SGI) and descriptive analyzes for demographic and clinical variables were provided for the two groups. Shapiro-

Wilk's and Levene's tests were used to assess the normality of data distribution and homogeneity of variance. Comparisons of clinical variables, treatment measures and outcome measures of the two groups were conducted using Student t-tests for continuous variables when appropriate (Mann-Whitney test for non-parametric distributions), and chi-square test for categorical variables (Fisher's exact test when appropriate). Logistic regression and analysis of covariance (ANCOVA) were used to investigate the relationship of received treatments and clinical outcomes with the immigrant generation, adjusting for age and %BMI at first referral.

Results

SAMPLE CHARACTERISTICS

In the selected period the patients affected by FED born from at least one foreign parent were 59. Specifical-

ly, 36 patients (61.0%) were affected by AN; 12 patients (20.3%) were affected by avoidant/restrictive food intake disorder (ARFID); 5 patients (8.48%) by Other Specified Feeding or Eating Disorder (OSFED); 4 patients (6.78%) by Bulimia Nervosa, and 2 patients (3.40%) by Binge Eating Disorder. All the patients with AN met the inclusion criteria and were included in the study.

The sample included 36 patients affected by AN (86% females and 14% males). The mean age was 14.5 years (Standard Deviation (SD)=1.6), coming from 14 different countries: 18 FGI (50%) (patients born in a foreign country) and 18 SGI (50%) (patients born in Italy from at least one parent migrated to Italy from a foreign country). Table 1 includes the main demographic characteristics of the two groups. The table also reports the type of traumatic stress that patients experienced, classified according to the NCTSN classification. No significant difference in clinical symptoms and %BMI at presentation was found between first- and second-generation immigrants.

Table 1. Demographic characteristics of the sample. Continuous variables are expressed as mean (+/- SD).

	FGI	SGI	p-value
Age (years)	14.5 (\pm 1.6)	13.7 (\pm 1.6)	0.131
Age of onset (years)	13.5 (\pm 1.7)	12.4 (\pm 1.7)	0.078
Time to illness before treatment (years)	1.0 (\pm 0.7)	1.2 (\pm 0.8)	0.439
Sex	F = 15 (83.3%); M = 3 (16.7%)	F = 16 (88.9%); M = 2 (11.1%)	1.000
%BMI at admission	81.2 (\pm 10.8)	79.2 (\pm 11.2)	0.715
NCTSN types of traumatic stress			
Medical trauma	2 (11.1%)	1 (5.6%)	1.000
Traumatic grief	3 (16.7%)	1 (5.6%)	0.603
Bullying	4 (22.2%)	4 (22.2%)	1.000
Refugee trauma	6 (33.3%)	2 (11.1%)	0.228
Physical abuse	3 (16.7%)	1 (5.6%)	0.603
Disasters	0 (0%)	1 (5.6%)	1.000
Early childhood trauma	2 (11.1%)	0 (0%)	0.486
Intimate partner violence	3 (16.7%)	4 (22.2%)	1.000
Complex events	2 (11.1%)	1 (5.6%)	1.000

Legend: FGI= first-generation immigrants; SGI= second-generation immigrants; NCTSN= The National Child Traumatic Stress Network.

The most frequent countries of origin for FGI were Morocco (8.3%), Bangladesh (5.6%), Romania (5.6%), and Germany (5.6%). Apart from Italy, the most frequent countries of origin for the parents were Morocco (11.1%), Romania (8.3%), and Bangladesh (8.3%). The mean number of family members per patient was 3.7 (+/- 1.2). As to the current working conditions reported by the mothers of our patients, the most frequent were unemployment (5 cases, 13.8%), technical professions (4 cases, 11.1%), tertiary sector/service professions (4 cases, 11.1%), commercial professions (3 cases, 8.33%). As to the fathers of enrolled patients, 5 cases (13.8%) were working in the field of tertiary sector/service professions, 3 drivers (11.1%), 2 workers (5.6%) and 2 militaries (11.1%). Considering the AN clinical subtype, for 24 patients (66.7%) the diagnosis was restrictive AN, and for 12 patients (33.3%) it was binge-eating/purging subtype.

Comparisons of the frequency of the main symptoms characterizing AN between FGI and SGI are reported in Figure 1. The mean %BMI at presentation was 81.2% (± 10.8) for FGI and 79.8% (± 11.2) for SGI. No significant difference in clinical symptoms and %BMI at presentation was found between the two groups (table 1 and figure 1).

Concerning comorbid diagnoses, 2 patients (5.6%) met the criteria for obsessive-compulsive disorder and 2 patients (5.6%) for major depressive disorder; 1 patient (2.8%) had comorbid neurofibromatosis, type 1.

Concerning psychopharmacological treatments, 26 patients (72.2%) were treated with selective serotonin reuptake inhibitors (SSRI) and 13 patients (36.1%) were treated with atypical antipsychotics (AAP). The specific reported treatments were ris-

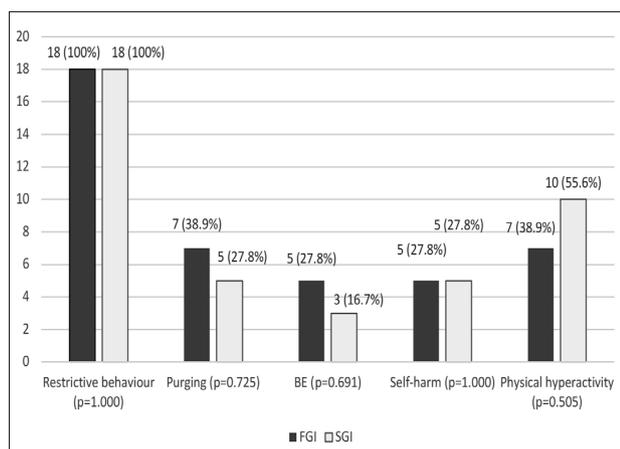


Figure 1. Frequency of clinical symptoms of Anorexia Nervosa. Results are reported as the number of patients (%) presenting selected clinical symptoms.

Legend: FGI= first-generation immigrants; SGI= second-generation immigrants; BE= binge-eating. P-values for comparisons of reported symptoms between the two groups are reported in the figure.

peridone (16.7%), olanzapine (19.4%), aripiprazole (5.6%), quetiapine (5.6%), valproate (2.8%), lithium (2.8%) fluvoxamine (8.3%), fluoxetine (33.3%), sertraline (50.0%). No significant difference was found between FGI and SGI concerning the use of SSRI ($p=0.264$) or AAP ($p=0.164$).

GENERATION AND OUTCOMES

Differences between FGI and SGI concerning the clinical outcomes are reported in table 2. During the T0-T1 period, FGI presented a significantly higher %BMI improvement than SGI, after controlling for age and %BMI at presentation in ANCOVA ($F(1.26)=6.335$, $p=0.018$). %BMI improvement during the T0-T1 period was unrelated to concomitant treatment with SSRI ($p=0.079$), AAP ($p=0.604$) or NGT ($p=0.324$).

Similarly, during the T0-T2 period, FGI presented a significantly higher improvement in %BMI, when compared with SGI, after controlling for age and %BMI at presentation ($F(1.30)=18.752$, $p<0.001$). The improvement in %BMI was not significantly correlated to concomitant treatment with SSRI ($p=0.498$), AAP ($p=0.998$), nor to the use of NGT ($p=0.751$).

No statistically significant difference was found between FGI and SGI when considering improvements at T3 (T3-T1, at three months) ($p=0.645$), at T4 (T4-T0, at six months) ($p=0.484$) and T5 (T5-T0, at 12 months) ($p=0.235$).

GENERATION AND TREATMENT

Differences between FGI and SGI concerning hospital treatments are reported in table 2. Fourteen patients (38.9%) required hospitalization in our Centre due to FED during the considered period. FGI required significantly less ($p=0.015$), and significantly shorter ($p=0.006$) hospitalizations, when compared with SGI. Day-hospital treatments were required for 8 patients (22.2%). No significant difference was found in the number of day-hospital treatments ($p=1.000$) or their duration ($p=0.782$) between first- and second-generation immigrants. Six patients (16.7%) required at least one access in a Paediatric Emergency Department, with no statistically significant difference between patients with different generations ($p=0.365$).

After controlling for age and %BMI at presentation, FGI required significantly less hospitalizations (Odds Ratio (OR)=0.379, 95% CI: -1.768 - -0.171, $p=0.017$) and shorter hospitalizations ($F(1,32)=5.827$, $=0.022$), compared with SGI. In our sample hospitalizations were unrelated to the total duration of untreated illness ($p=0.276$).

No significant differences were found between first- and second-generation immigrants regarding

Table 2. Differences in clinical outcomes and hospital treatments between FGI and SGI. Continuous variables are expressed as mean (\pm SD).

Variables	FGI	SGI	p-value
Outcomes (%BMI improvement)			
T0-T1 (at 2 weeks)	+ 1.4% (\pm 2.7)	- 0.5% (\pm 1.6)	0.018*
T0-T2 (at 1 month)	+ 2.0% (\pm 2.9)	- 1.4% (\pm 2.6)	<0.001*
T0-T3 (at 3 months)	+ 2.3% (\pm 4.9)	+ 3.4% (\pm 8.1)	0.868
T0-T4 (at 6 months)	+ 4.8% (\pm 3.5)	+ 6.9% (\pm 11.3)	0.978
T0-T5 (at 12 months)	+ 5.0% (\pm 7.7)	+ 9.9% (\pm 9.1)	0.259
Hospital treatments			
N. of hospitalizations	0.2 (\pm 0.4)	0.6 (\pm 0.5)	0.017*
Total months of hospitalizations	0.4 (\pm 1.2)	2.2 (\pm 2.5)	0.022*
N. of day-hospital treatments	0.3 (\pm 0.6)	0.3 (\pm 0.6)	0.999
Total months of day-hospital treatments	1.2 (\pm 2.5)	1.0 (\pm 2.3)	0.569
N. of accesses in a PED	0.3 (\pm 0.8)	0.1 (\pm 0.3)	0.402

Legend: FGI= first-generation immigrants; SGI= second-generation immigrants; %BMI= percentual-median body-mass index; PED= Paediatric Emergency Department.

Note: Significant differences marked with *.

Correlations are adjusted for age and %BMI.

treatments with SSRI ($p=0.264$) or AAP ($p=0.164$). administered. Four patients (11.4%) received enteral feeding with NGT; all of them were second-generation immigrants ($p=0.104$).

Discussion and conclusions

The influence of the environment represents a risk factor for ED⁸. Migratory and cultural processes are progressively changing the epidemiological and clinical management of a series of mental health conditions. For this reason, we decided to investigate in our Italian Regional Centre for FED in children and adolescents, the difference in treatment and clinical outcomes among young first- and second-generation immigrants with ED, with a focus on AN.

The main results of our preliminary study are:

- When compared with SGI, FGI required significantly fewer and shorter hospitalizations. These results were independent of the severity of AN at first evaluation, age, duration of untreated illness, and concomitant treatments received. No significant differences were found between the two groups accounting for duration of untreated illness, the number of accesses to a Pediatric Emergency Department, symptoms for ED, or psychopharmacological treatments received. This

evidence, albeit preliminary, is to our knowledge unprecedented in the literature.

- When compared with SGI, FGI had significantly better weight outcomes at the first phases (two weeks and one month from referral). Differences were independent of psychopharmacological treatments, the use of NGT, or the severity of AN at referral. This may lead us to hypothesize that specific social and psychological factors may account for these differences. Previous studies have focused on outcomes of patients with psychotic episodes, showing similar outcomes between FGI, SGI, and natives^{29,30}. Our results are in line with those of Mustelin et al.²¹. They carried out a nationwide population study that investigated the prevalence of ED in the immigrant population in Sweden and Denmark. The results showed that SGI patients had a more than doubled risk of developing Anorexia Nervosa (AN) compared with FGI peers, which suggests that socio-cultural factors may contribute to risk reduction.

Studies addressing ED have linked longer periods spent in Western countries to weight-related values and behaviors more similar to those of natives³¹. Veteran immigrants have been shown to present more disordered eating attitudes than new immigrants in Israel³². Body dissatisfaction and disordered eating in immigrants seem to be mediated by Western thin-ideal internalization³³. Interestingly, when compared

with British Caucasians tested in England and with Pakistanis tested in Pakistan, British Asians present more disordered eating disorder attitudes, which are highly correlated with cultural conflict scores³⁴. Other studies, however, have shown increased ED symptomatology during the first years of immigration^{35,36}. We argue that contrasts between Westernized ideals of thinness and socio-cultural values from the family of origin may be responsible for worse outcomes in SGI with AN. These hypotheses should be verified by addressing acculturation factors linked to outcome measures.

In our sample, as mentioned above, FGI required fewer and shorter hospitalizations than SGI. Notably, these results concern only inpatients, who accessed our specialized Regional Centre for FED during developmental age. No relevant distinction emerged regarding referral to our day-hospital service, access to a Pediatric Emergency Department, or duration of untreated illness. These findings are in contrast with a previous, relevant study on psychiatric admissions of Ethiopian immigrants, former-Soviet-Union immigrants, and Israeli natives in Israel. The authors found that Ethiopian immigrants (arriving from a profoundly different sociocultural context) had more frequent and shorter hospitalizations when compared with the other two groups, but that these differences decreased after 10 years of residence in Israel³⁷. Thus, stronger acculturation in the host country seemed to reduce the need to access psychiatric services, a finding which our results contradict. It should be noted, however, that AN represents a unique mental health condition, characterized by relevant somatic manifestations and changes in the patient's appearance to her or his family. It has been observed that immigrants in Western countries present an increased referral to healthcare services when their condition encompasses somatic symptoms³⁸. Interestingly, no difference emerged in our sample between first- and second-generation immigrants concerning the duration of untreated illness, a finding which is in contrast with other studies addressing mental health, non-ED conditions³⁹. Based on our data and review of the literature, we propose that the specific nature of AN, which manifests itself with clearly visible somatic consequences in young patients, implies a similar referral to services for first- and second-generation immigrants. Further research should investigate specific acculturative and psychopathological factors conditioning the access to services of immigrants with AN, by comparing their access for other mental health disorders. Characteristics of the Italian Health Care System (universal, government-funded) should be considered when comparing this study to other studies carried out in different Western countries.

This preliminary study is based on a carefully assessed Italian sample in a Regional Centre for

children and adolescents with FED. Nevertheless, it has some limitations: the retrospective nature of the study reduced the availability of complete scores for psychological tests, particularly in patients with partial knowledge of the Italian language; the small sample size considered did not allow significant comparisons between immigrants of different cultural areas. These are preliminary findings, as this research is ongoing. Future research directions include the investigation of psychopathological and sociocultural factors accounting for differences between patients with diverse generations.

Conflict of interests: the authors have no conflict of interests to declare.

Availability of data and materials: the datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate: the study was approved by the Institutional Review Board of the University of Bologna and was performed in compliance with the Declaration of Helsinki and its later amendments. Parents gave informed consent to the processing of personal data at the time of the clinical evaluation.

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References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders: DSM-5. Washington, DC: American Psychiatric Publishing, 2013.
2. Weissman RS. The role of sociocultural factors in the etiology of eating disorders. *Psychiatr Clin North Am* 2019; 42: 121-44.
3. Couturier J, Isserlin L, Norris M, et al. Canadian practice guidelines for the treatment of children and adolescents with eating disorders. *J Eat Disord* 2020; 8: 4.
4. Pruccoli J, Parmeggiani A. Inpatient treatment of anorexia nervosa with adjunctive valproate: a case series of 14 young and adolescent patients. *Eat Weight Disord* 2021 Jul 1; doi: 10.1007/s40519-021-01260-y.
5. Herpertz-Dahlmann B. Adolescent eating disorders: update on definitions, symptomatology, epidemiology, and comorbidity. *Child Adolesc Psychiatr Clin N Am* 2015; 24: 177-96.
6. Mairs R, Nicholls D. Assessment and treatment of eating disorders in children and adolescents. *Arch Dis Child* December 2016; 101: 1168-75.
7. Pruccoli J, Rosa S, Cesaroni CA, Malaspina E, Parmeggiani A. Association among Autistic Traits, Treatment Intensity and Outcomes in adolescents with Anorexia Nervosa: preliminary results. *J Clin Med* 2021; 10: 3605.
8. Nasser M. Eating Disorders across cultures. *Psychiatry* 2009; 5: 392-5.
9. Levine JM, Moreland RL. Group Socialization: theory and research. *Eur Rev Soc Psychol* 1994; 5: 305-36.
10. Bearman SK, Martinez E, Stice E, Presnell K. The skinny on body dissatisfaction: a longitudinal study of adolescent girls and boys. *J Youth Adolesc* 2006; 35: 217-29.

11. Aguera Z, Brewin N, Chen J, et al. Eating symptomatology and general psychopathology in patients with anorexia nervosa from China, UK and Spain: a cross-cultural study examining the role of social attitudes. *PLoS One* 2017; 12: e0173781.
12. Chowbey P, Salway S, Ismail M. Influences on diagnosis and treatment of Eating Disorders among minority ethnic people in the UK. *J Public Ment Health* 2012; 11: 56-64.
13. Gigantesco A, Masocco M, Picardi A, Lega I, Conti S, Vichi M. Hospitalization for anorexia nervosa in Italy. *Riv Psichiatr* 2010; 45: 154-62.
14. Zaccagni L, Rinaldo N, Bramanti B, Mongillo J, Gualdi-Russo E. Body image perception and body composition: assessment of perception inconsistency by a new index. *J Transl Med* 2020; 18: 20.
15. Mezuk B, Li X, Cederin K, et al. Ethnic enclaves and risk of psychiatric disorders among first- and second-generation immigrants in Sweden. *Soc Psychiatry Psychiatr Epidemiol* 2015; 50: 1713-22.
16. Vang ZM, Sigouin J, Flenon A, Gagnon A. Are immigrants healthier than native-born Canadians? A systematic review of the healthy immigrant effect in Canada. *Ethn Health* 2017; 22: 209-41.
17. Vieno A, Santinello M, Lenzi M, Baldassari D, Mirandola M. Health status in immigrants and native early adolescents in Italy. *J Community Health* 2009; 34: 181-7.
18. Bomba M, Riva A, Neri F. Migratory processes and psychiatric disorders in a sample of adolescents: a retrospective observational study. *Cogent Psychology* 2017; 4.
19. Rucci P, Piazza A, Perrone E, et al. Disparities in mental health care provision to immigrants with severe mental illness in Italy. *Epidemiol Psychiatr Sci* 2015; 24: 342-52.
20. Margari L, Pinto F, Laforteza ME, et al. Mental health in migrant schoolchildren in Italy: teacher-reported behavior and emotional problems. *Neuropsychiatr Dis Treat* 2013; 9: 231-41.
21. Mustelin L, Hedman AM, Thornton LM, et al. Risk of eating disorders in immigrant populations. *Acta Psychiatr Scand* 2017; 136: 156-65.
22. Toselli S, Brasili P, Spiga F. Body image, body dissatisfaction and weight status in children from Emilia-Romagna (Italy): comparison between immigrant and native-born. *Ann Hum Biol* 2014; 41: 23-8.
23. Garner DM. Eating Disorder Inventory-3 (EDI-3) Professional Manual, Psychological Assessment Resources. *Int J Eat Disord* 2004; 35: 478-9.
24. Cianchetti C, Sannio Fascello G. SAFA. Scale Psichiatriche di Autosomministrazione per Fanciulli e Adolescenti. Milano: Organizzazioni Speciali, 2001.
25. Franzoni E, Bernardi E, Valeri V, Sacrato L. EDQ-C. Eating Disorders Questionnaire in Childhood. Firenze: Giunti Psychometrics, 2017.
26. NCTSN – The National Child Traumatic Stress Network. Available on: <https://bit.ly/3hztbZ8> [last accessed on September 20, 2021].
27. College Report CR168 Junior. MARSIPAN: Management of Really Sick Patients under 18 with Anorexia Nervosa. London: Royal College of Psychiatrists, 2012. Available on: <https://bit.ly/36LgesQ> [last accessed on September 15, 2021].
28. World Health Organization. BMI-for-age (5-19 years). Available on: <https://bit.ly/3C77xEU> [last accessed on September 15, 2021].
29. Abdel-Baki A, Ouellet-Plamondon C, Medrano S, Nicole L, Rousseau C. I Immigrants' outcome after a first-episode psychosis. *Early Interv Psychiatry* 2018; 12: 193-201.
30. Stouten LH, Veling W, Laan W, Gaag M. Psychopathology, cognition and outcome in Dutch and immigrant first-episode psychosis patients. *Early Interv Psychiatry* 2019; 13: 646-56.
31. Ball K, Kenardy J. Body weight, body image, and eating behaviors: relationships with ethnicity and acculturation in a community sample of young Australian women. *Eat Behav* 2002; 3: 205-16.
32. Greenberg L, Cwikel J, Mirsky J. Cultural correlates of eating attitudes: a comparison between native-born and immigrant university students in Israel. *Int J Eat Disord* 2007; 40: 51-8.
33. Mussap AJ. Acculturation, body image, and eating behaviors in Muslim-Australian women. *Health Place* 2009; 15: 532-9.
34. Mujtaba T, Furnham A. A cross-cultural study of parental conflict and eating disorders in a non-clinical sample. *Int J Soc Psychiatry* Spring 2001; 47: 24-35.
35. Perez M, Voelz ZR, Pettit JW, Joiner TE. The role of acculturative stress and body dissatisfaction in predicting bulimic symptomatology across ethnic groups. *Int J Eat Disord* 2002; 31: 442-54.
36. Jennings PS, Forbes D, McDermott B, et al. Acculturation and eating disorders in Asian and Caucasian Australian adolescent girls. *Psychiatr Clin Neuro* 2005; 59: 56-61.
37. Youngmann R, Pugachova I, Zilber N. Patterns of psychiatric hospitalization among ethiopian and former Soviet Union immigrants and persons born in Israel. *Psychiatr Serv* 2009; 60: 1656-63.
38. Fenta H, Hyman I, Noh S. Health service utilization by Ethiopian immigrants and refugees in Toronto. *J Immigr Minor Health* 2007; 9: 349-57.
39. Lam AP, Kavanagh DJ. Help seeking by immigrant Indo-chinese psychiatric patients in Sydney, Australia. *Psychiatr Serv* 1996; 47: 993-5.

Corresponding author:
 Prof. Antonia Parmeggiani
 IRCCS Istituto delle Scienze Neurologiche di Bologna
 Dipartimento di Scienze Mediche e Chirurgiche
 Università di Bologna
 Via Massarenti 9
 40138 Bologna
 E-mail: antonia.parmeggiani@unibo.it