Prevalence of eating disorders in early adolescent students

Objective. To measure the prevalence of Eating Behavior Disorders (EBD) in Spanish Early-Adolescent students using standardized methods.

Methods. A two-stage survey of prevalence of EBD in a representative sample of 12 to 13 year old students in 2007 in Zaragoza (Spain). Standard evaluation: We used a two-phase cross-sectional design, which involved screening with questionnaires (EAT at a cutoff score of 20) and subsequent semi-structured interviews (SCAN) of screen-positive and screen-negative subjects. We calculated the sociodemographic characteristics, EBD prevalence with their 95% confidence intervals (CI) with Confidence Interval Analysis (C.I.A.) disk version 2.0.0 (Altman et al., 2000). The study was financed by F.I.S. PI 05/2533 (Spain Health Department).

Results. In 2007 we studied 701 male and female, ages 12 to 13, seventh-grade students in 9 public and private schools in Zaragoza (30 classrooms). In the second phase, 164 early adolescents agreed to participate in the clinical evaluation (63 at risk, high scorers; 101 selected sample not at risk). EBD prevalence was 0.7% unspecified eating behavior disorders (UEBD) 50.9 (95% CI: 0.3%-1.7%).

Conclusion. The ICD-10 point prevalence rates of EBD population in Spanish Early-Adolescent students are similar to those reported for other developed countries. The prevalence of subclinical EBD is substantially higher than that of full-syndromes.

Key words: Eating disorders, epidemiology, prevalence, adolescence.

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Prevalencia de trastornos alimentarios en estudiantes adolescentes tempranos

Introducción. Objetivos: medir la prevalencia de los trastornos de la conducta alimentaria (TCA) en adolescentes tempranos zaragozanos con métodos estandarizados.

Métodología. Estudio de corte en dos estudios de prevalencia en una muestra representativa de estudiantes españoles de 12 a 13 años en 2007 en colegios de Zaragoza. Evaluación estándar: diseño de corte en dos estadios con cribado de casos y entrevista individual semiestructurada (SCAN) de sujetos con criba positiva y negativa. Se calculan las características sociodemográficas, prevalencia de TCA con sus intervalos de confianza 95% (CI) con Confidence Interval Analysis (C.I.A.) disk versión 2.0.0 (Altman et al, 2000). El estudio se financia con fondos F.I.S. PI 05/2533.

Resultados. En 2007 se estudia 701 alumnos de 1º de Enseñanza Secundaria Obligatoria, de 12 y 13 años en colegios de Zaragoza. Evaluación estándar: diseño de corte en dos estadios con cribado con cuestionarios autocumplimentados (EAT-26 con punto de corte de 20) y entrevista individual semiestructurada (SCAN) de sujetos con criba positiva y negativa. Se calculan las características sociodemográficas, prevalencia de TCA con sus intervalos de confianza 95% (CI) con Confidence Interval Analysis (C.I.A.) disk versión 2.0.0 (Altman et al, 2000). El estudio se financia con fondos F.I.S. PI 05/2533.

Conclusiones. Las tasas de prevalencia puntual de TCA CIE-10 en la población zaragozana de estudiantes adolescentes tempranos es similar a la publicada en otros países desarrollados. La prevalencia de TCA subclínicos o atípicos que no cumplen todos los criterios diagnósticos es sustancialmente mayor que los síndromes completos.

Palabras clave: Trastornos de la conducta alimentaria, epidemiología, prevalencia, adolescencia.
INTRODUCTION

Eating behavior disorders (EBD) is an extremely difficult condition to treat and the patients consume an enormous amount of mental health energy and resources. Important advances have been achieved in understanding the neuroendocrine mechanisms that regulate appetite and intake. These achievements clearly contrast with the limited progress in elucidating the pathogenesis of EBD and developing effective preventive treatment and interventions.

The epidemiology of eating disorders in our country is a research area that has advanced from nothing to infinite in just a few years. We have gone from having hardly any reliable data in one decade to probably being the European nation with the most work groups and methodologically rigorous studies in the general adolescent and young population. More than repeating similar studies in all of the regional communities, the future pathway that would be the best would be to advance in more unknown areas: childhood, adults, males and in the study of the risk factors. There are not many two-phase Spanish studies that have included early adolescent subjects, which is why it is interesting to investigate this age group.

After an epidemiological study of EBD in 1997 in Zaragoza in an extensive stratified representative community sample of 4047 Spanish subjects from 12 to 18 years with standardized methods (in two stages), which found a 4.51% prevalence of EBD among the women studied, a prospective study was initiated beginning in 1999 to examine the effect of a controlled school program the prevention of EBD. The ZARIMA Prevention group, a multidisciplinary team that has been working with EBD since 1995, has developed a community action program that promotes mental health regarding primary and secondary prevention (included in the Directory of Projects in Europe, Mental Health Promotion of Adolescent and Young People, M.H.E. financed by the European Commission), in collaboration with the Association of families of EBD (ARBADA) and the Consejo Nacional Juventud Aragón (National Youth Council of Aragon) (CJA), declared to be of health care interest and financed by the Health Department of the Aragon government and the Fondo de Investigación Sanitaria (Health Care Research Fund) (Spain).

Within this project continuing over time, an early detection of EBD study was performed in 2007 in adolescents in the first year of secondary school, their data being presented herein.

This epidemiologic and secondary prevention study was carried out in the school setting for several reasons: first, our primary goal was to detect eating disorders in a community setting (in the “real world”). It was also because of the easy access to young students at risk because of their age. Adolescents spend one fourth of their time at school. The schools are often the most accessible educational and social institutions for the intervention. Thus, viability is the primary argument for the role of the school and the preventive work.

Prevalence studies invariably show that there are more cases of EBD in the school populations than those revealed by the clinical research. The earlier the treatment is begun, the better the prognosis. That is why early detection is important in the educational community.

This study evaluates the epidemiological results of our screening program, seeking secondary prevention of the EBDs.

General objective

Epidemiology of EBD in early-adolescents (Obligatory Secondary Teaching - first year).

Specific objectives

1. Evaluate the population at risk of EBD in the first year of secondary school.
2. Calculate the rate of point prevalence (ICD-10, DSM-IV-TR).
3. Detect cases of EBD early in the pre-adolescent or early adolescent population.

Work hypothesis

- The population at risk of EBD prevalent cases found among the early-adolescent population of Zaragoza of our community will not differ significantly from the previous results found another Spanish and international research works.
- Most of the EBD cases that will be found will be unspecified or atypical.

METHODOLOGY

Design

A cutoff or prevalence study design in two stages or phases was established.

Sample

The original randomized cluster sample (classrooms) consisted in 750 students from public and private charter secondary schools of Zaragoza (Spain) with at least 2 classrooms of the first year of secondary school in each
school. In order to calculate the sample size needed, we wanted to estimate the measurement with a maximum possible error (e) of 2% and 99% confidence interval (1-alpha). The estimated prevalence of EBD in Zaragoza according to our previous study was 4.5%. The necessary sample size would be 713 subjects. As each classroom had a mean of 25 students, 30 classrooms would be necessary for a sample of 750 students. These should be randomly selected with the data of the Department of Education of our community with a stratified cluster sample.

**Standard evaluation**

Standardized psychological measurements were used. A double phase procedure was used to identify prevalent cases of EBD with ICD-10, DSM IV-TR diagnostic criteria. Screening was carried out with validated questionnaires (Eating Attitudes Test, EAT-26) and after with semi-structured interviews (Schedules for Clinical Assessment in Neuropsychiatry, SCAN). A two-stage cutoff design was used with screening and interviews of positive and negative subjects. In the first phase, a self-administered questionnaire was used to detect the population with risk of EBD. Skilled investigators administered the Spanish version of the Eating Attitudes Test (EAT-26). In the second phase, a semi-structured interview was performed for those considered to be at risk in the first phase and a sample of the negative ones. One psychiatrist or clinical psychologist, an expert investigator in EBD, and trained in this interview, administered the SCAN blinded to the condition of the student evaluated at the onset.

**Data collection. Work field**

Written informed consent was obtained from the young person and his/her father- mother/Guardian. The relevant ethical institutional approvals were obtained from the Ethics Committee of Aragon (AEC). The principles of the Declaration of Helsinki and Belmont Report were followed. All the questionnaires were anonymous, using a number code with a card with the personal data if the adolescent was chosen for the second phase. If an EBD was diagnosed during this phase, the diagnosis and treatment were provided in our specialized units of reference for all of the Community of Aragon. We prepared a detailed instruction manual and we standardized the procedure of the teams that came to the schools (from September to December 2006). An attempt was made to unify the information given in the classrooms, and the way of collectively administering the questionnaires and the measurement of weight and height with portable high precision scales and stadiometer scales individually for each student, separately from the rest of their classmates. Training in individual semi-structured clinical interviews was also made. The work field was from January to April 2007, as this was the most appropriate due to the school schedule.

**Data analysis**

The sociodemographic characteristics, EBD prevalence with their 95% confidence intervals (CI) with the Confidence Interval Analysis (C.I.A.) disk version 2.0.9. We used the recommended method (Wilson) with less than 30 in each group or if the proportions observed were outside of the range of 0.1 to 0.9.

**RESULTS**

In 2007, 701 students from the first year of Obligatory Secondary Education, from 12 to 13 years, boys and girls, in private and public secondary school centers (30 classrooms), in Zaragoza (Spain) were studied.

A total of 701 students out of a possible 750 from 9 centers in Zaragoza (30 classrooms) participated voluntarily in the first phase: 340 women and 361 men, this meaning a participation of 93.5%.

In the first phase, 63/701, 9% of the adolescents were classified at risk of EBD (high scores, above the cutoff, > or = 20 on the EAT-26) with a 95% CI with the Wilson recommended method between 0.071 and 0.113 and standard error (SE) of 0.011.

In the second phase, 164 adolescents out of the 167 selected (98.2% of those selected, 23% of the total sample) agreed to begin with the clinical evaluation by interview with a psychiatrist or clinical psychologist expert in EBDs. Of the sample, 63 adolescents were at risk, with high scores on the EAT-26 and 101 of those selected for the sample were without risk, with scores on the EAT-26 of 0 or 1, which accounts for 14.40% of the total sample. Very few students did not participate because of absenteeism (2 students) or transfer to another school site (3 students): a total of 5 students: 2 males and 3 females.

In Zaragoza, we found 5 cases of unspecified Eating Behavior Disorders (UEBD), atypical or subclinical, among the 701 students studied after performing 164 interviews: 63 interviews with risk and 101 without risk.

**Table 1**

<table>
<thead>
<tr>
<th>Gender</th>
<th>EBD Risk (%)</th>
<th>95% CI (SE) EBD Prevalence (%)</th>
<th>95% CI (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>35/340 (10.3%)</td>
<td>7.5%-14% (0.016)</td>
<td>5/340 (1.5%)</td>
</tr>
<tr>
<td>Men</td>
<td>28/361 (7.8%)</td>
<td>5.4%-11% (0.014)</td>
<td>0/361 (0%)</td>
</tr>
</tbody>
</table>
Prevalences by gender with their 95% confidence intervals are shown in Table 1.

The difference between the population at risk of EBD between men and women was 2.5% with a 95% CI for the difference between the two population proportions between -0.017 and 0.069 (with a SE of 0.22) that included 0, the value of equality, and that was not statistically significant.

The point prevalence of EBD found between this early adolescent population sample was 5/701, 0.7% of UEBD, atypical or subclinical EBD, 5 cases that fulfilled the diagnostic criteria of F 50.9 ICD-10, DSM-IV-TR (95% confidence interval calculated with the recommended Wilson method with the CIA disk version 2.00: 0.3%-1.7%). The standard error was 0.003.

All the cases detected were found in the population at risk (EAT-26 with the high score greater than or equal to the cutoff of 20). No case was detected among the students with scores of 0 or 1 on the EAT-26.

Among the cases diagnosed, none were under medical or psychological treatment for their EBD nor had it been detected by the family setting or the educational community prior to this secondary prevention community study.

The difference between the population with EBD between the men and the women is 1.5% with a 95% CI for the difference between the two population proportions between 0.001 and 0.034 (with a SE of 0.007) that did not include 0, the value of equality, and that was statistically significant.

DISCUSSION

Significant advances have been carried out in the research of the epidemiology of EBD in Spain. Based on recent studies (tables 2 and 3)10-37, and in spite of their methodological limitations38, it has been suggested that the prevalence of abnormal eating behaviors and attitudes in Spanish nonclinical populations does not significantly differ.
The wide range of variation in the prevalence rates of EBD published in adults and adolescents may be related with the methodological problems inherent to this type of investigation. Anorexia nervosa and the related EBD are more frequently investigated in adolescent girls and young women and many investigators have dealt with the prevalence in this high risk group\(^1\).

The self-administered or self-report questionnaires, above all, serve to detect minor deviated eating behaviors. True anorexias or bulimias can only be diagnosed through clinical interview\(^3\). In this study, the diagnosis was only reached after the interview by a clinician who was experienced and trained in the procedure.

Good epidemiological studies have not been made with child, early adolescent or male populations. The last work in Barcelona by Pilar Muro in the early adolescent population stands out with 13.16% of the sample of 1,115 male and female participants with an age between 10 and 11 years of age\(^2\). Their study, as ours, only found UEBD, subclinical or atypical disorders that did not fulfill all the diagnostic criteria, which were substantially superior to the complete or typical cases that met all the criteria in these ages\(^37\).

Our previous study in Zaragoza\(^2\) and that of Pérez-Gaspar in Navarra in 1997\(^18\), those of Rojo in Valencia\(^21\) and Imaz in Valladolid\(^24, 25\) in 1999, that of Peláez in Madrid in 2002 and that of Sancho in 2007\(^37\) in Tarragona are the only Spanish ones in two phases up to date that include early adolescents within the population studied. The prevalence levels of UEBD found do not differ greatly from our results if the methodological differences for the detection of cases are taken into consideration.

The works having the best methodological quality published are the two-phase cross-sectional studies of the third generation of psychiatric epidemiological research of Dohrenwed and Dohrenwed, the most accepted methodology, the best design for the detection of cases in the community as well as being a relatively efficient means to calculate the prevalence of psychopathology\(^2\). Using a diagnostic interview in the second phase as a reliable method for case detection is important\(^18\). Two-phase studies are "economical" as they do not interview all the subjects of the sample, but they also have some disadvantages and biases precisely for that reason\(^39\).

### Table 3: Two phase studies of EBD prevalence in Spain in the XXI Century

<table>
<thead>
<tr>
<th>Study</th>
<th>Date</th>
<th>City</th>
<th>Age</th>
<th>N</th>
<th>Instruments</th>
<th>Prevalence %</th>
</tr>
</thead>
</table>
| Beato et al (27, 28, 29) | 2000-2001   | Castilla La Mancha | 15 y  | 1076 | GHQ-28, EAT-40, BITE, BSQ, SCAN | Women 6.4% TCA  
Men 0.6% TCA |
| Gandarillas et al (30, 31) | 2002       | Madrid        | 15-18 y | 1238 F | EDI-I, EAT-26, EDE-12 | Women 0.6% AN, 0.6% BN, 2.1% TCANE, 3.4% TCA |
| Peláez et al (32, 33) | 2002       | Madrid        | 12-21 y | 1543 | EAT-40, EDE-Q, EDE | Women 0.11% AN, 2.29% BN, 2.73% TCANE, 5.13% TCA,  
Men 0.0% AN, 0.16% BN, 0.48% TCANE, 0.64% TCA |
| Arrufat (34) | 2006       | Osuna         | 14-16 y | 1147 F 1133 M | EAT-26, CDRS, DICA-IV | Women 0.35% AN, 0.44% BN,  
TCANE 2.7%, 3.49% TCA,  
Men 0.0% AN, 0.09% BN,  
TCANE 0.18%, 0.27% TCA |
| Muro y Amador (35, 36) | 2006       | Barcelona     | 10-17 y | 1155 | EDI-2, EDE-12 | Women TCANE 2.31% TCA,  
Men TCANE 0.17% TCA |
| Sancho et al (37) | 2007       | Tarragona     | X=13,4 | 1336 | ChEAT, DICA-C, DICA-P, DICA-A | Women TCANE 3.44% TCA,  
Men TCANE 3.81% TCA |

from that described in other developed countries. Our study joined these findings.

Our previous study in Zaragoza\(^2\) and that of Pérez-Gaspar in Navarra in 1997\(^18\), those of Rojo in Valencia\(^21\) and Imaz in Valladolid\(^24, 25\) in 1999, that of Peláez in Madrid in 2002 and that of Sancho in 2007\(^37\) in Tarragona are the only Spanish ones in two phases up to date that include early adolescents within the population studied. The prevalence levels of UEBD found do not differ greatly from our results if the methodological differences for the detection of cases are taken into consideration.
Our research was conducted in two stages of point prevalence and was performed in a large and representative sample after random cluster stratified sampling of 701 early adolescent male and female adolescents from 30 classrooms of 9 public and private charter schools of Zaragoza, which gives representativeness and validity to our data.

In this early age, the population at risk of EBD did not show a statistically significant difference between men and women, which agrees with our 1997 data2, 40, 41.

Both the population at risk and a large subsample of the population without risk were interviewed individually in the second phase to try to avoid frequent false negatives among the EBD population that tends to minimize or deny their symptoms in the self-filled out questionnaires, by falsifying or hiding their symptoms. That is precisely why the interview is made at the lowest scores (0 and 1). Using this procedure, an attempt is made to minimize underestimation of the data of the EBD prevalence among the population sample studied. In almost all the Spanish two phase works, as in most of the international ones, the study of the existence of false negatives is lacking, the interview diagnoses a sample of probable controls and this may underestimate the real prevalence of the disorder29, 38. This methodological problem is not surprising since this study of false negatives means a significant personal, organizational and economical effort, an effort that has been made in this study.

The high percentage of participation in the second phase of 98.2% of those selected is significant. The diagnosis is made with the DSM-IV-TR and the ICD -10 criteria, with the two international classifications in force. And the structured interviews, performed by the psychiatrist or clinical psychologist, are always face-to-face, never by telephone42.

As observed in other studies between the cases diagnosed, none were under treatment or had been detected by their family or teachers prior to this community study of secondary prevention. That is why early detection campaigns in the community are important.

Limitations

This study has some important limitations, as in any epidemiological research, that are difficult to correct.

Using the EAT-26 as a screening questionnaire may be questioned even though a validated version to Spanish was used, given the tendency to denial, to secrecy and lack of motivation regarding treatment of EBD patients who may hide their attitudes and abnormal eating behaviors on a self-filled out questionnaire. The only way to avoid this bias completely would be by applying the clinical interview to the entire sample. However, this would increase costs and exceeds our possibilities as a research team.

We have preferred to use the EAT-26 over the Children Eating Attitudes Test (ChEAT) or the “Kid’s eating disorders survey (KEDS), recently validated into Spanish”43, because of our previous experience on its use in epidemiological research of the EBDs in Spain.

Criticisms can also be made about the selection of the individuals in the second stage with minimum extreme scores, instead of a random selection of subjects with scores under the cutoff of the EAT-26, which would be the best for the detection of false negatives. This design decision may bias the results and underestimate the prevalence as it misses possible cases close to the cutoff of the EAT. This is a serious limitation of this study. The decision to interview the 0 and 1 was made because of the already-mentioned tendency to lie by patients with EBD in the self-filled out questionnaire studies demonstrated in several investigations and verified in the clinical practice16.

Another problem is the application of the categorial diagnostic criteria of the international classifications in the community in which subclinical cases predominate within a spectrum where it may sometimes be difficult to establish the limits between normal and pathological. The cases diagnosed in this study strictly fulfill the diagnostic criteria of the UEBD of the international classifications in force and have been re-evaluated in our specific EBD unit, verifying the community diagnosis.

There is a greater proportion of EBD cases among the subjects that refused to participate in the investigations on the EBDs than among the sample that responded2, 39. Our rates are probably somewhat underestimated for this reason. Although a high 93.5% participated, some undetected cases may be found among the remaining 6.5%. The bias of non-response gives rise to a difference between the initially estimated sample and that finally obtained. The magnitude of this difference may have a great influence on the validity of the results16.

Given the low prevalence of the EBD among males, it is not surprising that we did not find any case with this sample size, which would need to be greatly increased in size in order to increase the likelihood of finding a male with an eating disorder19.

Another bias is that no population without schooling was included in the sample. We have left a part of the population without study. However, given their difficult accessibility (as they are a marginal population, immigrants from certain ethnic groups and social classes) and the human and material costs that this could mean, we consider that the loss of information that would be obtained from their non-inclusion is assumable16.
CONCLUSIONS

The point prevalence rates of the EBD ICD-10, DSM-IV-TR in the Spanish Zaragoza population of early-adolescent students is similar to that published in other developed countries, in other Spanish studies. The prevalence of subclinical or atypical EBDs that do not meet all the diagnostic criteria is substantially greater than the complete syndromes.

The revision of the studies published up to date in our country agrees with our data and indicates that the magnitude of the impact of the EBDs is clearly established and is a relevant and even worrisome health problem in the early-adolescent female population. Unspecified or atypical cases seem to be the most frequent. The prevalence studies invariably show that there are more cases in the school-aged populations than those disclosed by the clinical investigations. Thus, control devices of secondary prevention for the population at risk and of the cases should be developed in the community such as that which we are presenting. Given the prevalence observed, the primary and secondary prevention services need to be improved.

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