Gender, Phenotypical Differentation and Therapy Response for Bulimia Nervosa

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GENDER, PHENOTYPICAL DIFFERENTIATION AND THERAPY RESPONSE FOR BULIMIA NERVOSA

by

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To obtain the degree of Doctor from the University of Barcelona

Facultat de Medicina

Línia de Neurociències clíniques i experimentals

Grup de recerca: Psiquiatria i Salut Mental

Director: **Dr. Fernando Fernández-Aranda**

Barcelona, 2012

A goal is a dream with a deadline

ACKNOLEGMENTS:

This thesis owes its existence to the help, support, and inspiration of many people.

In the first place, I would like to express my sincere appreciation and gratitude to my director Dr. Fernando Fernández-Aranda for his support and encouragement during all the years of this thesis's work. This dissertation couldn't be possible without his supervision and advice during this period.

Also the discussions and cooperation with all of my colleagues in the Unidad de Trastornos de la Conducta Alimentaria of the University Hospital of Bellvitge have contributed substantially to this work.

During three years I have worked with people in the University of Minho (Braga) and many professionals involved in the INTACT European project whose contribution in assorted ways to the research deserve special mention. It is a pleasure to convey my gratitude to them all, especially to Dr Paulo Machado.

I also would like to express my deepest sense of gratitude to Dr. Isabel Krug for her encouragement and excellent advice throughout this dissertation.

Finally, I owe special gratitude to my family and friends for continuous and unconditional support, as well as for dealing with my moments of discouragement throughout all this process, because without their support I am sure I would never have managed to reach my goal.

Thank you all!

University Hospital of Bellvitge

University of Barcelona

University of Minho

Marie Curie Actions

University of Heidelberg

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PRELIMINARY NOTE:

I started my PhD at the University of Barcelona (UB) at the department of Psychology: "Personality, psychological assessment and treatment". My tesina project (DEA): "Rasgos de personalidad y psicopatología en varones con TCA: Estudio Comparativo", which I presented in 2006, was in the area of eating disorders (EDs), since during this time I was working as a researcher and clinician at the ED Unit of the University Hospital of Bellvitge. It was a great honor to collaborate with Dr. Fernando Fernandez-Aranda, head of the ED Unit and Associated Professor at the Faculty of Medicine of the UB, and his team for more than three years on this and various other research projects. During this time I was also actively involved in further data collection and writing up of several scientific papers, which I have used for my PhD thesis.

From March 2008 to April 2011, I was a Marie Curie fellow at the Psychology Research Centre (CIPsi) at the University of Minho (Portugal), where I was collaborating with Professor Paulo Machado's team on clinical psychology; psychotherapy and ED research. This fellowship was part of a European project called INTACT (Individually Tailored Stepped Care for Women with ED) funded by the European Commission (2007-2011) within the Marie Curie Framework. INTACT represented a multi-disciplinary network of 9 European partners and pretended to develop new strategies for the prevention and treatment of EDs. The Marie-Curie fellowship allowed me to move to Portugal (University of Minho) for three years and allowed me to participate in various international conferences and workshops.

The underlying reasons why I chose the topic of Bulimia Nervosa (BN):

Since I started my voluntary collaborations on EDs (after I got my Psychological degree) I was always interested in BN. At the very beginning, when I was doing monitoring work and assisted in cognitive-behaviour therapy (CBT) group sessions for BN, I was impressed not only about the bulimic features and behaviours, but also about the feelings of guilt, the comorbidity of anxiety and depression and the low levels of self-esteem frequently associated with the disorder. I was especially curious about males with this disorder and wondered whether males with EDs would display similar ED symptomatology than female ED patients. After a year, when I started my stay in Bellvitge Hospital, I had the opportunity to collaborate in clinical work with BN outpatient group therapy, as well as with binge eating disorder (BED) group therapy. Again, I was feeling really interested on these pathologies and I was curios about the similarity and differences between BED and BN. And also when I got my first grant in the Department and I had the chance to use new technologies for the treatment of BN symptomatology, I was glad to be involved in the field.

Therefore when I began thinking of PhD possibilities and planning, I decided that I wanted to focus in three aspects of BN: (1) gender & treatment, (2) phenomenology of BN and boundaries, and (3) new technologies for BN symptomatology treatment.

Finally, I decided to embark on a European PhD, which required me to undertake a stay abroad, which for me meant moving to Portugal (University of Minho) for three years. The European PhD also encouraged me to write my PhD mainly in English.

I decided to present my PhD in the form of journal articles. Below is a list of the 5 papers, which will be included in the current thesis. Four of these papers have already

been published in international peer-review journals and one has been published in a national Spanish journal.

The first two studies look at gender/treatment issues:

1) "Do men with eating disorders differ from women in clinics, psychopathology and personality?" Authors: **Núñez-Navarro, A.**; Agüera, Z.; Krug, I.; Jimenez-Murcia, S.; Sánchez, I.; Araguz, N; Gorwood, P.; Granero, R.; Penelo, E.; Karwautz, A.; Moragas, L; Saldaña, S; Treasure, J.; Menchón, J.M. and Fernández-Aranda, F. (2012) *European Eating Disorders Review 20 (1) 23-31 (Impact Factor* of 1,38 Q3)*

2) "Male eating disorders and therapy: a controlled pilot study with one year follow-up"

Authors: Fernández-Aranda, F.; Krug, I.; Jiménez-Murcia, S.; Granero, R.; **Núñez, A.**; Penelo, E.; Solano, R. and Treasure, J. (2009) *J. Behav. Ther. & Exp. Psychiat. 40 (3) 479–486 (Impact Factor* of 2.032 Q2)*

Third study considers BN phenomenology:

3) "Differentiating purging and nonpurging bulimia nervosa and binge eating disorder"

Authors: **Núñez-Navarro, A.,** Jiménez-Murcia, S., Álvarez-Moya, E., Villarejo, C., Sánchez, I.; Masuet, C., Granero, R., Penelo, E., Krug, I., Tinahones, FJ. Bulik, C. and Fernández-Aranda, F. (2011) *International Journal of Eating Disorders 44(6)488-496 (Impact Factor* of 2.947 Q2)*

And the last two ones focus on online treatment:

4) "Nuevas tecnologías en el tratamiento de los trastornos de la alimentación" Authors: Fernández Aranda, F.; Martínez, C.; **Núñez, A.**, Álvarez, E. y Jiménez-Murcia, S. (2007) *Cuadernos de Medicina Psicosomática y Psiquiatría de enlace, 82, 7-16.*

5) “Internet-based cognitive-behavioral therapy for bulimia nervosa: a controlled study” Authors: Fernández-Aranda, F.; **Núñez, A.**; Martínez, C.; Krug, I.; Cappozzo, M.; Carrard, I.; Rouget, P.; Jiménez-Murcia, S.; Granero, R.; Penelo, E.; Santamaría, J. and Lam, T. (2009) *Cyberpsychology & behavior 12 (1) 37-41 (Impact Factor* of 1.295 Q1)*

ABBREVIATIONS:

AED = Academy for Eating Disorders

AETREC = Spanish Society on Rational Emotive Behaviour Therapy

AN = Anorexia Nervosa

BED = Binge Eating Disorder (Spanish = TA / Catalan = TA)

BITE = Bulimic Investigatory Test Edinburgh

BMI = Body Mass Index (Spanish = IMC / Catalan = IMC)

BN = Bulimia Nervosa

CBT = Cognitive Behaviour Therapy (Spanish = TCC / Catalan = TCC)

CIPsi = Psychology Research Centre at the University of Minho

COPC = Catalan Official School of Psychologists

DSM-5 = Diagnostic and Statistical Manual of mental disorders Fifth edition

DSM-IV-R = Diagnostic and Statistical Manual of mental disorders Fourth edition Revised

EAT 40 = Eating Attitudes Test 40

EDI-2 = Eating Disorder Inventory 2

EDNOS = Eating Disorders Not Otherwise Specified (Spanish= TCANE / Catalan = TCANE)

EDs = Eating Disorders (Spanish = TCA / Catalan = TCA)

IBT = Internet-Based cognitive behavioural Therapy (Spanish = TBI / Catalan = TBI)

ICD-10 = International Classification of Diseases Tenth revision

INTACT = Individually Tailored Stepped Care for Women with ED

IPT = Interpersonal Psychotherapy

PD = Personality Disorders

REBT = Rational Emotive Behaviour Therapy

SALUT = Intelligent Environment for the Diagnostic, Treatment and Prevention of Eating Disorders

SCL-90-R = Symptom Checklist-Revised

SCRITC = Catalan Society for Research and Therapy

SHG = Self Help Guide

SPR = Society for Psychotherapy Research

TCI-R = Temperament and Character Inventory-Revised

WL = Waiting List (Spanish= LE / Catalan= LLE)

1. Introduction

Eating disorders (EDs) are syndromes characterized by severe disturbances in eating behaviour and excessive concerns about body shape or weight, that reflect difficulties in many individual areas of life, such as self-assertion or expression of emotions (Lowe, 2011). Presentation varies, but EDs generally arise from an interaction between environmental events and the biological and developmental features of the individual (Treasure & Zucker, 2009). In addition EDs often occur with severe medical and/or psychiatric comorbidity (Mond, Crosby, Hay & Mitchell, 2009; Steinhausen, 2009) leading to important physical and psychological health consequences for the individuals that suffered the ED and their families (Mond, Hay, Rodgers, Owen, & Beumont, 2005). Therefore, these conditions carry significant costs to the individual, their family and to society (Klump, Kaye, Treasure & Tyson, 2009). The present thesis, first of all, will give a general overview of the ED literature by providing details of the different ED diagnoses, the epidemiology of EDs, risk factors associated with EDs, comorbidity with other psychiatric disorders, prognosis of the disorder and treatment of mainly BN. In specific, the main aim of the current thesis will be on EDs with bulimic symptomatology, namely BN and eating disorders not otherwise specified (EDNOS), concretely BED. Afterwards, the five different studies that comprise this thesis will be presented through three main themes, which include: 1) Gender and treatment; 2) Phenomenology of BN and boundaries and 3) New technologies for the treatment of EDs with bulimic symptomatology. Finally, the main findings of these studies will be discussed in more detail.

1.1 Diagnosis

In the diagnostic and statistical manual of mental disorders fourth edition revised (DSM-IV-R) (APA, 1994), three broad categories are delineated: anorexia nervosa (AN), bulimia nervosa (BN), and eating disorder not otherwise specified (EDNOS). The international classification of diseases tenth revision (ICD-10) (Organization, 1992) has three categories: anorexia nervosa, bulimia nervosa, and atypical eating disorder. The DSM-IV-R was used as a diagnostic instrument in all the studies included on the present thesis. (See table above for ED classification and diagnosis).

1.1.1. Anorexia Nervosa (AN)

As shown in Table 1, AN is characterized by present extremely low body weight (below 85% of usual weight for age and height) as well as extreme anxiety and fear of its increase. This disorder also shows dysfunctional attitudes about weight and shape that severely affect self-evaluation. Furthermore, amenorrhea for minimum of 3 consecutive menstrual periods is required. There are two sub-types of AN described on the DSM IV-TR: "Restricting Type" typified by rigorous dieting or exercise without binge eating behaviour and "Binge-eating/Purging type", characterized by self-induced vomiting, or use of rigorous weight control methods after binge eating episodes (APA, 1994).

Table 1: Adapted ED Diagnostic Criteria for AN from DSM IV-TR (APA, 1994)

Diagnostic Criteria for Anorexia Nervosa
A. Refusal to maintain body weight at or above a minimally normal weight for age and height, for example, weight loss leading to maintenance of body weight less than 85% of that expected or failure to make expected weight gain during period of growth, leading to body weight less than 85% of that expected.

B. Intense fear of gaining weight or becoming fat, even though underweight.

C. Disturbance in the way one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight.

D. In postmenarcheal females, amenorrhea, i.e., the absence of at least 3 consecutive menstrual cycles. A woman having periods only while on hormone medication (e.g. estrogen) still qualifies as having amenorrhea.

Specify type

Restricting Type: During the current episode of AN, the person has not regularly engaged in binge-eating or purging behaviour (self-induced vomiting or misuse of laxatives, diuretics, or enemas).

Binge Eating/Purging Type: During the current episode of AN, the person has regularly engaged in binge-eating or purging behaviour (self-induced vomiting or misuse of laxatives, diuretics, or enemas).

1.1.2. Bulimia Nervosa (BN)

The DSM IV-TR (APA, 1994) criteria for BN are shown in table 2. Individuals who suffer from BN consume a large amount of food in a short period of time, also known as this binge eating behaviour, which is followed by compensative behaviours, such as self-induced vomiting, laxative misuse, enemas, diuretics, severe caloric restriction, or excessive exercising; to avoid weight gain. BN patient often have negative body weight and shape experiences. There are two sub-types of BN described on the DSM IV-TR: "Purging type", characterized by self-induced vomiting, or use of rigorous weight control methods such dieting, fasting or excessive exercise; and "Non-purging type", which is restricted to the rigorous weight control methods of dieting, fasting or exercising without purging behaviour (APA, 1994).

Table 2: Adapted ED Diagnostic Criteria for BN from DSM IV-TR (APA, 1994)

Diagnostic Criteria for Bulimia Nervosa

A. Recurring episodes of binge eating characterized by both of the following:

1. Eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances.
2. A sense of lack of control over eating during the episode, (such as a feeling that one cannot stop eating or control what or how much one is eating).

B. Recurrent inappropriate compensatory behaviour to prevent weight gain, such as self-induced vomiting, misuse of laxatives, diuretics, enemas, or other medications, fasting, or excessive exercise.

C. The binge eating and inappropriate compensatory behaviour both occur, on average, at least twice a week for 3 months.

D. Self-evaluation is unduly influenced by body shape and weight.

E. The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

Specify type

Purging Type: During the current episode of Bulimia Nervosa, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

Non Purging Type: During the current episode of Bulimia Nervosa, the person has used other inappropriate compensatory behaviour, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or misused laxatives, diuretics, or enemas.

1.1.3. Eating Disorder Not Otherwise Specified (EDNOS)

The DSM IV-TR (APA, 1994) criteria for EDNOS are showed in table 3. This category is frequently used for individuals who meet some, but not all of the diagnostic criteria for AN or BN diagnoses but suffer similar body image and eating difficulties. Examples of behaviours that would be suitable for this diagnostic category might display all but

one criterion (e.g., the amenorrhea) for AN, or meeting all criteria for BN but not meeting the frequency criteria for bingeing and/or purging behaviour (APA, 1994).

EDNOS represents the most common ED diagnosis in specialized treatment settings (Machado, Machado, Gonçalves & Hoek, 2007). It is common that cases diagnosed as specific ED in a particular period of time (such as AN or BN), overlap across the time with symptoms of other EDs and finally fulfil the criteria for the EDNOS category (Steinhausen & Weber, 2009; Tozzi et al, 2005). This is one of the reasons of why a large proportion of the individuals who seek treatment are grouped into EDNOS category (Sysko & Walsh, 2011). Likely, it explains also the fact that the majority of the individuals recruited for epidemiological studies are individuals that suffer from EDNOS (Grilo et al, 2007; Striegel-Moore & Franko, 2008).

Table 3: Adapted ED Diagnostic Criteria for EDNOS from DSM IV-TR (APA, 1994)

Diagnostic Criteria for Eating Disorder Not Otherwise Specified
This diagnosis includes disorders of eating that do not meet the criteria for any specific ED diagnoses. Examples include:
1. For female patients, all of the criteria for Anorexia Nervosa are met except that the individual has regular menses.
2. All of the criteria for Anorexia Nervosa are met except that, despite significant weight loss, the individual's current weight is in the normal range.
3. All of the criteria for Bulimia Nervosa are met except that the binge eating and inappropriate compensatory mechanisms occur less than twice a week or for less than 3 months.
4. The regular use of inappropriate compensatory behaviour by an individual of normal body weight after eating small amounts of food (e.g., self-induced vomiting after consuming two cookies).
5. Repeatedly chewing and spitting out, but not swallowing, large amounts of food.
6. Binge-eating disorder: recurrent episodes of binge eating in the absence of regular inappropriate compensatory behaviour characteristic of Bulimia Nervosa.

Binge eating disorder (BED) is a subcategory of EDNOS diagnosis and it is described by persistent binge eating episodes with a frequency of at least two episodes per week over a six month period but not followed by compensatory weight methods such as fasting or purging to lose weight. The binge eating may involve eating large amounts of food when not hungry, rapid food consumption sense of loss of control over eating and uncomfortable fullness after eating (APA, 1994). The DSM IV-TR (APA, 1994) criteria for BED are showed in table 4.

However in the DSM IV-TR, BED is considered as a diagnosis for further study; it is the most frequent described and studied disorder from the EDNOS category (Barry, Grilo, & Masheb, 2003; Mond, Rodgers, Owen, & Mitchell, 2006; Van Hanswijck de Jonge, Lacey & Waller, 2003; Wolfe, Smith & Kelly-Weeder, 2009). Moreover, support is given from empirical research for recognition of BED as a specific diagnostic category (independent from EDNOS) (Latzer, 2003; Striegel-Moore & Franko, 2008; Sysko & Walsh, 2011; Wonderlich, Mitchell, Crosby & Engel, 2009) as well as it relationship with non purging BN or other forms of overeating (Cooper & Fairburn, 2003; Mond et al, 2006; Wilfley & Agras, 2003).

Table 4: Adapted ED Diagnostic Criteria for BED from DSM IV-TR (APA, 1994)

Diagnostic Criteria for Binge Eating Disorder
A. Recurring episodes of binge eating. The two characteristics of a binge eating episode are:
(1) Eating a much larger amount of food than most people would consider normal under similar circumstances and within the same time frame (eating may continue for several hours).
(2) While eating, there is a feeling of loss of control over the amount of food or type of food being consumed.

B. Binge eating episodes are related to at least three of the following:

(1) eating until feeling uncomfortably full.
(2) eating large quantities of food when not even hungry.
(3) eating noticeably faster than is considered normal.
(4) eating alone due to embarrassment of overeating.
(5) feelings of disgust, depression, or guilt after a binge.

C. There is obvious distress concerning binge eating behaviour.

D. On average, binge eating takes place twice weekly, and has done so for 6 months.

E. There are no recurring efforts to compensate for binge eating, such as purging or excessive exercise. The disorder occurs at times other than during episodes of anorexia nervosa or bulimia nervosa.

1.1.4. Future Diagnostic Criteria

It is important to highlight here that the diagnostic criteria for the DSM are in the process of revision and that ED categories will be modified in the future DSM-5. The American Psychiatric Association is nowadays working on the development of "The Future of the Psychiatric Diagnosis: DSM-5". As it is expressed on their website (http://www.dsm5.org/Pages/Default.aspx) the new manual will have a restructured organization, with the objective of better reflecting scientific advances in the understanding of psychiatric disorders, as well as to make diagnosis easier and more clinician-friendly.

The ED Work Group, chaired by B. Timothy Walsh, M.D, is the responsible group team to address the ED new proposals (for more information see on the website: http://www.dsm5.org/MeetUs/Pages/EatingDisorders.aspx). Different recommendation are in the moment subjected to study, such as: (1) recognizing BED as specific diagnosis; (2) renaming the "Eating Disorders" category to "Feeding and Eating

Disorders"; (3) eliminate the AN criteria for amenorrhea; (4) renaming the updated EDNOS category to "Feeding or Eating Disorder Not Elsewhere Classified"; and/or (5) to remove the differentiation between BN-P and BN-NP subtypes.

1.2 Epidemiology

Prevalence and incidence rates are the common epidemiological measures to study the frequency of a disease.

1.2.1 Prevalence

Prevalence measures how much of a disease or condition there is in a population at a particular point in time. The prevalence is calculated by dividing the number of persons with the disease or condition at a particular time point by the number of individuals examined (Roe & Doll, 2000). This is the most useful rate for planning health facilities, because it indicates the demand for care (Hoek & Van Hoeken, 2003).

The lifetime prevalence of ED is about 5% in the general population (Keski-Rahkonen, Susser, Lima, Sihvola, Raevuori, Bulik et al, 2007). Concretely, the prevalence of EDs in adults is about 1% for BN, 0,6% for AN and 3% for BED (Treasure & Zucker, 2009). The literature indicates that 24.8% of the girls and 3.4% of the boys are at risk of developing an ED (Keski-Rahkonen et al, 2007). Moreover, evidence has been found about how frequent are symptoms of ED in college population (Eisenberg, Nicklett, Roeder & Kirz, 2011).

In Spain, values have been obtained the range from 1 to 3.5% in both disorders, AN and BN (Morandé, Celada & Casas, 1999; Rojo et al, 2003). The literature for Spanish

adolescents indicates a prevalence of 2'72% for EDNOS, 2'29% for BN and 0'33% of AN (Peláez, Labrador & Raich, 2007).

Table 5 shows an interesting comparison done by Hoek and van Hoeken (Hoek & Van Hoeken, 2003) between the ED prevalence rates of young females at three different levels: community, primary care and mental health care. Data were collected from different studies in the Nederlands and it was calculated from 1 year period of ED prevalence rates per 100.000 young females. For level 0 authors calculated the ED prevalence rates in the community; level 1 was the prevalence of ED individuals that were detected by primary care physicians and, finally, level 2 showed the prevalence of individuals that receive ED treatment in outpatient or inpatient mental health care services. Results show that 34'3% of the individuals that suffer AN in the community receive mental health care; while only 5'8% of subjects with BN get it (Hoek & Van Hoeken, 2003).

Table 5: 1 year period prevalence rates per 100,000 young females at different levels of care (Hoek & Van Hoeken, 2003)

Level of morbidity	**Anorexia Nervosa**	**Bulimia Nervosa**
Community (0)	370	1,500
Primary care (1)	160	170
Mental health care (2)	127	87

It is well know that women are more affected than men. Nevertheless, some authors estimated that males make up 5-10% of people with AN, 10-15% of people with BN and 40% of cases of BED (Dominé, Berchtold, Akré, Michaud & Suris, 2008; Muise, Stein & Arbess, 2003). The lifetime prevalence of EDs in male adults is 0'3% for AN,

0’5% for BN and 2% for BED (Treasure & Zucker, 2009). Taking into consideration the Spanish population, the prevalence for male adolescent is 0’48% for EDNOS and 0’16% for BN (Peláez et al, 2007).

1.2.2. Incidence

Incidence measures the rate of occurrence of new cases of a disease or condition. It is calculated as the number of new cases of a disease or condition in a specified time period divided by the size of the population (Roe & Doll, 2000). The incidence is commonly expressed per 100,000 of the population per year (Hoek & Van Hoeken, 2003).

Hoek and colleagues (2003) indicated in their systematic review that the overall incidence for AN was at least 8 per 100,000 population per year and for BN it was 12 per 100,000 (Hoek & Van Hoeken, 2003). AN and BN, particularly in 15-24 year old females (Hoek & Van Hoeken, 2003; Klump, Bulik, Kaye, Treasure & Tyson, 2009) have presented a greater incidence increase during the last decades. However, more than 50% of cases in the community are considered EDNOS (Fairburn & Cooper, 2007).

As regards to males with EDs an increasing incidence rate has been observed in Spain (Fernández-Aranda & Jimenez-Murcia, 2009; Rodriguez-Cano & Belmonte-Llario, 2005) and other European countries (Kjelsas, Bjornstrom & Gotestam, 2004) during the last decades. However, literature explain that males could be under-diagnosed because ED were more related to woman disorders (Kjelsas et al, 2004; Striegel-Moore, Garvin, Dohm, & Rosenheck, 1999), as well as, because males have been historically showed to be less like to seek for medical treatment than females (Braun, Sunday, Huang & Halmi,

1999; Carlat, Camargo, & Herzog, 1997; Stoving, Andries, Brixen, Bilenberg & Horder, 2011).

1.2.3. Limitations associated with epidemiological research on EDs

It is important to remark here some limitations associated with epidemiological research in EDs. First of all, the majority of the epidemiological studies on ED have been done in Western Europe and/or the United States, (Hoek & Van Hoeken, 2003). Despite this, some studies have demonstrated abnormal eating attitudes and EDs in developing countries and emerging economies such as Brazil and China (Hoek, 2006; Hoek & Van Hoeken, 2003; Treasure & Zucker, 2009). Secondly, accurate ED diagnosis has been found complex because the difficulty in detecting sub-clinical cases of EDs (Dalle Grave & Calugi, 2007). Finally, there might be, methodological problems concerning the selection of the different populations assessed and the tendency of the individuals that suffer from EDs to not seek treatment or avoid professional help (Hoek & Van Hoeken, 2003).

1.3 Comorbidity

The ED literature has shown that 28% of individuals with any psychiatric illness have two or more comorbid lifetime diagnoses (Kessler, Berglund, Demler, Jin, Merikangas & Walters, 2005). EDs are associated with an elevated risk for physical disability and psychiatric disorders, especially in AN, where suicidal behaviour and mortality rates are particularly high (Bulik, Pinheiro, Plotnicov, Klump, Brandt, Crawford et al, 2008). The current literature suggests that mortality associated with EDNOS is similar to that seen

in AN (Crow, Swanson, Raymond, Specker, Eckert & Mitchell, 2009). As regards to BN self-harming Behaviours such as cutting and burning oneself are common, and a high risk for alcohol or substance misuse is also present (Root, Thornton, Lichtenstein, Pedersen & Bulik, 2010; Treasure & Zucker, 2009). BED is often associated with obesity, which is becoming the next public health epidemic (Pull, 2004; Villarejo et al, 2012).

Strong psychiatric comorbidity documented in literature with EDs are affective disorders (Fernandez-Aranda, Pinheiro, Tozzi, Thornton, Fichter, Halmi et al, 2007). Concretely for BN, the prevalence rates with major depression range from 36% to 76% (Green, Scott, Hallengren & Davis, 2009). Research indicates that depressive severity increases when ED symptoms reach diagnosable levels, and this comorbidity does not differ by gender (Green et al, 2009).

Previous studies have also indicated the comorbidity between ED and anxiety disorders, concretely for BN the prevalence of at least one anxiety disorder range from 25% to 75% (Peñas-Lledó et al, 2010; Swinbourne & Touyz, 2007). Empirical research suggests that the onset of an anxiety disorder is previous to the onset of an ED (Bulik, 2003; Godart et al, 2003) and also anxiety disorders are significantly more frequent on ED individuals than on general community (Godart et al, 2003). Therefore, anxiety disorders may predispose EDs (Swinbourne & Touyz, 2007). The highest comorbidity with ED has been revealed with obsessive-compulsive disorders and social phobia (Swinbourne & Touyz, 2007). Moreover, research indicates that obsessive-compulsive disorders (OCD) share similarities with EDs in terms of personality traits; concretely AN individuals and OC individuals share obsessive personality traits (Jiménez-Murcia, Fernandez-Aranda, Raich, Alonso, Krug, Jaurrieta et al, 2007).

Impulsive control disorders have been also related to EDs, presented higher severity of ED psychopathology, specifically related with binge eating and compensative Behaviours (Fernández-Aranda, Pinheiro, Thornton, Berrettini, Crow, Fichter et al, 2008) as well as specific personality traits (such as impulsivity and perfectionism) (Bulik, Klump, Thornton, Kaplan, Devlin, Fichter et al, 2004).

In sum, comorbidity is the rule rather than the exception for people that suffer from ED (Treasure, Claudino & Zucker, 2009).

1.4 Risk factors

Because of the complexity and multi-determined characteristics of EDs, many putative risk factors have been associated with the development of these disorders, including genetic and biological factors, social, familial, psychological, environmental, and developmental factors (Treasure, Claudino & Zucker, 2009). However, because for many of these factors the direction of its influence is unclear, it is difficult to determine whether they are symptoms of the disorder, maintaining factors, or consequences of the disorder (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004).

Cross-sectional studies that used a retrospective design revealed that the following factors were related to AN: obsessive compulsive disorder, perfectionism and negative self-evaluation (Jacobi et al, 2004). Factors associated with BN comprised: childhood obesity, parental problems (alcoholism and obesity), family environmental factors, such as critical comments on weight and shape by the family and negative self-evaluation (Fairburn, Welch, Doll, Davies, & O'Connor, 1997; Jacobi et al, 2004).

1.4.1. Personality

The ED literature has long suggested comorbidity between personality disorders (PD) and EDs; although many empirical studies have studied this relationship, findings were often contradictory (Thompson-Brenner, Eddy, Satir, Boisseau & Westen, 2008). Taking into consideration personality traits, predisposing factors that may increase the risk for developing an ED include: negative emotionality, perfectionism, poor interoceptive awareness, ineffectiveness and obsessive-compulsive traits (Lilenfeld, Wonderlich, Riso, Crosby & Mitchell, 2006). Moreover, studies have also shown that ED samples score higher on: impulsivity, obsessive-compulsive traits and perfectionism compared to non-ED samples (Peterson, Thuras, Ackard, Mitchell, Berg, Sandager et al, 2010).

BN and AN symptoms can coexist in the same patient or even crossover overtime, nevertheless, personality pathology is consistent (Thompson-Brenner et al, 2008). Research has indicated that several personality traits remain even after recovery from an ED (Wagner, Barbarich-Marsteller, Frank, Bailer, Wonderlich, Crosby et al, 2006). Moreover, empirical studies suggest that comordility between both disorders (ED and personality) is associated with poor prognosis and more treatment difficulties (Lilenfeld et al, 2006).

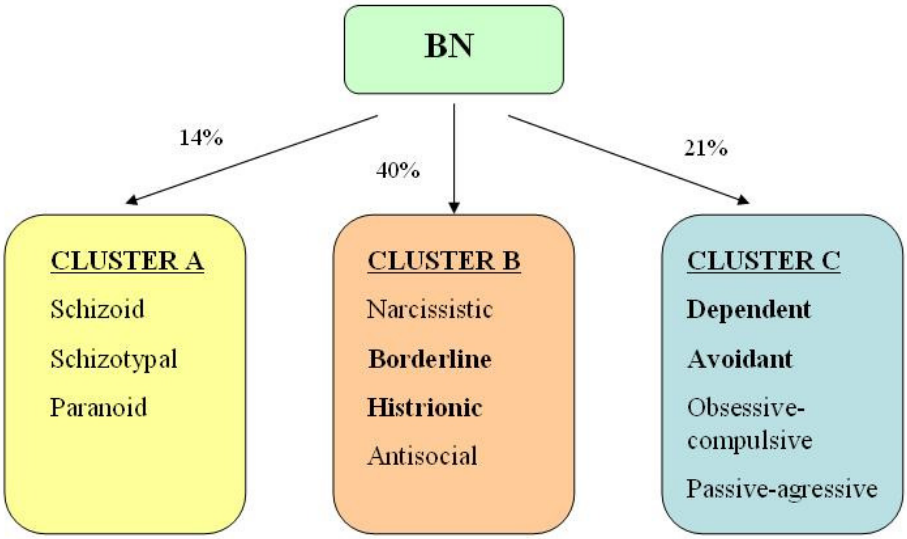
Research has consistently linked anorexia to personality traits such as introversion, perfectionism, rigidity, and obsessive-compulsive features. The personality features of BN are more heterogeneous with impulsivity and emotional instability being the most prevalent traits. However perfectionism, harm avoidance, compulsivity and obssesionality have also often been documented in these patients (Klump, Strober, Bulik, Thornton, Johnson, Devlin et al, 2004). BN individuals are more reactive to stress, have more negative emotions, are more upset and troubled by guilt than other ED

individuals (Peterson et al, 2010). Furthermore, impulsive personality traits and behaviours (substance use, smoking, sexual risk taking, aggressiveness), are also commonly associated with bulimic behaviours (Fernández-Aranda & Jiménez-Murcia, 2009). Taken in consideration BED, research indicates that individuals that suffer from this disorder present high level on harm avoidance; it may be related to attempts to avoid danger or painful situations (Peterson et al, 2010).

Borderline personality traits have also commonly been reported in the ED literature (Thompson-Brenner et al, 2008). Disturbed identity, pattern of unstable and intense interpersonal relationships, self-mutilating and suicidal behaviours, impulsivity, affective instability or feelings of emptiness; are some of the features of this borderline disorder (Lewis, Caputi & Grenyer 2012). Comorbility with borderline personality disorder (BPD) is the worst predictor for an ED, because it is associated with greater severity in psychosocial and behaviour problems (such as abuse of alcohol or drugs) as well as with suicide attempts and problematic personal and social relationships (Echeburúa & Marañón, 2001). BPD is also considered a disorder difficult to treat because of its high rates of comorbidity with other mental health disorders (Lewis et al, 2012).

In Spanish ED samples, a high comorbidity between ED and personality disorders has also been found (Echeburúa & Marañón, 2001); BN was highly associated with cluster B personality disorders (64% of the cases), where borderline personality disorder was the most frequent associated pathology, followed by histrionic disorder and also in less frequency, dependent disorder from cluster C (Gargallo Masjuán, Fernández-Aranda & Raich, 2002) (see figure 2 for personality clusters and BN).

Figure 1: Personality disorder clusters related to BN



In bold the personality disorders that have been found to be most frequently associated with BN patients (Gargallo Masjuán et al, 2002)

1.4.2. Gender

Female gender is the most potent risk factor to suffer from an ED (Treasure et al, 2009) and during the first half of the 20th century ED in males was considered rare (Woodside et al, 2001). Males with EDs have been found to be more reluctant to seek treatment, probably because of the idea that it is a "girl problem" (Bosley, 2011; Stoving et al, 2011).A detailed summary of gender and eating disorders literature can be found on table 6 (were **M** = males and **F** = females).

Gender differences have been reported in the literature as regards to clinical features, risk factors and ED symptomatology. ED males have been found to present later age of onset (Bramon-Bosch, Troop, & Treasure, 2000; Fernández-Aranda, Badia, Giménez, Collier, & Treasure, 2004; Forman-Hoffman, Watson, & Andersen, 2008), lower levels

of compensative behaviours (Anderson & Bulik, 2004; Braun et al, 1999; Button, Aldridge & Palmer, 2008), as well as lower drive for thinness and weight and shape concerns (Anderson & Bulik, 2004; Barry, Grilo & Masheb, 2002; Kjelsas, Augestad, & Flanders, 2003; Strober et al, 2006) than ED females. In terms of risk factors, compared to ED females, ED males have been found to reveal higher levels of homosexuality (Bosley, 2011; Grabhorn, Kopp, Gitzinger, Von Wietersheim & Kaufhold, 2003) and more frequent premorbid overweight (Fernández-Aranda et al, 2004; Gueguen et al, 2012). However, the literature has also reported gender similarities (Darcy et al, 2012; Fernández-Aranda, 2004; Gueguen et al, 2012; Hay, 1998; Tanofsky, Wilfley, Spurrell, Welch & Brownell 1997; Woodside et al, 2001).

1.4.2.1. General psychopathology

The literature indicates that males with EDs present more general psychopathology (Bean, Maddocks, Timmel, & Weltzin, 2005) and higher comorbidity with other mental disorders such as substance abuse, alcohol dependence, depression disorders or schizophrenia (Bramon-Bosch et al, 2000; Striegel-Moore, Garvin, Dohm, & Rosenheck, 1999; Weltzin, et al, 2007; Woodside et al, 2001) compared with ED females. However, some authors found non significant gender differences on psychiatric comorbidities (Braun et al, 1999; Strober et al, 2006).

1.4.2.2. Personality traits

In relation to personality traits, gender differences indicated on literature were: ED adolescent males with BN symptoms showed more perfectionism and interpersonal distrust than ED adolescent females (Joiner, Katz & Heatherton, 2000); ED males diagnosed with AN had lower harm avoidance compared to AN female (Fassino et al, 2001); lower harm avoidance, reward dependence, cooperativeness and perfectionism were found for ED male compared with ED female (Woodside et al, 2004) and taking in consideration Spanish samples, ED males had less harm avoidance than ED females (Fernández-Aranda et al, 2004).

Table 6: Summary of gender and eating disorders literature

Paper	Authors	Journal	ED diagnoses studied	Features investigated	Gender significant differences
Severe anorexia nervosa in men: comparison with severe AN in women and analysis of mortality	Gueguen et al	International journal of eating disorders (2012), 00, pp. 00-00	23 AN **M**, 601 AN **F** (DSM-IV)	Mortality rates Clinical features ED symptomatology	Clinical features: Males later age of onset and more frequent premorbid overweight. Similar eating features by gender. Mortality rates: Males high rates of mortality, similar than females, but higher number of deaths in men than in women after hospitalization.
Gender differences in outcome of eating disorders: a retrospective cohort study	Stoving et al	Psychiatry Research (2011) 186, (2-3), pp. 362-366	977 **F**, 38 **M** AN, BN, EDNOS (DSM-IV)	Gender differences in weight restoration ED symptomatology	Males better outcome on body weight restoration and remission of purging behaviour.
Nutritional knowledge, eating attitudes and chronic dietary restraint among men with eating disorders	Scagliusi et al	Appetite (2009) 53, pp. 446–449	AN (7 **M**, 30 **F**) BN (10 **M**, 20 **F**) (DSM-IV)	Socio-demographic Clinical features ED symptomatology	Socio-demographic: Current age lower in Males Clinical features: Current body weight higher in Males ED symptomatology: F emales scored higher on Eating attitudes indicative of worse attitudes
Eating disorder age of onset in males: Distribution and associated characteristics	Forman-Hoffman et al	Eat Weight Disord. (2008), 13(2), pp. 28-31.	ED **M**ales 70	Age of onset Clinical features	Clinical features: Males later age of onset.
Are There Gender Differences in Core Symptoms, Temperament, and Short-Term Prospective Outcome in Anorexia Nervosa?	Strober et al	International Journal of Eating Disorders (2006) 39(7), pp. 570-575	AN (14 **M**, 85 **F**) (DSM-IV)	ED symptomatology Psychiatric co-morbidity	ED symptomatology: Increased weight, shape and eating concern in Females
Personality and psychopathological traits of males with an eating disorder	Fernández-Aranda et al	European Eating Disorders Review (2004) Vol 12, Issue 6, pp.367-374	AN (7 **M**, 7 **F**) BN (13 **M**, 13 **F**) (DSM-IV)	Socio-demographic Clinical features ED symptomatology Psychiatric co-morbidity Personality traits	Clinical features: later onset, higher maximum BMI and ideal BMI in Males ED symptomatology: Higher Body dissatisfaction, Drive for thinness and Impulse regulation in Females Personality: Lower harm avoidance in Males

Paper	Authors	Journal	ED diagnoses studied	Features investigated	Gender significant differences
Personality in men with eating disorders	Woodside et al	Journal of Psychosomatic Research (2004), 57 pp. 273-278	BN,ANBN, EDNOS (21 **M**, 40 **F**) AN (21 **M**, 40 **F**) (DSM-IV)	Socio-demographic Clinical features ED symptomatology Psychiatric co-morbidity Personality Traits	Clinical features: Current BMI higher in Males ED symptomatology: Females reported higher levels of preoccupation Personality Traits: Females reported more personality traits associated with EDs.
Differences between female and male patients with eating disorders: results of the multicenter study on eating disorders (Mz-Ess)	Grabhom et al	Psychotherapie Psychosomatik Medizinische Psychologie (2003) Vol 53(1), pp. 15-22	AN (13 **M**, 342 **F**) BN (18 **M**, 629 **F**) (DSM-III-R)	Clinical features ED symptomatology Psychiatric co-morbidity Personality traits	ED symptomatology: Minor gender differences in eating behaviours. Females higher body dissatisfaction. BN Males presented higher percentage of homosexuals and were more satisfied with their body. AN Males less preoccupation than AN Females.
Gender Differences in Patients with Binge-Eating Disorder	Barry et al	International Journal of Eating Disorders (2002), 31, pp. 63-70	BED (35 **M**, 147 **F**) (DSM-IV)	Socio-demographic Clinical features ED symptomology Psychiatric co-morbidity	Clinical features: Current BMI, highest adult BMI and Obesity classification all higher in Males ED symptomatology: Increased Body dissatisfaction and Drive for thinness in Females. Increased Maturity fears in Males Psychiatric co-morbidity: Males had more past drug abuse problems.
Comparisons of men with full or partial eating disorders, men without eating disorders and women with eating disorders in the Community	Woodside et al	Amercian Journal of Psychiatry (2001), 158 (4), pp.570-574	62 ED **M**, 212 ED **F**, 3769 healthy **M** (DSM-III-R)	Clinical features ED symptomology Psychiatric co-morbidity	ED symptomatology:clinical similarities between ED Males and Females. Psychiatric co-morbidity: ED Males had higher rates of psychiatric diagnoses that Healthy Males.

Paper	Authors	Journal	ED diagnoses studied	Features investigated	Gender significant differences
Eating Disorders in Males: A Comparison with Female Patients	Bramon-Bosch et al	European Eating Disorders Review (2000), 8, pp. 321-328	30 **M** and 30 **F** AN, BN, EDNOS (DSM-IV)	Socio-demographic Clinical Features ED symptomatology Psychiatric co-morbidity	Socio-demographic: Homosexuality more common in Males, higher levels employment in Females Clinical features: Age of onset later in Males Psychiatric co-morbidity: Increased Anxiety, Depressive disorders and Suicidal behaviour in Males
Eating Disorders in a National Sample of Hospitalized Female and Male Veterans: Detection Rates and Psychiatric Comorbidity	Striegel-Moore et al	International Journal of Eating Disorders (1999), 25, pp. 405-414	98 **M** and 63 **F** AN, BN, EDNOS (ICD-9-CM)	Socio-demographic Psychiatric co-morbidity	Psychiatric co-morbidity: Females had more personality disorders (borderline BPD) and more comorbid substance, mood and anxiety disorders. Males high rates on comorbid schizophrenia, psychotic and organic mental disorders.
More Males Seek Treatment for Eating Disorders	Braun et al	International Journal of Eating Disorders (1999), 25, pp. 415–424	51 **M**, 693 **F** AN, BN, EDNOS (DSM-IV)	Socio-demographic Clinical features ED symptomatology Psychiatric co-morbidity	Socio-demographic: More Males were involved on a sport where control of weight was important for performance. Clinical features: Age of onset later in Males. Statistical differences on weight control methods: Females more diet pills and laxatives abuse. Psychiatric co-morbidity: no significant gender differences
Comparison of Men and Women with Binge Eating Disorder	Tanofsky et al	International Journal of Eating Disorders (1997), 21(1), pp. 49-54	BED (21 **M**, 21 **F**) (DSM-IV)	Socio-demographic Clinical features ED symptomatology Psychiatric co-morbidity Personality traits	ED symptomatology: Non gender differences on eating disturbance, shape or weight concerns. Females score high rates of anxiety, anger, frustration and depression scales. Psychiatric co-morbidity: Males more Axis I psychiatric diagnosis and substance dependence.

Paper	Authors	Journal	ED diagnoses studied	Features investigated	Gender significant differences
Eating disorders in males: A report on 135 patients	Carlat et al	American Journal of Psychiatry (1997), 154(8), pp.1127-1132	**M**ALES 62 BN, 30 AN, 43 EDNOS (DSM-IV)	Sexual orientation ED symptomatology Psychiatric co-morbidity	ED symptomatology: similar characteristics than female with ED. Regard to body image and weight, AN Male were more similar to AN Female than BNMale/BNFemale. BN Males were less concerned about strict weight control. Psychiatric co-morbidity: high rates of comorbid major depression, prevalence of substance abuse, anxiety and personality disorders. Sexual orientation: homosexuality / bisexuality is a specific risk factor for Males (especially BN Males).
Anorexia Nervosa in Males: Clinical Features and Outcome	Oyebode et al	International Journal of Eating Disorders (1988), 7(1), pp. 121-124	AN (13 **M**, 13 **F**) (DSM-III)	Socio-demographic Clinical features ED symptomatology	Clinical features: Similar gender clinical features. ED symptomatology: Males higher tendency of excessive exercise.
Anorexia nervosa in males: A comparison with female patients	Margo	British Journal of Psychiatry (1987), 151, pp.80-83	AN (13 **M**, 39 **F**)	Socio-demographic Clinical features	Clinical features: Similar gender clinical features. Males seems to be less vulnerable to AN than Females.
Anorexic syndromes in the male	Fitchter et al	Journal of Psychiatric Research (1985), 19(2-3), pp.305-313	AN (29 **M**, 23 **F**)	ED symptomatology Personality traits	ED symptomatology: Males high rates of hyperactivity, achievement orientation and sexual anxiety. Personality Traits: Males score higher on extraverted and "superfeminine" (masculinity vs feminity scale on FPI).
Bulimia in male patients	Mitchell & Goff	Psychosomatics: Journal of Consultation Liaison Psychiatry (1984), 25(12), pp.909-913	BN 12 **M**	Clinical features ED symptomatology	Clinical features: Similar gender clinical features. ED symptomatology: high rates of substance abuse.

1.5 Treatment

It is well know that individuals who suffer from EDs seek treatment; but it is also common that people with ED (specially BN and BED) don't specifically look for help for the eating problem, but they seek treatment in relation to the symptoms associated with the ED or the overweight, such as general psychological distress or medical complications (Mond, Crosby, Hay, & Mitchell, 2009).

In terms of treatment for EDs, Cognitive behavioural therapy (CBT), based on the cognitive model postulated by Fairburn, Marcus, and Wilson (Fairburn et al, 1993), is the psychotherapeutic treatment of choice for BN, due to the strong evidence that supports good outcomes in randomized controlled trials (Shapiro et al, 2007; Treasure et al, 2009). CBT has been found to be superior to no treatment, to antidepressant treatment, and to other forms of psychotherapy (Agras et al, 2000; Lowe, Bunnell, Neeren, Chernyak & Greberman, 2011). Only interpersonal psychotherapy (IPT) has demonstrated similar outcomes to CBT in longer term, although CBT is superior in reducing BN symptomatology and reaching remission (Agras et al, 2000; Van den Eynde & Schmidt, 2008) CBT has been also the treatment choice for BED (Gorin, Le Grange, & Stone, 2003); because it has shown to reduce symptomatology (reducing binges episodes and improving abstinence rates after treatment) (Brownley, Berkman, Sedway, Lohr & Bulik, 2007); however it does not improve the associated weigh problem in BED patients (Van den Eynde & Schmidt, 2008).

Self-help strategies have been found effective with women both at risk of developing an eating disorder and who have minimal symptoms of the disorder (Winzelberg et al,

1998; Zabinski et al, 2001).Concretely for BN, benefits has been found from different self-help treatments: (see table 7 below)

Table 7: Self-help treatments used in BN

Unguided Self-help Manual Characteristics: to provide psycho-educational information (basic nutritional knowledge, problem solving skills, cognitive-behavioural educational and treatment strategies), but without any supervision or therapeutical intervention. Literature shows significant reductions in the frequency of binge eating and vomiting. It can provide some benefits specially as a first step in treatment (Carter, 2003; Thiels, Schmidt, Treasure, Garthe, & Troop, 1998; J. S. Treasure, U.; Troop, N.; Tiller, J.; Todd, G. & Turnbull, S., 1996) (U. T. Schmidt, J. & Treasure, J., 1993)
Supervised Self-help Manual Characteristics: to provide a self-help manual (basic nutritional knowledge, problem solving skills, cognitive-behavioural educational and treatment strategies) followed by some kind of support, leaded by a family doctor, a trained expert or a therapist. Research has found that the monitoring supervision increase the percentage of symptoms reduction and the maintenance of the treatment gains on time (Bailer, 2004; Banasiak, 2005; Durand, 2003; Pritchard, 2004)
Self-help treatment through a CD-ROM Characteristics: to provide psycho-educational information through a CD-ROM–based cognitive-behavioural multimedia self-help intervention without any added therapist input. In literature significant reductions in binging and compensatory behaviours has been found, however it has been also described a high dropout rate (Bara-Carril, 2004; Murray, 2003)
Guided Self-help groups Characteristics: to provide psycho-educational information (basic nutritional knowledge, problem solving skills, cognitive-behavioural educational and treatment strategies) within a guided self-help group Literature found the self-help group as a valuable tool to reduce BN symptomatology and also as a good first step on a stepped care approach for BN (F. Fernandez-Aranda, Sanchez, I., Turon, J.V., Jimenez, S., Alonso, P., & Vallejo, J., 1998; Olmsted, 1991; Rathner, 1993)

On that point, it is important to remark that most of the treatments used in BN have been confidently applied for BED (Brownley et al, 2007), and that structured self-help formats based on CBT interventions have been found also appropriate as the first step of BED treatment (Vocks et al, 2010).

Taking into consideration gender, males with EDs have been constantly included in theoretical and clinical framework always based on women studies. Although literature support the idea that CBT can be as good treatment for ED males as it is for ED female (Weltzin et al, 2005); to better understand ED in males, it will be important to examine moderating effects of gender on treatment for ED (Lock, 2009), as well as refine the diagnostic criteria's (Attia & Roberto, 2009) and validate the efficacy of some questionnaires in screening ED on males (Bean, Maddocks, Timmel & Weltzin 2005; Kjelsas et al, 2003).

1.5.1 New Technologies approaches

Difficulties derived from the geographical distance between patient and center of treatment or either from job timetables, promote the use of new technologies as an intervention tools (Fernandez-Aranda, Martínez, Núñez, Álvarez, & Jiménez-Murcia, 2007). From the last decade, the development new technologies play an increasing role in psychotherapy (Newman, 2004). Different media such as e-mail and chat rooms have already been successfully used in prevention and maintenance approaches (after intervention) for patients with various mental disorders (Kordy, Haug & Percevic, 2006). An additional advantage of using new technologies is to reduce the costs of treatment, even more if the electronic tools and programs can be adapted and/or translated to different countries and cultures (Beintner, Jacobi & Taylor, 2011).

In the literature, different studies examine the pros and cons of the new technology's influences. As benefits, some of the revisions defend the idea that computers offer an anonymous way for people to seek information and engage in treatment (Tate &

Zabinski, 2004); open new perspectives for service provision on treatment (chatroom, forum, etc) (Myers, Swan-Kremeier, Wonderlich, Lancaster, & Mitchell, 2004) or facilitate treatment to people with geographical barriers (Fernandez-Aranda et al, 2007). Contrarily, some authors suggest that technology may interfere with the development of a therapeutic relationship as well as may increase the likelihood that clients will terminate early (Newman, 2004).

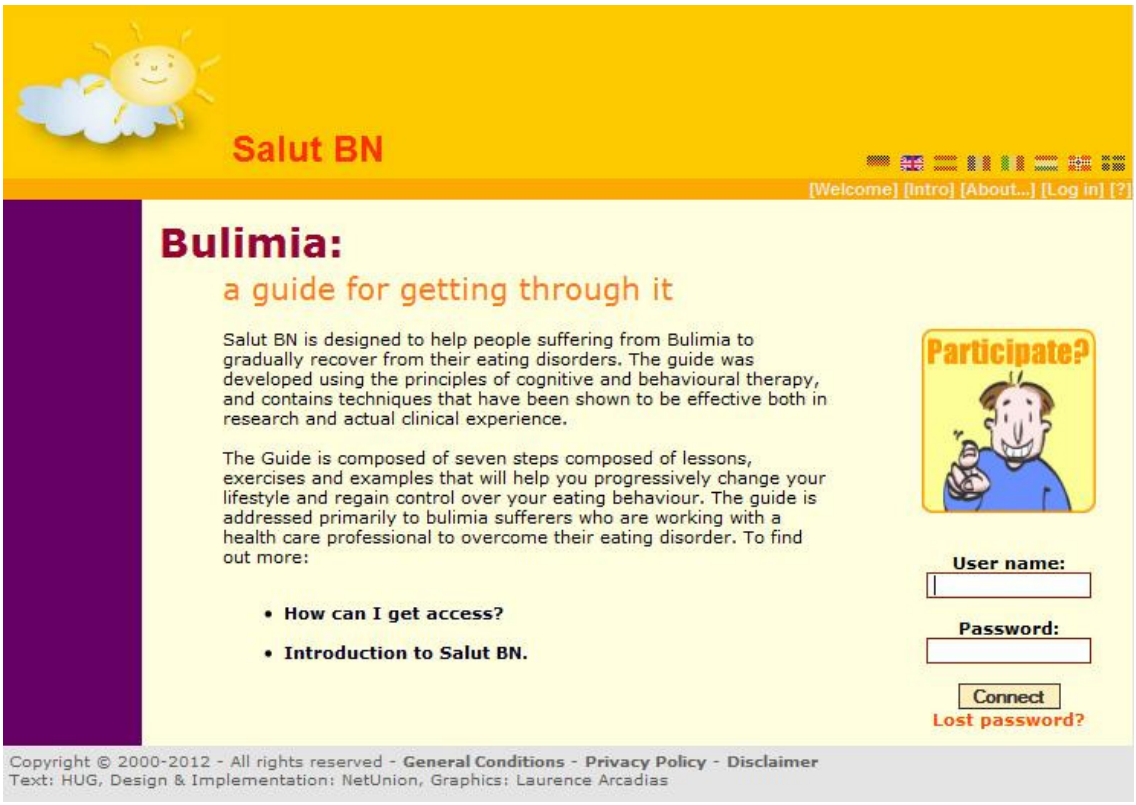
Concretely, for the treatment of ED different technological tools have been used during the last years as an alternative interventions or complementary therapy instruments, such as: telemedicine (Bakke et al, 2001), CD-ROM (Murray et al, 2003), Internet (Myers et al, 2004; Rouget, Carrard & Archinard, 2005), virtual reality (Perpiñá, Marco, Botella & Baños, 2004), mobile text messages (SMS) (Bauer, Percevic, Okon, Meermann & Kordy, 2003), emails (Robinson & Serfaty, 2003; Sánchez-Ortiz, Munro, Startup, Treasure & Schmidt, 2011) and also videogames (Playmancer) (Fernández-Aranda et al, 2012; Kalapanidas et al, 2009).

Also a number of self-help techniques and new forms of therapy service have been delivered electronically through computer software programs (Treasure et al, 2009); and literature suggests that for good adherence and outcome on Internet delivered therapy, it is necessary an online therapist to guide the participant development and provide feedback (Andersson, 2009).

As example of an Internet guided self-help programme for BN, SALUT (Intelligent Environment for the Diagnostic, Treatment and Prevention of Eating Disorders) created in 2011 an online program (http://www2.salut-ed.org/demo/) based on CBT self-help manual written by the Psychiatric Liaison Unit of the HUG (Rouget, Carrard & Archinard, 2003) and developed by the University Hospital of Geneva (Rouget et al,

2005). This online program was simultaneously implemented in four European countries: Sweden, Spain, Holland and Switzerland. (Carrard et al, 2011).

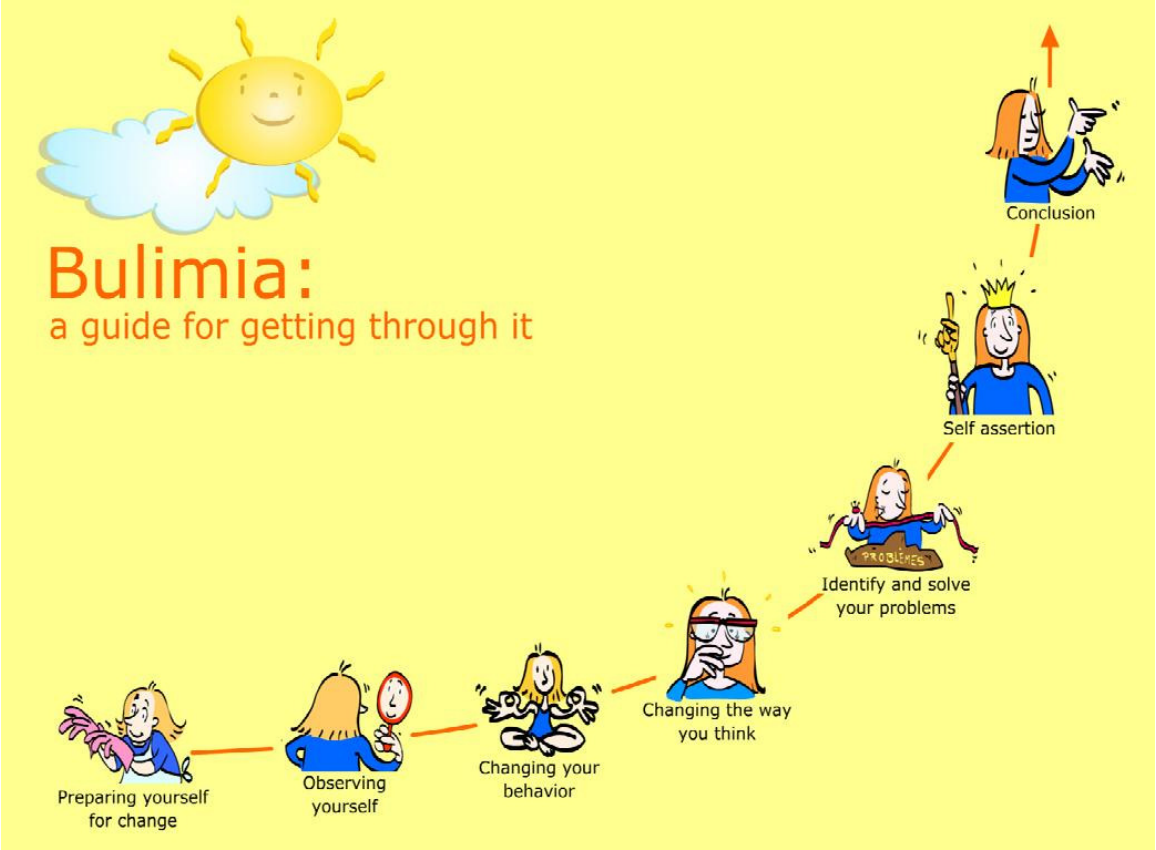
Figure 2: Images from the SHG (Salut Project): Welcome page



This Self Help Guide (SHG) online program for BN was composed of seven sequential steps: (1) motivation, (2) self-observation, (3) modification of behaviour: dietary plan and strategies for warding off or avoiding binges, (4) observation and modification of automatic thoughts, (5) problem solving, (6) self-affirmation and (7) conclusion and relapse prevention. All of the modules were filled with information, examples and exercises based on cognitive behavioural therapy (see figure 4).

In 2006 an extension of the Salut BN was created for BED, modules were adapted specifically for this disorder and positive results were obtained (Carrard et al, 2011). The efficacy of the Spanish version of the SHG for BN is analyzed through the study 5 of this present thesis.

Figure 3: Images from the SHG (Salut Project): Steps



1.6 Prognosis/ Outcome

In relation to prognosis, the literature has studied potential baseline predictors of outcome for EDs such as: history of AN, history of obesity, current personality or mental disorder, body mass index, duration of the disorder, general psychiatric symptoms, self-esteem, etc. (Agras et al, 2000). BN is a complex disorder with high rates of psychiatric comorbidity that anticipate a poor prognosis, as well as, high rates of chronicity (Steinhausen & Weber, 2009), because their symptoms are longstanding (Mehler, 2011). Moreover, high body image disturbance and also psychosocial inadaptability are predictors for relapse (Bohon, Stice & Burton, 2009). However, empirical research also suggests that a longer the BN duration is associated with a worse chance of recovery (Treasure et al, 2009). Strong predictors of positive outcome in BN have been found to include early behaviour change in treatment, such as a substantial decrease in the frequency of purging behaviours or the dietary restrain early in treatment (Fairburn et al, 2004; Lowe et al, 2011).

It is important also to remark that BN comorbidity with personality disorders, particularly borderline personality disorder, are related to a poor prognosis (Lilenfeld et al, 2006; Thompson-Brenner et al, 2008). And taken into consideration gender, studies have shown a better outcome in males than females on body weight restoration and remission of purging behaviour (Stoving et al, 2011). Early diagnosis and treatment also have been found as predictors of positive outcome in males (Weltzin et al, 2005).

Finally, research has also indicated that knowing some personality traits from the ED patients can help in predicting differences in their psychological adjustment and treatment outcomes (Thompson-Brenner et al, 2008).

2. Approach and general objectives

The **main objective** of the present PhD thesis is to explore different aspects related to the BN disorder: gender, phenotypical and therapy response; with the expectation of bringing novel contributions about gender characteristics, better understanding on phenotypical differentiation and contributions of new treatment possibilities for this disorder.

2.1. Main objectives:

- To determine if there are gender differences on clinical features, general psychopathology and personality traits in ED patients when compared to a healthy comparison group.
- To examine whether cognitive-behavioural therapy (CBT) outpatient treatment for male patients with bulimic symptomatology is as effective as it is for females.
- To explore similarities and differences in clinical, personality and treatment response across individuals with BED or BN subtype (purging and nonpurging).
- To explore the use of new technologies as a new type of intervention for the treatment of EDs, especially for the treatment of BN.
- To analyze the short-term effectiveness of an Internet-based cognitive behavioural therapy (IBT) program for BN.

2.2. Secondary objectives:

- To assess whether are gender-specific differences among ED subtypes: AN, BN, EDNOS.
- To compare personality traits of females with BED, BN-P, and BNNP.
- To analyze the treatment results of IBT for BN when compared to a waiting list (WL) control group.
- To determine clinical and psychopathological predictors of good and poor short-term outcome after using IBT.

2.3. Hypothesis:

Taking in consideration gender:

- ED male participants would exhibit lower body image concerns and drive for thinness than ED female participants.
- There would be gender specific differences on personality traits (related to some traits such as harm avoidance or cooperativeness).

Taking in consideration phenomenology of BN symptomatology:

- Individuals with nonpurging forms of ED (i.e., BED and nonpurging BN) would exhibit similar personality traits and psychopathology, while individuals with purging profiles (i.e., BN-P) would be distinct and evidence greater psychopathology.

Taking in consideration new technologies and treatment for BN symptomatology:

- Individuals undergoing the IBT would exhibit better outcomes than patients on the WL.
- Lower severity of ED symptomatology and some specific personality traits will predict better short-term outcome after using IBT.

2.4. Articles included in this thesis:

As explained before, in order to better understand the results of this dissertation, the present thesis is classified in three different blog areas of knowledge, that will involved the 5 studies that were carried on:

(1) Gender & treatment:

Study 1: **Núñez-Navarro, A.**; Agüera, Z.; Krug, I.; Jimenez-Murcia, S.; Sánchez, I.; Araguz, N; Gorwood, P.; Granero, R.; Penelo, E.; Karwautz, A.; Moragas, L; Saldaña, S; Treasure, J.; Menchon, J.M. and Fernández-Aranda, F. (2012) Do men with eating disorders differ from women in clinics, psychopathology and personality? *European Eating Disorders Review 20 (1) 23-31*

Study 2: Fernandez-Aranda, F.; Krug, I.; Jimenez-Murcia, S.; Granero, R.; **Núñez, A.**; Penelo, E.; Solano, R. and Treasure, J. (2009) Male eating disorders and therapy: a controlled pilot study with one year follow-up. *J. Behav. Ther. & Exp. Psychiat. 40 (3) 479–486*

(2) Phenomenology of BN and boundaries:

Study 3: **Núñez-Navarro, A.,** Jiménez-Murcia, S., Álvarez-Moya, E., Villarejo, C., Sánchez, I.; Masuet, C., Granero, R., Penelo, E., Krug, I., Tinahones, FJ. Bulik, C. and Fernández-Aranda, F. (2011) Differentiating purging and nonpurging bulimia nervosa and binge eating disorder. *International Journal of Eating Disorders 44(6)488-496*

(3) New technologies for BN symptomatology treatment:

Study 4: Fernández Aranda, F.; Martínez, C.; **Núñez, A.**, Álvarez, E. y Jiménez-Murcia, S. (2007) Nuevas tecnologías en el tratamiento de los trastornos de la alimentación. *Cuadernos de Medicina Psicosomática y Psiquiatría de enlace, 82, 7-16.*

Study 5: Fernández-Aranda, F.; **Núñez, A.**; Martínez, C.; Krug, I.; Cappozzo, M.; Carrard, I.; Rouget, P.; Jiménez-Murcia, S.; Granero, R.; Penelo, E.; Santamaría, J. and Lam, T. (2009) Internet-based cognitive-behavioral therapy for bulimia nervosa: a controlled study. *Cyberpsychology & behavior 12 (1) 37-41*

3. Results

Gender & treatment

3.1.1. Study 1: Do men with eating disorders differ from women in clinics, psychopathology and personality?

Authors: **Núñez-Navarro, A.**; Agüera, Z.; Krug, I.; Jimenez-Murcia, S.; Sánchez, I.; Araguz, N; Gorwood, P.; Granero, R.; Penelo, E.; Karwautz, A.; Moragas, L; Saldaña, S; Treasure, J.; Menchon, J.M. and Fernández-Aranda, F.

Journal: European Eating Disorders Review 2012, 20 (1) 23-31

English abstract:

Abstract

Objective: To determine if male and female eating disorders differ in clinics, psychopathology and personality traits when compared with a healthy group. **Methods:** Sixty male and 60 female eating disorder individuals (16% anorexia nervosa, 42% bulimia nervosa and 42% eating disorder not otherwise specified), matched for age and diagnostic, were compared with 120 healthy-eating participants (60 male and 60 female participants). All were diagnosed according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. Assessment measures included Eating Disorder Inventory-2 (EDI-2), Symptom Checklist-Revised (SCL-90-R) and Temperament and Character Inventory-Revised (TCI-R), as well as other clinical and psychopathological indices. **Results:** Male eating disorder participants reported significant lower laxative abuse ($p = 0.020$) and significant higher vomiting episodes ($p = 0.019$) than female eating disorder participants. Differences on drive for thinness, body dissatisfaction and some SCL-90-R scales were found across genders in eating disorder participants. Male eating disorder participants scored significantly lower than female participants with eating disorders on harm avoidance, reward dependence and cooperativeness. **Conclusions:** Although eating disorder clinical features were similar across genders, male eating disorder participants had less body image concern and general psychopathology than female eating disorder participants.

Spanish abstract:

Resumen

Objetivo: Determinar si varones y mujeres con trastornos de la conducta alimentaria (TCA) se diferencian en sintomatología clínica, psicopatología y/o rasgos de personalidad, cuando son comparados con un grupo control sano. **Metodología:** Sesenta

varones y 60 mujeres todos ellos con TCA (16% anorexia nerviosa, 42% bulimia nerviosa y 42% trastorno de la conducta alimentaria no especificado), emparejados por edad y diagnóstico, fueron comparados con 120 participantes sanos (60 varones y 60 mujeres). Todos ellos diagnosticados con criterios del DSM-IV-R. Medidas de evaluación incluidas fueron: Eating Disorder Inventory-2 (EDI-2), Symptom Checklist-Revised (SCL-90-R) y Temperament and Character Inventory-Revised (TCI-R), así como otros índices clínicos y psicopatológicos. **Resultados:** Los participantes varones con TCA refirieron un menor abuso de laxantes de forma significativa ($p = 0.020$) y un mayor uso de vómitos también de forma significativa ($p = 0.019$), que las participantes mujeres con TCA. Se encontraron diferencias de género en: impulso a la delgadez, insatisfacción corporal y algunas de las escalas del SCL-90-R. Los participantes varones con TCA puntuaron significativamente menor que las participantes mujeres TCA en los rasgos: evitación al daño, dependencia a la recompensa y cooperación. **Conclusiones:** A pesar de que las características clínicas fueron similares en los dos sexos, los participantes varones TCA mostraron menor preocupación por la imagen corporal y menor psicopatología general que las participantes mujeres TCA.

Catalan abstract:

Resum

Objectiu: Determinar si homes i dones amb trastorns de la conducta alimentària (TCA) es diferencien en sintomatologia clínica, psicopatologia i/o trets de personalitat, quan són comparats amb un grup control sa. **Metodologia:** Seixanta homes i 60 dones tots ells amb TCA (16% anorèxia nerviosa, 42% bulímia nerviosa i 42% trastorn de la conducta alimentària no especificat), aparellats per edat i diagnòstic, van ser comparats amb 120 participants sans (60 homes i 60 dones). Tots ells diagnosticats amb criteris del DSM-IV-R. Mesures d'avaluació incloses van ser: Eating Disorder Inventory-2 (EDI-2), Symptom Checklist-Revised (SCL-90-R) i Temperament and Character Inventory-Revised (TCI-R), així com altres índex clínics i psicopatològics. **Resultats:** Els participants homes amb TCA van referir un menor abús de laxants de forma significativa ($p = 0.020$) i un major ús de vòmits també de forma significativa ($p = 0.019$), que les participants dones amb TCA. Es van trobar diferències de gènere en: impuls a la primesa, insatisfacció corporal i algunes de les escales del SCL-90-R. Els participants homes amb TCA van puntuar significativament menys que les participants dones TCA en els trets: evitació al dany, dependència a la recompensa i cooperació. **Conclusions:** Malgrat que les característiques clíniques van ser similars en els dos sexes, els participants homes TCA van mostrar menor preocupació per la imatge corporal i menor psicopatologia general que les participants dones TCA.

RESEARCH ARTICLE

Do Men with Eating Disorders Differ from Women in Clinics, Psychopathology and Personality?

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Abstract

Objective: To determine if male and female eating disorders differ in clinics, psychopathology and personality traits when compared with a healthy group.
Methods: Sixty male and 60 female eating disorder individuals (16% anorexia nervosa, 42% bulimia nervosa and 42% eating disorder not otherwise specified), matched for age and diagnostic, were compared with 120 healthy-eating participants (60 male and 60 female participants). All were diagnosed according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. Assessment measures included Eating Disorder Inventory—2, Symptom Checklist—Revised and Temperament and Character Inventory—Revised, as well as other clinical and psychopathological indices.
Results: Male eating disorder participants reported significant lower laxative abuse ($p=0.020$) and significant higher vomiting episodes ($p=0.019$) than female eating disorder participants. Differences on drive for thinness, body dissatisfaction and some Symptom Checklist—Revised scales were found across genders in eating disorder participants. Male eating disorder participants scored significantly lower than female participants with eating disorders on harm avoidance, reward dependence and cooperativeness.
Conclusions: Although eating disorder clinical features were similar across genders, male eating disorder participants had less body image concern and general psychopathology than female eating disorder participants.

Keywords
males; eating disorders; anorexia nervosa; bulimia nervosa; EDNOS

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Published online 5 August 2011 in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/erv.1146

Introduction

Eating disorders (ED) are less frequent in male participants than in female participants (5–12% of cases) (Button, Aldridge, & Palmer, 2008; Kjelsås, Bjørnstrøm, & Gotestam, 2004). Epidemiology studies have been carried out in both clinical and community populations. In clinical settings, male participants make up 5–10% of people with anorexia nervosa (AN) who seek treatment (Striegel-Moore, Garvin, Dohm, & Rosenheck, 1999a), 10–15% of people with bulimia nervosa (BN) (Carlat, Camargo, & Herzog, 1997) and 40% of cases with binge eating disorder (Muise, Stein, & Arbess, 2003). However, community population studies report a prevalence of 15% for male participants with AN (Garfinkel et al., 1996) and 8–10% for male participants with BN (Garfinkel et al., 1995). Recently, an increasing rate of male ED has also been observed in Spain (Fernández-Aranda & Jiménez-Murcia, 2009; Rodríguez-Cano, Beato-Fernández, & Belmonte-Llario, 2005) and other European countries (Kjelsås et al., 2004).

In general, studies have indicated that the clinical manifestations of male participants with ED are similar to the one of female eating disorder participants in terms of age of onset, weight control methods and associated eating disorder factors (Braun, Sunday, Huang, & Halmi, 1999; Carlat et al., 1997; Fernández-Aranda et al., 2004; Keel, Klump, Leon, & Fulkerson, 1998;

Olivardia, Pope, Mangweth, & Hudson, 1995). However, some gender differences in clinical characteristics and risk factors have been noted (Andersen & Mickalide, 1985; Deter, Köpp, Zipfel, & Herzog, 1998; Woodside et al., 2001) including sexual orientation (Andersen & Holman, 1997; Bramon-Bosch, Troop, & Treasure, 2000; Carlat et al., 1997; Russell & Keel, 2002; Schneider, 1995), adverse childhood experiences (Kinzl, Mangweth, Traweger, & Biebl, 1997) and premorbid obesity (Sharp, Clark, Dunan, Blackwood, & Shapiro, 1994). Furthermore, gender differences in eating disorder participants have been reported in terms of eating disorder symptomatology (Charles & Anderson, 2004), general psychopathology (Bramon-Bosch et al., 2000) and personality (Fernández-Aranda et al., 2004), all of which will be explained in more detail in the following paragraphs.

Eating disorder symptomatology in male eating disorders

In male ED, physical activity is more pronounced than in female participants (Lewinsohn, Seeley, Moerk, & Striegel-Moore, 2002; Spann & Pritchard, 2008), whereas laxatives are used less (Braun et al., 1999; Button et al., 2008; DiGioacchino, Sargent, Sharpe, & Miller, 1999; Fichter, 1985). Male participants also have a later age of onset than female participants (Bramon-Bosch et al., 2000; Braun et al., 1999; Grabhorn, Köpp, Gitzinger, von Wietersheim, & Kaufhold, 2003). Furthermore, male participants have been found to show less concern about body dissatisfaction and drive for thinness than female participants. This has been shown in both clinical ED (Joiner, Katz, & Heatherton, 2000; Kjelsås, Augestad, & Flanders, 2003) and general population samples (Behar, de la Barrera, & Michelotti, 2002; Davis & Katzman, 1998; Geist, Heinmaa, Katzman, & Stephens, 1999; Lewinsohn et al., 2002).

General psychopathology in male eating disorders

Male participants with ED have more general psychopathology and comorbidity than female ED (Bean, Maddocks, Timmel, & Weltzin, 2005). In several comparison studies, male ED have higher rates of depression and substance abuse (Striegel-Moore, Garvin, Dohm, & Rosenheck, 1999b) and higher levels of Axis I (Weltzin et al., 2007) or Axis II (Striegel-Moore et al., 1999a) comorbidity than female participants with ED. Conversely, other studies have failed to find gender differences in comorbid psychopathology (Woodside et al., 2001). Further research is therefore required to disentangle these contradictory findings.

Personality in male eating disorders

The few studies assessing personality in men with ED have shown inconsistent findings. Although some studies revealed lower levels of harm avoidance, reward dependence, cooperativeness and higher scores on novelty seeking in male paticipants than female paticipants with AN (Fassino, Daga, Pierò, Leombruni, & Rovera, 2001; Woodside et al., 2004), other studies indicated a higher level of perfectionism and interpersonal distrust in male paticipants (Behar et al., 2002; Joiner et al., 2000).

Taken together, there is evidence that there are gender-specific differences in eating disorder participants in terms of eating disorder symptomatology, general psychopathology and personality. However, most studies include small sample sizes, sometimes with a lack of a control group and insufficient information on the methodology employed. To improve on these earlier designs, the present study set out to examine differences across male and female eating disorder participants by employing a wide range of psychometric measures in a large sample of consecutive male eating disorder referrals in Spain.

Aims of the study

The main goals of this study are twofold as follows: a) to determine if male and female eating disorder participants differ in terms of clinical features, associated psychopathology and personality traits when compared with a healthy comparison group; and b) to assess whether there are gender-specific differences among eating disorder subtypes [AN, BN and eating disorder not otherwise specified (EDNOS)] and controls on these measures.

We hypothesized that male eating disorder participants would exhibit lower body image concerns and drive for thinness than female eating disorder participants and that there would be gender-specific differences on personality traits (related to some traits such as harm avoidance or cooperativeness).

Methods

Participants

The present study employed a case–control design. Entry into the study was between January 2002 and 2006. The total sample comprised 240 participants as follows: an eating disorder group (60 male and 60 female paticipants) and a healthy comparison group (60 male and 60 female paticipants).

The Ethics Committee of our institution approved this study, and informed consent was obtained from all participants.

Eating disorder participants

The psychiatric cohort (the case group) included 60 male eating disorder participants, diagnosed according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000) [AN (n=10), BN (n=25) and EDNOS (n=25)] and who had consecutively attended our outpatient unit. This group was compared with 60 female eating disorder participants matched by means of a pairwise matching procedure, using SPSS program (SPSS Inc., Chicago, IL, USA), in terms of age, diagnosis and duration of the disorder. Each case of the male eating disorder group (N=60) was paired to a randomly selected female eating disorder participant (N=60) from a larger pool of 742 female eating disorder cases using propensity scores.

All participants were diagnosed by means of a semi-structured clinical interview (First, Spitzer, Gibbon, & Williams, 2002) conducted by experienced psychologists and psychiatrists.

Healthy controls

The healthy control comparison group, recruited from student volunteers and participants visiting the hospital for routine blood test, was composed of 60 male and 60 female participants. All controls were from the same catchment areas as index patient. The exclusion criteria for the control group were the following: (a) current psychiatric disturbances, screened by the General Health Questionnaire (Goldberg, 1981) and (b) lifetime ED,

according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000). From the initial sample of 134 controls, the following were excluded: (1) participants who had a lifetime ED ($n=4$) and (2) participants with a current mental illness ($n=10$).

Assessment

We developed a comprehensive battery of assessments to quantify eating disorder symptoms, general psychopathology and personality. The battery included the Eating Disorder Inventory—2 (EDI-2; Garner, 1991), Symptom Checklist—Revised (SCL-90-R; Derogatis, 1990), Temperament and Character Inventory—Revised (TCI-R; Cloninger, 1999) and a structured clinical interview (Fernández-Aranda & Turón, 1998) evaluating sociodemographic and clinical variables.

Eating Disorder Inventory—2 (Garner, 1991)

The EDI-2 (Garner, 1991) is a reliable and valid 91-item multidimensional self-report questionnaire that assesses different cognitive and behavioural characteristics, which are typical for ED. The EDI-2 (Garner, 1998) retains the 64 items (grouped into the following eight scales: drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness and maturity fears) of the EDI and adds 27 new items into three provisional scales as follows: asceticism, impulse regulation and social insecurity. All of these scales are answered on a six-point Likert scale and provide standardized subscale scores. This instrument was validated in a Spanish population (Garner, 1998) with a mean internal consistency of 0.63 (Cronbach's α).

Symptom Checklist—Revised (Derogatis, 1990)

In order to evaluate a broad range of psychological problems and symptoms of psychopathology, the SCL-90-R (Derogatis, 1990) was employed. This test contains 90 items and helps to measure nine primary symptom dimensions, which are the following: somatization, obsession–compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. In addition, it includes three global indices, which are the following: a global severity index (GSI), designed to measure overall psychological distress; a positive symptom distress index, intended to measure the intensity of symptoms; and a positive symptom total, which assesses self-reported symptoms. The GSI can be used as a summary of the test. This scale has been validated in a Spanish population (Derogatis, 2002), obtaining a mean internal consistency of 0.75 (Cronbach's α).

Temperament and Character Inventory—Revised (Cloninger 1999)

The TCI-R (Cloninger, 1999) is a 240-item, five-point Likert scale, reliable and valid questionnaire that measures, as in the original TCI version (Cloninger, Svrakic, & Przybeck, 1993), seven dimensions of personality as follows: four temperament (harm avoidance, novelty seeking, reward dependence and persistence) and three character dimensions (self-directedness, cooperativeness and self-transcendence). Performances on the Spanish version of the original questionnaire (Gutiérrez et al., 2001) and the revised version (Gutiérrez-Zotes et al., 2004) have been documented. The scales in the latter have shown an internal consistency of 0.87 (Cronbach's α).

Evaluation of sociodemographics and clinical variables

Additional sociodemographic information including age, marital status, education, occupation, living arrangements, motivation to receive treatment, parental occupation and clinical relevant variables regarding the participants' ED and psychopathological symptoms were assessed by a structured clinical interview (Fernández-Aranda & Turón, 1998).

Procedure

Upon presentation at the eating disorder unit (secondary and tertiary care unit), three experienced psychologists with master's or doctoral degrees conducted a 2-hour semi-structured face to face interview to measure eating disorder symptoms and psychopathological traits (Fernández-Aranda & Turón, 1998), which is part of the assessment of all patients attending the eating disorder unit. In addition to this comprehensive clinical and psychological evaluation (including the instruments mentioned above), further demographic information was obtained.

Statistical analysis

The PASW 17 program (SPSS system, SPSS Inc., Chicago, IL, USA) was used in the statistical analyses. Firstly, differences across genders for the sociodemographic and clinical variables were compared separately for the total sample, the eating disorder participants and the controls through t-test procedures for quantitative measures and chi-squared analyses for categorical variables. Secondly, we explored differences in the clinical variables because of gender (male–female) and diagnosis (case–control) through a 2×2 analysis of variance procedures [analysis of variance (ANOVA), using the general linear model] adjusted by participant's age. For the gender comparison stratified by eating disorder subdiagnosis, Mann–Whitney U-tests were used. The α level of significance for symptomatology [EDI-2 and body mass index (BMI)], comorbid psychopathology (SCL-90-R) and personality (TCI-R) comparisons was established at 0.002. Many studies indicate that ANOVA is robust to moderate violations of normality when sample sizes for each group are not unreasonably small ($n<5$) (Driscoll, 1996; Markowski & Markowski, 1990). The data were checked to assure that nonrelevant deviations from normality emerged and that samples sizes guaranteed the absence of bias due to this condition.

Results

Sociodemographics

The mean age of the total sample was 24.0 ($SD=5.6$) [cases: $M=21.0$ ($SD=5.2$); controls: $M=24.0$ ($SD=5.9$); $p=0.912$]. The majority of the participants were single (87.3%) and had completed high school (68.7%). Approximately 52.4% of the participants were employed. In the total sample, there were no gender differences for marital status and education. However, in the control group, significant gender differences were revealed for age [male participants: $M=26.2$ ($SD=5.7$); female participants: $M=21.9$ ($SD=5.3$); $p<0.001$]. Therefore, the remaining statistical

analyses were adjusted for age. In the eating disorder group, no gender differences were obtained for age.

Clinical features

The mean age of onset of the ED was 18.6years (*SD*=4.1) and the mean duration of the disorder was 4.8years (*SD*=3.7). The mean number of previous treatments was 0.8 (*SD*=1.0), ranging from 0 to 5. Participants reported a weekly average of 4.0 binge-eating episodes (*SD*=6.8), 4.6 vomiting episodes (*SD*=7.8), 2.9 laxative-use episodes (*SD*=9.8) and 0.7 diuretic-use episodes (*SD*=4.4). The mean BMI at assessment was 22.8kg/m^2 (*SD*=5.9).

The only variables where male and female ED differed were weekly frequency of vomiting and laxative use. Male eating disorder participants reported a higher mean number of weekly vomits (6.4 vs. 2.9; p=0.019) and a lower mean frequency of laxative use (0.7 vs. 5.0; p=0.020) than women. When different eating disorder subtypes were assessed, male BN participants were found to report a higher frequency of vomiting episodes (mean weekly frequency: 10.9 vs. 4.9, respectively; p=0.049) and lower laxative use than female participants (mean weekly frequency: 1.0 vs. 5.5, respectively; p=0.018). Finally, male EDNOS participants exhibited a significantly lower number of previous treatments (0.4 vs. 1.20, respectively; p=0.002) and a higher age of onset than female EDNOS participants (20.0 vs. 17.2, respectively; p=0.013).

Male participants and eating disorder symptomatology

Table 1 contains the results of the ANOVA procedures for eating disorder symptomatology across genders for eating disorder participants and healthy controls adjusted by age, whereas Table 2 shows the gender comparisons across eating disorder subtypes (AN, BN and EDNOS). Because no interaction sex by diagnosis was statistically significant (p>0.002), only the main effects were tabulated and interpreted. As expected, eating disorder cases obtained higher mean scores in all measures, except for current BMI and the EDI-2 perfectionism scale, where eating disorder participants and controls reported statistically equal scores. Regarding differences because of gender, men ED had a higher maximum BMI and lower means in the EDI-2 drive for thinness and body dissatisfaction scales than female ED; a similar trend was also observed in the control sample.

When the eating disorder subtype was considered, differences across genders were only found in the EDNOS group. That is, male participants showed higher current BMI values and lower EDI-2 body dissatisfaction scale scores than female participants.

Male participants and comorbid psychopathology and personality

Table 3 presents the results for the differences in comorbid psychopathology and personality between eating disorder participants and healthy controls. No interaction effect (gender × group) was observed (p>0.002). Significant differences between cases and controls were observed for all SCL-90-R scales and for TCI-R harm avoidance and self-directedness scales. In addition, various gender differences were also obtained. As regard to general psychopathology, men reported significantly lower scores on the following SCL-90-R scales: somatisation, interpersonal sensitivity, depression, anxiety, GSI and positive symptom total. In

Table 1 Comparison of eating disorder symptomatology measures by gender and eating disorder cohort

	Mean and standard deviations: comparison for control–ED				Mean differences (ANOVA)	
	Controls		Cases		Main effects	
	Male (*N*=60)	Female(*N*=60)	Male (*N*=60)	Female (*N*=60)	Sex[♀]	Diagnose[§]
BMI						
Baseline	23.89 (3.34)	20.97 (2.57)	22.77 (5.19)	22.80 (6.53)	−1.0 (−2.2; 0.3)	0.3 (−0.9; 1.5)
Maximum	25.95 (4.51)	22.29 (3.17)	28.21 (6.64)	26.03 (5.87)	−2.3 (−3.6; −0.9)*	2.9 (1.6; 4.3)*
Minimum	21.66 (2.63)	19.32 (2.29)	19.37 (4.25)	18.91 (3.25)	−1.2 (−2.0; −0.3)	−1.4 (−2.2; −0.5)*
EDI-2						
Drive for thinness	1.90 (3.20)	5.08 (6.36)	9.26 (6.37)	13.48 (5.88)	3.8 (2.2; 5.3)*	7.9 (6.3; 9.4)*
Body dissatisfaction	2.88 (3.19)	6.75 (7.18)	10.90 (7.75)	16.70 (7.29)	4.9 (3.0; 6.8)*	9.0 (7.2; 10.8)*
Interoceptive awareness	1.43 (2.21)	2.42 (3.27)	7.53 (6.71)	11.35 (6.35)	2.2 (0.8; 3.7)	7.5 (6.1; 8.9)*
Bulimia	0.59 (1.50)	0.83 (1.53)	5.05 (5.54)	6.40 (5.67)	1.0 (−0.2; 2.2)	5.0 (3.9; 6.2)*
Interpersonal distrust	2.84 (3.23)	2.15 (2.42)	6.10 (4.46)	5.97 (4.30)	−0.6 (−1.7; 0.4)	3.6 (2.5; 4.6)*
Ineffectiveness	1.59 (2.39)	2.08 (3.17)	8.51 (7.04)	11.87 (6.88)	1.8 (0.2; 3.3)	8.3 (6.9; 9.8)*
Maturity fears	4.45 (4.42)	5.04 (3.86)	9.36 (6.28)	8.45 (5.16)	−0.5 (−1.9; 0.9)	4.2 (2.8; 5.5)*
Perfectionism	4.16 (3.92)	3.42 (3.00)	4.51 (4.42)	6.03 (4.85)	0.2 (−0.9; 1.4)	1.5 (0.4; 2.6)
Impulsivity	1.76 (3.17)	1.77 (2.54)	6.32 (7.22)	8.33 (6.08)	0.5 (−0.9; 2.0)	5.6 (4.2; 7.0)*
Asceticism	2.41 (3.06)	1.92 (1.99)	6.19 (4.96)	6.97 (4.33)	0.2 (−0.9; 1.3)	4.4 (3.4; 5.5)*
Social insecurity	2.57 (3.09)	2.35 (2.83)	7.27 (5.51)	8.42 (5.27)	0.4 (−0.9; 1.6)	5.4 (4.2; 6.6)*
Total	26.6 (20.8)	33.8 (25.5)	81.4 (50.4)	103.9 (41.5)	13.5 (3.0; 24.0)	62.4 (52.3;72.6)*

ED, eating disorders; ANOVA, analysis of variance; BMI, body mass index; EDI-2, Eating Disorder Inventory—2.
[♀]Sex factor: difference obtained for female–male participants.
[§]Diagnose factor: difference obtained for cases–controls.
*The parameter is significant at 0.002 level.

Table 2 Comparison of eating disorder symptomatology measures by gender and eating disorder subtype

	Mean and standard deviations: comparison for eating disorder subtypes					
	AN		BN		EDNOS	
	Male (n=10)	Female (n=10)	Male (n=25)	Female (n=25)	Male (n=25)	Female (n=25)
BMI						
Baseline	17.6 (2.3)	16.5 (0.9)	23.4 (3.5)	27.1 (5.4)	**24.1 (6.1)**	**21.0 (6.1)**
Maximum	22.9 (4.6)	22.4 (2.0)	29.5 (5.2)	29.5 (5.0)	29.0 (7.5)	24.1 (6.1)
Minimum	16.1 (2.2)	15.6 (0.9)	19.2 (4.4)	21.2 (2.4)	20.8 (4.1)	18.0 (2.9)
EDI-2						
Drive for thinness	6.9 (7.0)	11.9 (7.0)	10.8 (6.2)	14.5 (5.2)	8.6 (6.1)	13.1 (6.1)
Body dissatisfaction	7.7 (4.9)	10.4 (5.6)	13.2 (8.8)	18.9 (6.8)	**9.9 (7.0)**	**17.0 (7.1)**
Interoceptive awareness	5.2 (4.7)	10.1 (6.0)	10.0 (7.5)	12.0 (6.6)	5.9 (5.9)	11.2 (6.4)
Bulimia	3.2 (3.2)	2.5 (3.2)	8.5 (6.3)	9.3 (4.5)	2.2 (2.9)	5.0 (6.1)
Interpersonal distrust	4.5 (3.4)	4.1 (2.8)	6.9 (3.7)	6.1 (4.5)	5.9 (5.5)	6.6 (4.5)
Ineffectiveness	4.3 (3.0)	9.8 (6.3)	11.2 (7.7)	11.6 (7.4)	7.5 (6.5)	13.0 (6.6)
Maturity fears	7.4 (4.5)	7.5 (5.5)	11.2 (6.4)	7.8 (4.5)	8.3 (6.5)	9.4 (5.7)
Perfectionism	1.6 (1.6)	3.8 (3.6)	6.0 (4.7)	6.2 (5.1)	4.1 (4.3)	6.8 (5.0)
Impulsivity	2.5 (2.5)	4.8 (5.0)	9.0 (7.8)	9.5 (5.2)	5.1 (7.0)	8.6 (6.9)
Asceticism	4.3 (2.6)	5.6 (3.9)	8.0 (5.8)	7.6 (4.1)	5.1 (4.3)	6.9 (4.7)
Social insecurity	5.5 (3.1)	5.0 (3.7)	8.6 (5.7)	8.5 (5.2)	6.6 (6.0)	9.7 (5.4)
Total	53.1 (19.8)	75.5 (33.2)	103.5 (51.1)	112.0 (39.0)	69.8 (50.2)	107.3 (43.5)

In bold: significant differences by gender with each eating disorder subtype ($p \leq 0.002$), Mann–Whitney procedure.
AN, anorexia nervosa; BN, bulimia nervosa; EDNOS, eating disorder not otherwise specified; BMI, body mass index; EDI-2, Eating Disorder Inventory—2.

Table 3 Comparison of general psychopathology and personality by gender and eating disorder cohort

	Mean and standard deviations: comparison for control–ED				Mean differences (ANOVA)	
	Controls		Cases		Main effects	
	Male (N=60)	Female (N=60)	Male (N=60)	Female (N=60)	Sex[♀]	Diagnose[♂]
SCL-90-R						
Somatization	0.54 (0.48)	0.80 (0.61)	1.29 (0.91)	1.75 (0.99)	0.4 (0.1; 0.6)*	0.8 (0.6; 1.0)*
Obsessive–compulsive	0.76 (0.51)	0.86 (0.58)	1.57 (0.98)	1.90 (0.96)	0.2 (0.0; 0.4)	0.9 (0.7; 1.1)*
Interpersonal sensitivity	0.61 (0.61)	0.88 (0.71)	1.59 (0.99)	2.12 (0.91)	0.4 (0.2; 0.6)*	1.1 (0.9; 1.3)*
Depression	0.55 (0.50)	0.85 (0.64)	1.72 (1.00)	2.33 (0.79)	0.5 (0.3; 0.7)*	1.3 (1.1; 1.5)*
Anxiety	0.47 (0.44)	0.70 (0.53)	1.27 (0.81)	1.86 (0.95)	0.4 (0.2; 0.6)*	1.0 (0.8; 1.2)*
Hostility	0.51 (0.61)	0.63 (0.67)	1.22 (0.91)	1.61 (0.98)	0.2 (0.0; 0.4)	0.8 (0.6; 1.0)*
Phobic anxiety	0.20 (0.38)	0.32 (0.46)	0.80 (0.87)	1.17 (0.93)	0.2 (0.0; 0.4)	0.7 (0.5; 0.9)*
Paranoid ideation	0.68 (0.77)	0.80 (0.63)	1.39 (1.03)	1.57 (0.96)	0.1 (−0.1; 0.3)	0.7 (0.5; 1.0)*
Psychoticism	0.38 (0.44)	0.44 (0.49)	1.12 (0.83)	1.34 (0.77)	0.1 (−0.1; 0.3)	0.8 (0.7; 1.0)*
GSI	0.54 (0.41)	0.76 (0.55)	1.38 (0.81)	1.81 (0.76)	0.3 (0.1; 0.5)*	0.9 (0.8; 1.1)*
PSDI	1.44 (0.39)	1.48 (0.42)	2.11 (0.65)	2.42 (0.53)	0.2 (0.0; 0.3)	0.8 (0.7; 0.9)*
PST	30.3 (17.9)	39.9 (20.9)	55.2 (22.1)	66.0 (20.0)	9.3 (4.0; 14.6)*	24.9 (19.7;30.1)*
TCI-R						
Novelty seeking	104.3 (14.8)	102.2 (14.8)	103.4 (15.4)	103.3 (12.3)	−1.2 (−5.0; 2.6)	0.0 (−3.7; 3.7)
Harm avoidance	92.1 (17.1)	98.8 (13.8)	108.1 (20.9)	120.3 (20.5)	9.5 (4.6; 14.4)*	18.9 (14.2;23.7)*
Reward dependence	100.8 (13.1)	110.0 (13.5)	99.1 (17.3)	103.6 (17.6)	6.7 (2.6; 10.9)*	−4.1 (−8.2; −0.1)
Persistence	111.2 (18.6)	108.3 (17.1)	103.4 (22.9)	113.1 (21.4)	3.8 (−1.5; 9.2)	−1.5 (−6.6; 3.7)
Self-directedness	141.8 (20.4)	143.0 (14.9)	122.4 (22.4)	112.3 (23.2)	−3.8 (−9.2; 1.7)	−25.0 (−31; −20)*
Cooperativeness	131.7 (18.5)	140.2 (11.5)	128.8 (19.5)	136.3 (17.6)	8.1 (3.5; 12.6)*	−3.5 (−7.9; 0.9)
Self-transcendence	60.5 (13.7)	65.5 (13.3)	64.0 (15.4)	68.2 (16.1)	4.9 (1.0; 8.8)	3.0 (−0.8; 6.8)

ED, eating disorders; ANOVA, analysis of variance; SCL-90-R, Symptom Checklist—Revised; GSI, global severity index; PSDI, positive symptom distress index; PST, positive symptom total; TCI-R, Temperament and Character Inventory—Revised.
[♀]Sex factor: difference obtained for female–male participants.
[♂]Diagnose factor: difference obtained for cases–controls.
*The parameter is significant at 0.002 level.

terms of personality traits, significant differences across genders were found for harm avoidance, reward dependence and cooperativeness with the men scoring significantly lower than the female participants on these measures.

When differences in SCL-90-R scores were assessed across eating disorder subtypes, significant differences were only obtained for the EDNOS group, with the male participants scoring higher than the female participants on depression, anxiety, GSI and positive symptom distress index. Conversely, male EDNOS participants had lower scores than women on SCL-90-R phobic anxiety scale (Table 4). Significant differences in personality traits with regard to gender were also obtained across eating disorder subtypes. That is, male EDNOS participants scored significantly lower than female participants on self-directedness.

Discussion

This is the first study using a large sample of male eating disorder participants when compared with female eating disorder participants and a large healthy control group. Moreover, the present study assessed gender differences in diverse eating disorder subgroups, which has not been previously attempted. Overall, there were many similarities between male and female eating disorder participants. However, there were gender differences in compensatory behaviours. That is, male participants had a higher frequency of vomiting episodes but less laxative abuse than women. Furthermore, compared with female eating disorder participants, we found that in general terms, male participants with ED were less pre-occupied with thinness, exhibited lower general psychopathology and revealed lower scores on the following TCI-R traits: harm avoidance, reward dependence and cooperativeness.

Male participants and eating disorder symptomatology

Our results are in line with some previous studies that have shown that male participants were less likely to use laxatives as a weight control method than female ED (Braun et al., 1999; Button et al., 2008; DiGioacchino et al., 1999) but contradict other studies which have failed to find different weight control strategies (Bramon-Bosch et al., 2000; Braun et al., 1999; Carlat et al., 1997; Fernández-Aranda et al., 2004; Keel et al., 1998; Olivardia et al., 1995). Curiously, and not in concordance with the prior literature (Bramon-Bosch et al., 2000; Ross & Ivis, 1999), in our study, male participants reported a higher frequency of vomiting episodes than female ED. This is consistent with a recent review (Ricciardelli, McCabe, Williams, & Thompson, 2007) that has indicated that Hispanic male participants reported more weight loss behaviours than non-Hispanic male participants, suggesting cultural differences in extreme weight loss strategies. One possible explanation for these observed differences is that male participants may be less informed about ED and compensatory behaviours than female participants (Fernández-Aranda et al., 2004).

The lower body image concerns and drive for thinness results agree with the findings of previous studies conducted with clinical

Table 4 Comparison of general psychopathology and personality by gender and eating disorder subtype

	Mean and standard deviations: comparison for eating disorder subtypes					
	AN		BN		EDNOS	
	Male (n=10)	Female (n=10)	Male (n=25)	Female (n=25)	Male (n=25)	Female (n=25)
SCL-90-R						
Somatization	1.0 (0.6)	1.7 (1.0)	1.0 (0.8)	1.3 (0.6)	1.9 (1.1)	1.7 (1.0)
Obsessive–compulsive	1.3 (0.8)	1.9 (1.0)	1.3 (0.9)	1.6 (0.8)	2.1 (0.9)	1.8 (1.0)
Interpersonal sensitivity	1.3 (0.8)	1.9 (0.9)	1.4 (1.1)	1.6 (0.7)	2.3 (0.9)	2.2 (1.0)
Depression	1.7 (0.9)	2.1 (0.9)	1.3 (1.0)	2.1 (0.8)	**2.5 (0.8)**	**2.3 (0.8)**
Anxiety	1.1 (0.6)	1.6 (0.8)	1.0 (0.8)	1.3 (0.9)	**2.1 (1.0)**	**1.9 (0.9)**
Hostility	0.9 (0.8)	1.5 (0.9)	1.0 (0.9)	1.2 (1.0)	1.7 (1.0)	1.7 (0.9)
Phobic anxiety	0.6 (0.7)	1.1 (0.9)	0.6 (0.8)	0.7 (0.7)	**1.2 (1.0)**	**1.3 (0.9)**
Paranoid ideation	1.0 (0.9)	1.7 (1.1)	1.3 (1.0)	1.1 (0.6)	1.7 (0.9)	1.6 (1.1)
Psychoticism	0.9 (0.7)	1.4 (0.8)	0.9 (0.8)	1.1 (0.8)	1.4 (0.7)	1.3 (0.8)
GSI	1.1 (0.6)	1.7 (0.8)	1.1 (0.8)	1.4 (0.6)	**2.0 (0.7)**	**1.8 (0.8)**
PSDI	2.0 (0.5)	2.4 (0.6)	1.8 (0.6)	2.2 (0.5)	**2.5 (0.5)**	**2.4 (0.5)**
PST	49.0 (19.7)	63.4 (20.2)	49.6 (23.0)	58.7 (23.2)	66.6 (18.0)	66.1 (20.8)
TCI-R						
Novelty seeking	93.0 (12.2)	106.8 (14.8)	104.3 (15.8)	97.9 (10.5)	105.6 (11.7)	103.1 (13.3)
Harm avoidance	102.0 (21.1)	114.9 (18.9)	103.6 (21.6)	111.7 (15.9)	121.3 (22.4)	122.9 (20.0)
Reward dependence	97.0 (16.6)	98.4 (16.7)	100.8 (18.7)	105.6 (15.0)	102.4 (17.1)	104.0 (19.7)
Persistence	103.6 (14.5)	102.4 (29.4)	104.4 (18.2)	114.1 (17.0)	110.7 (25.4)	115.1 (18.9)
Self-directedness	130.1 (18.9)	110.7 (19.9)	131.7 (21.2)	115.9 (45.9)	**110.8 (18.6)**	**112.6 (15.7)**
Cooperativeness	132.4 (21.5)	124.7 (18.0)	131.5 (20.1)	140.1 (13.1)	135.4 (20.2)	136.0 (16.6)
Self-transcendence	62.2 (12.9)	68.8 (17.4)	59.7 (13.0)	68.4 (13.0)	73.2 (17.2)	63.1 (15.0)

In bold: significant differences by gender ($p \leq 0.002$), Mann–Whitney procedure.

AN, anorexia nervosa; BN, bulimia nervosa; EDNOS, eating disorder not otherwise specified; SCL-90-R, Symptom Checklist—Revised; GSI, global severity index; PSDI, positive symptom distress index; PST, positive symptom total; TCI-R, Temperament and Character Inventory—Revised.

(Barry & Garner, 2001; Fernández-Aranda et al., 2004; Joiner et al., 2000; Kjelsås et al., 2003) and general populations (Sepúlveda, Carrobles, & Gandarillas, 2008; Striegel-Moore et al., 2009; Thianthai, 2008) and may reflect sociocultural gender differences, as a similar differential pattern was found in the healthy comparison group. Hence, in line with our clinical experience and the findings of other authors (Benninghoven, Raykowski, Solzbacher, Kunzendorf, & Jantschek, 2007; Fernández-Aranda et al., 2004; Gila, Castro, Cesena, & Toro, 2005; Weltzin et al., 2005), one explanation for these findings might be that male participants are more concerned about their body shape in terms of muscularity, whereas women are more pre-occupied with being thin.

Male participants and personality

The lower scores on harm avoidance, reward dependence and cooperativeness is consistent with previous clinical (Fassino et al., 2001a; Woodside et al., 2004) and general populations studies (Brändström, Richter, & Przybeck, 2001; Lask & Bryant-Waugh, 2000; Miettunen, Veijola, Lauronen, Kantojärvi, & Joukamaa, 2007). The previous literature suggested that female participants might have scored higher in these scales due to either a real gender bias, a sampling error or even due to some characteristics of the items in the questionnaires, which might be more salient for female participants than for male participants (Stewarta, Ebmeierb, & Dearyc, 2004). The questions on harm avoidance, for instance, may be more appropriate for female participants than for male participants in that it is easier for female participants to cry, whereas male participants might be more likely to express anger (Jorm, 1987). Interestingly, these gender differences have also been reported in other cultures and languages (Gutiérrez-Zotes et al., 2004).

Limitations of the present study

The present study has some limitations. First, the retrospective and self-report data collection procedures may limit the validity and the reliability of our findings. Second, the cross-sectional design does not allow us to determine causality of the variables assessed. Third, it should be noted that because our eating disorder sample was derived from a specialized eating disorder treatment centre, our findings might be slightly inflated due to the increasing comorbidity and symptom severity in this group. Fourth, the eating and shape concepts in the questionnaires may have different meanings across gender; for example, body image concerns may differ [e.g. men are more likely to desire a more muscular body, rather than thinness (see Weltzin et al., 2005)] and it is possible that these need further validation in male participants with ED. Unfortunately, such an investigation was beyond our resource. Conversely, even though the prevalence rate of ED is low especially in male participants, a specific strength of the present paper was that we were able to analyse a large clinical and control group composed of both male and female participants.

Clinical implications

Most studies suggest that given the clinical similarities, similar treatment strategies are appropriate for male and female eating disorder participants (Braun et al., 1999; Carlat et al., 1997; Muise et al., 2003). However, others have argued that interpersonal treatments may be more effective for male participants (Johnson et al., 2003; Muise et al., 2003). Our findings suggest that a differential type of focus on body image and nutritional factors may be needed.

Conclusions

In conclusion, although there are many similarities between male and female eating disorder participants, there are also differences in compensatory behaviours (less laxative use and more vomiting in male participants with ED) and body image concerns that do not relate to thinness. Furthermore, male ED obtained lower values than female ED on harm avoidance, reward dependence and cooperativeness, although these appeared to be more related to gender differences in general than to ED per se. Further studies on the needs of male participants and longitudinal studies analysing risk factors will be of value.

Acknowledgements

Financial support was received from Fondo de Investigación Sanitaria—FIS (PI081573; PI081714) and AGAUR (2009SGR1554). This study was also partially supported by the European Commission under the Seventh Framework Programme (FP7-ICT-215839-2007—Playmancer project). CIBER Fisiopatología de la Obesidad y Nutrición (CIBERobn) and CIBER Salud Mental (CIBERsam) are initiatives of ISCIII. The first author was supported by the Research Training Network funded by the European Commission 6th Framework Marie Curie Actions (MRTN-CT-2006-035988) and Individually Tailored Stepped Care for Women with Eating Disorders (INTACT). I. K. was supported by a Marie Curie Intra European Fellowship within the 7th European Community Framework Programme (2009-254774).

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3.1.2. Study 2: Male eating disorders and therapy: a controlled pilot study with one year follow-up.

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Journal: J. Behav. Ther. & Exp. Psychiat. 2009, 40 (3) 479–486

English abstract:

Abstract

Objectives: To examine whether outpatient treatment for male patients with bulimic symptomatology is as effective as it is for females. **Method:** The outcome of 19 male patients was compared to that of 150 female eating disorder (ED) individuals after a group CBT treatment. **Results:** A reduction in ED symptomatology was observed after treatment for both genders. Main effects for gender indicated that after collapsing across the mean pre/post values, lower mean scores were found for men in the EAT-40, in the EDI-total score and in the following EDI subscales: ‘‘drive for thinness’’, ‘‘body dissatisfaction’’ and ‘‘interoceptive awareness’’. **Conclusions:** A group CBT treatment appears to be effective for male and female ED patients.

Spanish abstract:

Resumen

Objetivos: Examinar si un tratamiento ambulatorio para pacientes varones que presentan sintomatología bulímica es tan efectivo como para las pacientes mujeres. **Metodología:** Se compararon los resultados de 19 pacientes varones con los de 150 pacientes mujeres después de un grupo terapéutico cognitivo conductual. **Resultados:** Se observó una reducción significativa de la sintomatología alimentaria después del tratamiento en ambos sexos. Como efectos principales de género, se encontraron (después de cruzarse por la media pre/post) puntuaciones más bajas para varones en el EAT-40, en la puntuación total del EDI y en las escalas: impulso a la delgadez, insatisfacción corporal y conciencia interoceptiva. **Conclusiones:** El grupo de tratamiento con terapia cognitiva-conductual parece ser efectivo tanto para varones como mujeres con TCA.

Catalan abstract:

Resum

Objectius: Examinar si un tractament ambulatori per a pacients homes que presenten simptomatologia bulímica és tan efectiu com per a les pacients dones. **Metodologia:** Es

van comparar els resultats de 19 pacients homes amb els de 150 pacients dones després d'un grup terapèutic cognitiu conductual. **Resultats:** Es va observar una reducció significativa de la simptomatologia alimentària després del tractament en tots dos sexes. Com a efectes principals de gènere, es van trobar (després de creuar-se per la mitjana pre/post) puntuacions més baixes per a homes al EAT-40,a la puntuació total del EDI i a les escales: impuls a la primesa, insatisfacció corporal i consciència interoceptiva. **Conclusions:** El grup de tractament amb teràpia cognitiva-conductual sembla ser efectiu tant per a homes com a dones amb TCA.

J. Behav. Ther. & Exp. Psychiat. 40 (2009) 479–486

Contents lists available at ScienceDirect

Journal of Behavior Therapy and Experimental Psychiatry

journal homepage: www.elsevier.com/locate/jbtep

Male eating disorders and therapy: A controlled pilot study with one year follow-up

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ARTICLE INFO

Article history:
Received 21 February 2008
Received in revised form 12 June 2009
Accepted 20 June 2009

Keywords:
Bulimia nervosa
Eating disorders
EDNOS
Cognitive-behavioural therapy
Males
Treatment

ABSTRACT

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Method: The outcome of 19 male patients was compared to that of 150 female eating disorder (ED) individuals after a group CBT treatment.

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Conclusions: A group CBT treatment appears to be effective for male and female ED patients.

1. Introduction

Eating disorders (EDs) are 2 less frequent in males than in females (6–12% of cases) (Kjelsas, Bjornstrom, & Gotestam, 2004). While most characteristics of men and women with EDs are similar,

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doi:10.1016/j.jbtep.2009.06.004

men have been reported to have higher levels of Axis I (Woodside et al., 2001), and Axis II (Striegel-Moore, Garvin, Dohm, & Rosenheck, 1999) comorbidity, more frequent homosexuality (Bramon-Bosch, Troop, & Treasure, 2000), more premorbid overweight or obesity (Fernández-Aranda et al., 2004) and a later onset (Braun, Sunday, Huang, & Halmi, 1999; Grabhorn, Kopp, Gitzinger, von Wietersheim, & Kaufhold, 2003). Other studies have failed to find gender differences in personality traits (Fernández-Aranda et al., 2004) or familial-genetic or individual risk factors (Strober, Freeman, Lampert, Diamond, & Kaye, 2001).

1.1. Outcome of EDs across gender

The few case–control studies where the effect of gender on the prognosis of EDs has been analyzed have shown a similar course and outcome for male and female ED patients (Andersen & Holman, 1997; Eliot & Baker, 2001; Muise, Stein, & Arbess, 2003; Saccomani, Savoini, Cirrincione, Vercellino, & Ravera, 1998). Other studies have however referred to a better (Deter, Kopp, Zipfel, & Herzog, 1998; Lindblad, Lindberg, & Hjern, 2006; Strober et al., 2006) or even a poorer (Oyebode, Boodhoo, & Schapira, 1988) outcome in male patients when compared to females of the same ED diagnosis.

1.2. Therapy for anorexia nervosa males

Therapy for ED males has received relatively little attention in the literature. Most studies on therapy have been conducted in males with Anorexia Nervosa (AN) undergoing inpatient-residential treatment. A Swedish case register study ($n = 61$) (Lindblad et al., 2006) for example found that the outcome of males with AN admitted for hospital treatment was better than for females which is in agreement with the findings of Strober et al. (2006). Also, Deter et al. (1998) reported a better psychosocial outcome in men with AN than in women, albeit two male cases died in this cohort.

1.3. Therapy for males with bulimic symptomatology

Even though increasing rates of males with bulimia nervosa (BN) and eating disorder not otherwise specified (EDNOS) patients have recently been observed (Fernández-Aranda & Jiménez-Murcia, 2009, Kjelsas et al., 2004), relatively little attention has been paid to these ED subtypes as regard to treatment effectiveness (Krug et al., 2008). It was not until the middle of the 80s, when some of the first descriptions of treated male BN cases were first published (Andersen, 1984; Mitchell & Goff, 1984). Research on the treatment of male EDNOS patients is almost entirely lacking in the literature. Only very few studies have assessed the treatment of EDs with bulimic symptomatology in addition to AN (Grabhorn et al., 2003; Weltzin, Weisensel, Cornelia-Carlson, & Bean, 2007), however most of these studies failed to differentiate the outcome for the specific ED subtypes. To our knowledge only one study (Weltzin et al., 2007) assessed BN and EDNOS male patients and found that residential therapy was as effective for males as for female ED counterparts.

It should be noted that some of the discrepancies observed in the current literature on EDs in males are partially due to methodological gaps, lack of control groups or too small sample sizes of the clinical used samples and a huge variety in the therapeutical settings employed.

In summary, there is a suggestion that men with EDs in particular males with AN undergoing inpatient treatment have a better outcome than females. However the outcome of males with bulimic symptomatology is still unknown. Assessing EDs in males is essential for clinical reasons, since there is a need for practical information on males with EDs to help guide diagnostic and treatment decisions.

The main goal of this study was to compare the short-middle term response to cognitive-behavioural therapy (CBT) delivered in a group, outpatient format between male and female individuals with bulimic symptomatology.

2. Method

2.1. Participants

Nineteen male ED patients with a bulimic disorder were ascertained from a series of consecutive referrals to our unit between December 2002 and September 2003 and were compared to 150 female ED patients with the same diagnoses (BN and EDNOS–BN). Twelve men (63.16%) fulfilled the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) (American Psychiatric Association, 2000a) criteria for threshold BN and seven (36.84%) for the EDNOS–BN subtype. The latter diagnosis was given if the individual did not meet the frequency criteria. Given that the patients at our unit normally undergo three to four initial interviews before starting the treatment, we were able to ensure that all symptoms had been present for a minimum of four weeks before starting treatment. Of note 50% of the individuals with EDNOS–BN reported having met criteria for full BN in the past. In the EDNOS–BN group, 71.4% did not report an objective binge-eating episode and 57.1% did not exhibit any purging behaviour.

Patients were excluded if they met any of the following criteria: (a) age below 18 years, (b) men with AN or binge-eating disorder (BED), (c) missing values for any diagnostic items, (d) current alcohol or drug abuse, or (e) current psychotic disorder. For the present analysis, the following individuals had to be excluded: men with AN ($n = 4$) and BED ($n = 2$). All of the patients who had been excluded from the study were treated separately with different therapeutic modalities. Disposition decisions were made by psychologists or psychiatrists who completed the anamnesis together with the treatment team according to published treatment guidelines (American Psychiatric Association, 2000b) for CBT treatment.

2.2. Assessment and procedure

2.2.1. ED symptomatology

The patients were given the Eating Disorder Inventory (EDI, Garner, Olmsted, & Polivy, 1983), Eating Attitudes Test 40 (EAT-40, Garner & Garfinkel, 1979), and the Bulimic Investigatory Test Edinburgh (BITE, Henderson & Freeman, 1987) prior to and after treatment. All the scales have been adapted and validated in Spanish populations and have demonstrated adequate internal consistency values of 0.74–0.92 (EDI, Guimerá & Torrubia, 1987), 0.93 (EAT-40, Castro, Toro, Salamero, & Guimerá, 1991) and 0.96 (BITE, Rivas, Bernabé, & Jiménez, 2004).

2.2.2. Weekly binge-eating and purging frequencies

Throughout the duration of the study, patients kept a food and purging diary (Fernández-Aranda and Turón, 1998). Weekly binge-eating and purging frequency was determined by examining these food diaries and calculating their mean values.

2.2.3. Demographic and clinical information

Additional demographic–clinical information including age, weight, height and clinical–psychopathological variables was also obtained. Furthermore, patients were evaluated by means of the SCID-I (First, Gibbon, Spitzer, & Williams, 1996) and a semi-structured interview (Fernández-Aranda & Turón, 1998) at 6 and 12 months follow-up after having completing the treatment.

This study was approved by the Ethics Committee of our institution and informed consent was obtained from all participants.

2.3. Procedure and design

The CBT therapy was based on the cognitive model postulated by Fairburn and colleagues (Fairburn, 1997; Fairburn, Marcus, & Wilson, 1993). In our study, this intervention consisted of 19 weekly outpatient sessions (90 min each) with a total of no more than 10 patients per group. Men and women were treated in separate groups. In total there were four groups, two tailored for male patients and two for females. In male and female groups the topics to be addressed in the group included: nutritional

patterns and monitoring of meal plans, strategies for decreasing bingeing and purging behaviour, cognitive restructuring, problem solving strategies and relapse prevention. We adapted our initial therapy model to fit the therapeutic needs of ED male patients. Therefore in the male group several topics were more emphasized than in the female groups. These included: motivation, difficulties with dealing with stress, interpersonal relationships and shyness (many times as a consequence of the negative experience of being criticized for previous obesity or overweight), cognitive style and underlying weight and shape beliefs (e.g. over-evaluation of muscularity, fear of gaining weight and becoming obese again), hyperactivity, autonomy from family and homosexuality in some cases (Fernández-Aranda & Jiménez-Murcia, 2009). The group was directed by a psychologist and a co-therapist. This program and accompanying program material have already been manualized and published in Spanish (Fernández-Aranda and Turón, 1998).

2.4. Statistical analysis

The statistical analysis was conducted with SPSS 15.0.1 for Windows. All analyses were adjusted by age, duration, BMI and subtype diagnosis. Analysis of variance with repeated measures (MANCOVA, gender × time) was applied for quantitative variables (baseline-pre vs. post-treatment) through the General Linear Model (GLM) procedure. Covariate variables were baseline BMI, age, duration of the disorder and diagnosis subtype. Due to the multiple-comparisons, results obtained in MANCOVA tests were considered significant only for p-values lower than 0.0036. Categorical data such as treatment adherence (dropout rates), and clinical outcome were compared by gender at the end of the therapy through chi-square tests (using exact Monte-Carlo estimations for small samples). The working definition of a good clinical outcome was absence of symptoms to a level meeting diagnostic criteria for a minimum of 2 months.

Due to the small men sample size and consequently the low power for significance tests, effect size measures for proportions were calculated based on Cohen's (1988) d, as the standardized difference between both values. Results were interpreted as small if d values were lower than 0.2, medium for d values ranged between 0.2 and 0.5 and large for d values higher than 0.5. Since effect sizes can also be thought of as the average percentile standing (PS) of the average treated participant relative to the average control participant, we have also interpreted these PS values (Kirk, 1996). For example, PS = 75 indicates that the mean of the treated group corresponds to the 75th percentile of the control group.

3. Results

3.1. Description of the sample

Table 1 contains the sociodemographic and clinical descriptive features of the sample stratified by gender. A lower proportion of women than men was single ($p = 0.018$). The majority of patients achieved primary or secondary studies (83.7% of the total sample, with no significant difference across gender: $p = 0.295$), and were employed (60.9%, $p = 0.523$). Men were significantly younger than females ($p = 0.014$). There was no statistically significant difference across gender in the previous number of treatments ($p = 0.580$). Most patients were diagnosed with BN, with the females reporting a significantly higher proportion than males ($p = 0.006$). The mean BMI value at baseline was higher for women than for men ($p = 0.009$).

3.2. The change in eating symptoms after treatment

Table 2 shows the comparison of eating psychopathology across gender before and after treatment. No significant interaction (sex × time) was observed (p-values above 0.0036, considering Bonferroni's correction for multiple-comparisons). Concerning the main effects, significant mean differences (MD) between pre and post-treatment outcomes were obtained for weekly frequency of binges (95% CI: 3.4–8.4) and vomiting (95% CI: 5.2–11.4), EAT-40 (95% CI: 14.1–34.3), EDI-total score (95% CI: 15.5–52.5), EDI-"drive for thinness" (95% CI: 4.2–10.5), EDI-"bulimia" (95% CI: 1.8–8.4), EDI-"interpersonal distrust" (95% CI: 1.8–6.4), BITE-"symptoms" (95% CI: 4.5–12.3) and BITE-"severity"

Table 1
Clinical and sociodemographic details of the male and female ED patients.

		Men ($n = 19$)	Women ($n = 150$)	p
Marital status; %	Single	100.0	72.3	0.018
Studies; %	Primary	22.2	35.1	0.295
	Secondary	50.0	50.0	
	University	27.8	14.9	
Employment status; %	Employed	64.7	60.4	0.523
	Unemployed	5.9	16.0	
	Student	29.4	23.6	
Consulting reason; %	Own free will	44.4	54.7	0.409
Age (yrs)	Mean (SD)	22.4 (3.7)	26.7 (6.7)	0.014
Age of onset of disorder (yrs)	Mean (SD)	17.8 (3.0)	19.9 (6.8)	0.213
Duration of disorder (yrs)	Mean (SD)	4.6 (3.1)	6.7 (5.3)	0.109
Number of previous treatments	Mean (SD)	0.67 (0.69)	0.79 (0.93)	0.580
Diagnose subtype; %	BN	57.9	86.0	0.006
	EDNOS	42.1	14.0	
Baseline BMI	Mean (SD)	20.8 (3.1)	23.6 (4.5)	0.009

BN: bulimia nervosa; EDNOS: eating disorder not otherwise specified; BMI: body mass index.
SD: standard deviation.

(95% CI: 4.0–9.9) scales. Main effects for gender indicated that after collapsing across the mean pre/post values, lower mean scores were found for men in the EAT-40 (95% CI: 10.5–41.1), in the EDI-total score (95% CI: 17.1–73.7) and the following EDI subscales: "drive for thinness"(95% CI: 4.0–13.2), "body dissatisfaction" (95% CI: 4.2–18.5) and "interoceptive awareness" (95% CI: 3.7–15.4).

3.3. Comparison of therapy outcome and treatment adherence

The proportion of patients who continued to fulfil the criteria for an ED diagnosis at the end of treatment was 33.3% for men and 49.0% for women ($p = 0.307$). At 1 year post-treatment follow-up, the probability of suffering from BN or EDNOS–BN was 28.6% for men and 25.7% for women ($p = 0.165$). Effect size for the difference of proportions was medium at the end of the therapy (Cohen's $d = 0.32$ and PS = 63) and small at follow-up ($d = 0.07$, PS = 53). The risk of dropout during the treatment was similar across gender (26.3% vs. 30.0% for men and women, respectively; $p = 0.798$).

4. Discussion

The current pilot study is a novel contribution to the literature as it compares across gender the outcome of a group CBT program of patients with a bulimic disorder, and therefore addresses several fundamental issues.

First, in terms of therapy outcome (measured as differences in the level of symptoms), a reduction in general bulimic symptomatology (measured through the BITE and the weekly frequency of binges and vomits), the EDI-total score and various EDI scales ("drive for thinness", "bulimia" "interpersonal distrust") for both male and female ED patients was observed, which is in agreement with previous studies on the therapy effectiveness of patients with bulimic symptomatology (e.g., Krug et al., 2008).

As regards to gender, significant findings were obtained for the EAT-40, the EDI-total score and the following EDI subscales "drive for thinness", "body dissatisfaction" and "interoceptive awareness", with the men scoring significantly lower on these scales than the females. This result is in concordance with previous studies, where males with EDs have shown less ED cognitions/body-related thoughts than females (e.g., Joiner, Katz, & Heatherton, 2000; Kjelsas, Augesta & Flanders, 2003).

In terms of categorical outcome (meeting diagnostic criteria) the overall outcome of treatment was good for both genders (47.0% post-treatment and 26.1% at one year post-treatment follow-up) (this level of improvement is at minimum equal to standard treatment) (Mitchell, Agras, & Wonderlich, 2007). This finding is in accordance with previous studies, which have shown a similar outcome for

Table 2
Comparison of EDI and BITE measures regarding gender and treatment, adjusted by age, initial BMI, duration of the disorder and diagnose subtype.

	Adjusted mean: standard deviation				F test	Interaction	Main effects			
	Men		Women			Sex × time	Time[b]		Sex[a]	
	Pre	Post	Pre	Post	Df	F (p)	F (p)	MD	F (p)	MD
Weekly freq. of binges	6.2; 8.7	0.2; 2.8	7.9; 8.2	2.1; 2.6	1, 66	0.00 (0.962)	22.91 (<0.001)	5.90*	1.36 (0.248)	−1.79
Weekly freq. of vomiting	12.5; 9.8	0.4; 5.8	7.6; 9.2	3.1; 5.4	1, 67	5.47 (0.022)	28.86 (<0.001)	8.29*	0.33 (0.570)	1.09
Body mass index (BMI)	22.4; 2.2	23.7; 3.2	24.4; 2.3	26.0; 3.4	1, 14	0.06 (0.810)	5.32 (0.004)	−1.42	2.84 (0.114)	−2.13
EAT-40: total score	39.3; 20.9	6.3; 24.9	56.3; 18.8	40.9; 22.3	1, 62	2.76 (0.102)	22.78 (<0.001)	24.20*	11.38 (0.001)	−25.77*
EDI: total score	60.8 (33.0)	15.8 (39.5)	95.2 (29.8)	72.2 (35.7)	1, 62	1.33 (0.253)	13.56 (<0.001)	34.02*	10.27 (0.002)	−45.40*
EDI: drive for thinness	11.4; 5.3	0.2; 6.6	16.1; 4.8	12.6; 6.0	1, 60	5.66 (0.021)	21.88 (<0.001)	7.34*	13.92 (<0.001)	−8.61*
EDI: body dissatisfaction	10.4; 7.7	2.8; 9.4	19.5; 7.0	16.4; 8.5	1, 60	1.39 (0.244)	8.40 (0.005)	5.34	10.13 (0.002)	−11.34*
EDI: interocep. awareness	5.9; 7.6	0.6; 8.2	14.7; 6.8	10.9; 7.5	1, 60	3.77 (0.098)	4.27 (0.043)	4.59	10.74 (0.002)	−9.58*
EDI: bulimic episodes	5.5; 6.1	1.5; 5.5	11.7; 5.7	5.6; 5.1	1, 59	0.39 (0.537)	9.55 (0.003)	5.10*	4.38 (0.041)	−5.18
EDI: interpersonal distrust	8.3; 6.2	1.8; 5.2	7.0; 5.6	5.3; 4.7	1, 60	4.01 (0.049)	12.63 (0.001)	4.07*	0.20 (0.655)	−1.09
EDI: inefficacy	8.3; 7.8	1.2; 8.3	11.8; 7.0	10.1; 7.5	1, 59	1.85 (0.179)	5.57 (0.022)	4.43	3.66 (0.061)	−6.22
EDI: maturity fears	9.2; 6.6	3.2; 6.0	8.4; 5.9	6.3; 5.4	1, 59	1.65 (0.204)	7.43 (0.008)	4.00	0.19 (0.661)	−1.12
EDI: perfectionism	3.0; 4.1	4.1; 4.1	5.9; 3.7	5.4; 3.7	1, 60	0.52 (0.473)	0.08 (0.778)	−0.31	1.80 (0.185)	−2.10
BITE: symptoms	19.1; 4.7	9.1; 9.9	25.2; 4.3	18.3; 9.1	1, 62	0.57 (0.453)	18.54 (<0.001)	8.40*	8.17 (0.006)	−7.67
BITE: severity	9.1; 6.8	3.1; 7.5	15.4; 6.2	7.6; 6.9	1, 62	0.37 (0.546)	22.60 (<0.001)	6.95*	4.00 (0.050)	−5.37

MANCOVA adjusted by baseline BMI, age, duration of the disorder and diagnose subtype. Df: degrees of freedom; MD: mean difference.
*Significant value ($p < 0.0036$) with Bonferroni's correction for multiple-comparisons.
[a] Men–women.
[b] Pre–post.

male and female ED patients after treatment (Andersen & Holman, 1997; Eliot & Baker, 2001; Muise et al., 2003; Saccomani et al., 1998).

Second, treatment adherence was also similar across gender in that there was no significant difference in the risk of dropout during treatment (26.3% vs. 30.0% respectively for males and females; $p = 0.798$). These results are within the range found in other studies for female BN patients (17.2–27.3%) (McKisack & Waller, 1997).

There are three limitations of the present study: (a) the small sample size, thus the power to distinguish between clinical outcomes after treatment and between diagnostic subtypes was limited, (b) the quantitative measures of symptom change were not measured at 6 and 12 month post-treatment follow-up and so it is uncertain whether there was a differential rate of relapse of symptoms between the genders, (c) the eating and shape concepts in the questionnaires may have different meanings across gender, for example body image concerns may differ [e.g., men are more likely to desire a more muscular body, rather than thinness (see Weltzin et al., 2005)] and it is possible that these need further validation in males with EDs. Unfortunately such an investigation was beyond our resource.

Upcoming research would profit from incorporating a larger sample size of men in the distinct subgroups of ED diagnoses to permit for a more accurate recognition of potential prognostic factors in diverse subsets of EDs. Furthermore since the literature has shown that some specific topics are more salient to males (e.g., coping with criticism for previous obesity or overweight, sexual identity and gender roles) than to females, further research would benefit from addressing these themes in different therapeutic modalities.

In conclusion, this is the first study to report the outcome of male cases of BN and EDNOS–BN treated as outpatients and found that even though male cases had significantly lower scores than females on many facets of ED psychopathology, men and women revealed a similar outcome after treatment and at post-treatment follow-up. The results of the present study therefore indicate that an outpatient CBT program appears to confer benefit for male and female ED patients.

Acknowledgment

Financial partial support was received from the European Union (Framework-V Multicentre Research Grant, QLK1-1999-916 and Framework VII, FP7-ICT-215839-2007) and FIS (PI081573). The CIBER Fisiopatologia de la Obesidad is an initiative of ISCIII.

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3.2. Phenomenology of BN and boundaries

3.2.1. Study 3: Differentiating purging and nonpurging bulimia nervosa and binge eating disorder

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Journal: International Journal of Eating Disorders 2011, 44(6) 488-496

English abstract:

Abstract

Objective: To explore similarities and differences in clinical and personality variables across three groups: binge eating disorder (BED), bulimia nervosa-purging type (BN-P), and bulimia nervosa-non purging type (BN-NP). **Method:** The participants were 102 female eating disorders patients (34 BED, 34 BN-P, and 34 BN-NP) consecutively admitted to the eating disorders unit, at the University Hospital of Bellvitge, and diagnosed according to DSM-IV criteria. **Results:** BED patients were older, and more likely to have personal and family history of obesity. A gradient in psychopathological scores emerged with BN-P patients having higher pathological scores on the SCL-90-R, followed by BN-NP and BED patients. No statistically significant differences were observed in personality traits. **Discussion:** Our data supported that eating disorders (namely BED, BN-NP, and BN-P) followed a linear trend in general psychopathology. Whereas personality may represent a shared vulnerability factor, differences in clinical severity suggest there to be a continuum with BN-P being the most severe and BED being the least severe.

Spanish abstract:

Resumen

Objetivo: Explorar las similitudes y diferencias en variables clínicas y de personalidad en tres grupos: trastorno por atracón (TA), bulimia nerviosa tipo purgativa (BN-P) y bulimia nerviosa tipo no purgativa (BN-NP). **Metodología:** Los participantes fueron 102 mujeres con trastorno de la conducta alimentaria (TCA): 34 TA, 34 BN-P, y 34 BN-NP; admitidas de forma consecutiva en la unidad de TCA del Hospital de Bellvitge y diagnosticadas según los criterios del DSM-IV. **Resultados:** Las pacientes TA eran mayores y con tendencia a presentar una historia familiar y personal de obesidad. Una graduación apareció en las puntuaciones psicopatológicas, donde BN-P puntuaban de forma significativamente más elevada en puntuaciones patológicas del SCL-90-R,

seguidas por las BN-NP y por las pacientes con TA. No se hallaron diferencias significativas en rasgos de personalidad. **Conclusiones:** Nuestros datos indican una tendencia lineal en la psicopatología general de estos trastornos (TA, BN-NP y BN-P). Mientras que la personalidad debe representar un factor de vulnerabilidad compartido, diferencias en la severidad clínica sugieren un continuo donde BN-P es el trastorno más severo y el TA el menos severo.

Catalan abstract:

Resum
Objectiu: Explorar les similituds i diferències entre variables clíniques i de personalitat en tres grups: trastorn per afartament (TA), bulímia nerviosa tipus purgativa (BN-P) i bulímia nerviosa tipus no purgativa (BN-NP). **Metodologia:** Els participants van ser 102 dones amb trastorn de la conducta alimentària (TCA): 34 TA, 34 BN-P, i 34 BN-NP; admeses de forma consecutiva a la unitat de TCA de l'Hospital de Bellvitge i diagnosticades segons els criteris del DSM-IV. **Resultats:** Les pacients TA tenien més edat i tendència a presentar una història familiar i personal d'obesitat. Una graduació va aparèixer a les puntuacions psicopatològiques, on BN-P puntuaven de forma significativament més elevada a puntuacions patològiques del SCL-90-R, seguides per les BN-NP i per les pacients amb TA. No es van trobar diferències significatives en trets de personalitat. **Conclusions:** Les nostres dades indiquen una tendència lineal a la psicopatologia general d'aquests trastorns (TA, BN-NP i BN-P). Mentre que la personalitat deu representar un factor de vulnerabilitat compartit, diferències a la severitat clínica suggereixen un continu on BN-P és el trastorn més sever i el TA el menys sever.

REGULAR ARTICLE

Differentiating Purging and Nonpurging Bulimia Nervosa and Binge Eating Disorder

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ABSTRACT

Objective: To explore similarities and differences in clinical and personality variables across three groups: binge eating disorder (BED), bulimia nervosa-purging type (BN-P), and bulimia nervosa-non purging type (BN-NP).

Method: The participants were 102 female eating disorders patients (34 BED, 34 BN-P, and 34 BN-NP) consecutively admitted to the eating disorders unit, at the University Hospital of Bellvitge, and diagnosed according to DSM-IV criteria.

Results: BED patients were older, and more likely to have personal and family history of obesity. A gradient in psychopathological scores emerged with BN-P patients having higher pathological scores on the SCL-90-R, followed by BN-NP and BED patients. No statistically significant differences were observed in personality traits.

Discussion: Our data supported that eating disorders (namely BED, BN-NP, and BN-P) followed a linear trend in general psychopathology. Whereas personality may represent a shared vulnerability factor, differences in clinical severity suggest there to be a continuum with BN-P being the most severe and BED being the least severe. © 2010 by Wiley Periodicals, Inc.

Keywords: binge eating disorder; bulimia nervosa; personality; psychopathology; classification

(Int J Eat Disord 2011; 44:488–496)

Introduction

Considerable research attention has been paid to the relation between bulimia nervosa (BN) and anorexia nervosa (AN), by exploring differences and similarities in biological factors, personality traits, psychopathology, and clinical variables.[1–4] However, other subcategories subsumed under eating disorders not otherwise specified (EDNOS), have received less scientific attention[5] despite being more common than AN or BN.[6–8] To date, the most commonly described type of EDNOS is binge eating disorder (BED), from the perspective of clinical presentation,[9–13] psychopathological features[9–11,14] and treatment response.[11,15,16]

The validity of current eating disorder diagnostic criteria has been the theme of continuous debate.[11,13,16–20] Given the paucity of systematic investigations, few firm conclusions can be drawn regarding whether BED warrants an official independent diagnostic classification.[11,17,21,22] Carefully designed studies are required to assist in the determination of whether BED represents a discrete and unique category, or is better subsumed under other diagnostic categories such as BN or obesity.

Clinical and Sociodemographic Features

The boundaries between BED and BN in psychopathology and diagnostic domains (and specifically between BED and BN non-purging subtype) are quite unclear.[13] When comparing across all eating disorders categories (BED vs. BN, and especially purging subtype), BED is characterized by lower levels of dietary restraint,[23–25]

Accepted 13 February 2010
Supported by PI081573; PI081714 from Fondo de Investigación Sanitaria –FIS. Supported by 2009SGR1554 from AGAUR and Supported by FP7-ICT-215839-2007 from the European Commission under the Seventh Framework Programme.
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Published online 24 September 2010 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/eat.20823

more frequent current and premorbid obesity,[16,20] greater body dissatisfaction,[11] lower likelihood of a previous history of AN,[9,20] poorer overall physical health,[26] less eating disorder symptomatology,[24,27] differential cognitions and behaviors associated with binge eating,[28,29] later age of onset[12] and better prognosis.[18,24]

Although differences between the purging subtype of BN and BED are identified by the absence of compensatory behaviors,[20] the boundary between the nonpurging subtype of BN and BED is much less clear.[9,21] Ramacciotti et al.,[21] in a cross-sectional clinical study with limited sample size, suggest that the differences between BED and BN-NP seem to be more of degree than of type, with patients showing similar psychopathological and eating profiles and comparable levels of social and occupational maladjustment secondary to the eating disturbance. Accordingly, Hay and Fairburn,[24] in a longitudinal two stage design general population study, also found no significant differences between individuals with BN-NP and those with BED on general psychopathology (obtained by personal interviews), social adjustment, or self-esteem. They suggested that bulimic eating disorders may exist on a continuum of severity, with the BN purging representing the most extreme form, BED the least severe form, and BN nonpurging resting intermediate between the two. However, neither of these studies considered other relevant personality traits or psychopathology variables (assessed with standardized procedures).

Psychopathological Factors and Comorbidity

No consensus exists in the literature comparing BED and BN on general psychopathological indices. While some studies found no significant differences between comorbidity profiles of individuals with BN and BED,[12] others report greater comorbidity and general psychopathological burden in BN.[14,19,30,31] Van Hanswijck et al.,[14] suggest that personality disorder difficulties are present in patients who binge eat, while obese patients who do not binge eat display significantly less personality disorder pathology. In general, studies that have examined personality disorders in BED suggest that avoidant, obsessive-compulsive, and borderline personality disorders are the most common.[14,23,32,33]

In general, BED patients display high self-criticism, low self-esteem, depressive symptoms, and over-evaluation of shape and weight.[34–36] The relation between self-criticism and over-evaluation of shape and weight may be partly mediated or explained by low self-esteem and depressive symptoms.[34]

Personality Traits

Although a considerable literature exists examining personality traits in eating disorders,[3,37–39] little has been done comparing personality traits in BED versus BN. Pratt et al.[36] compared perfectionism in individuals with BN, BED, and obesity. All three groups demonstrated similar levels of both socially prescribed and other-oriented perfectionism. Individuals in the BN and BED groups scored significantly higher on these measures than participants in the obese group.

Biological Variables

A body of literature has arisen to explore genetic factors in eating disorders.[4,40,41] Bulik et al. reported the heritability of binge eating to be 50 and 60% for general BN, while the remaining variance was explained by individual specific environmental factors. Shared environmental factors did not contribute to liability to binge eating,[42] whereas nonshared environment may be more relevant.[43] In a subsequent study, focused on obesity and binge eating, they found that there was a substantial contribution of additive genetic effects to both obesity and binge eating and they further revealed a modest overlap of genetic factors that contribute to each of these two traits.[44]

Despite a number of sporadic studies, no consistent body of literature has emerged to identify commonalities and differences between BED and BN across clinical, comorbidity, and personality domains. Hence, little evidence exists to assist with evaluating the validity of the current nosological differentiation across these three diagnostic categories (BED vs. BN-P vs. BN-NP).

Aims of the Study

The goals of this study were threefold: (1) to investigate whether individuals with BED or BN subtype (purging and nonpurging) differed significantly on sociodemographic, clinical, and psychopathological variables; (2) to compare personality traits of females with BED, BN-P, and BN-NP.

Based on previous reports,[21,45] we hypothesized that individuals with nonpurging forms of these eating disorders (i.e., BED and nonpurging BN) would exhibit similar personality traits and psychopathology, while individuals with purging profiles

(i.e., BN-P) would be distinct and evidence greater psychopathology.

Method

Participants

The participants were 102 female eating disorders patients (34 BED, 34 BN-P, and 34 BN-NP) with a mean age of 28.2 years (SD = 9.4). BED and BN-NP groups consisted of patients consecutively admitted to our Department of Psychiatry, Eating Disorders unit. This adult unit is specialized in outpatient and inpatient treatment for eating disorders, in Barcelona (Spain). The BN-P group was randomly selected from the pool of BN-P patients attending our unit. To obtain equal sample sizes, given that the number of BN-P patients attending our unit is much higher than the number of patients with BED or BN-NP diagnoses, we randomly selected 34 BN-P cases, by using a SPSS computerized procedure, from a larger pool of 418 BN-P cases attended consecutively during this period of time. BN-NP patients had no history of purging behaviors.

All patients were diagnosed according to DSM-IV criteria,[46] conducted by trained psychologists and psychiatrists. The majority of the patients were single (70.3%) and reported primary education (up to 8 years) (41.6%) and secondary education (up to 12 years) studies (46.5%). 83.8% were employed. Entry into the study occurred between December 2002 and December 2006. We obtained written informed consent from all participants and the study was approved by the Ethics Committee of our hospital.

For the present analysis, we excluded the following cases: (a) males (N = 29), as the number of males with these diagnoses was too small for meaningful comparison (24 BN-P; 1 BN-NP, and 4 BED); and (b) BED patients who had fulfilled criteria for BN in the past or who presented any subthreshold BN symptoms (e.g., irregular vomiting) (n = 7; 17.1%). BED patients with previous BN were excluded in order to obtain a more homogeneous group, and discard any possible confounding influence of previous BN in the results. No patients refused to participate.

Assessment

We developed a comprehensive battery of assessments to quantify eating disorder symptoms, general psychopathology, and personality. The battery included the Eating Attitudes Test (EAT-40),[47] the Eating Disorders Inventory-2 (EDI-2),[48] the Bulimic Investigatory Test Edinburgh (BITE),[49] the Symptom Checklist-Revised-90- Revised (SCL90-R),[50] and the Temperament and Character Inventory-Revised (TCI-R).[51] Additional demographic information including education, occupation and living arrangements was obtained via semi-structured interviews, and also current body weight.

Eating Attitudes Test

This questionnaire contains 40 items,[47] including symptoms and behaviors common to eating disordered patients and provides an index of the severity of the disorder. Scores on this questionnaire range from 0 to 120. The higher the scores, the more disturbed the eating behavior. This questionnaire was adapted to the Spanish population showing high internal consistency (Cronbach's alpha coefficient = 0.93).[52]

Eating Disorders Inventory 2

This is a reliable and valid 91-item multidimensional self-report questionnaire[53] that assesses different cognitive and behavioral characteristics, which are typical for eating disorders. The EDI-2 retains the 64 items (grouped into eight scales: Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, Maturity Fears) of the EDI and adds 27 new items into three provisional scales: Asceticism, Impulse Regulation, and Social Insecurity. All of these scales are answered on a 6-point Likert scale, and provide standardized subscale scores. This instrument was validated in a Spanish population[48] with a mean internal consistency of 0.63 (coefficient alpha).

The Bulimic Investigatory Test Edinburgh

This questionnaire[49] contains 33 items that measure the presence and the severity of bulimic symptoms. There are two subscales: the symptomatology scale (30 items), that determines the seriousness of the symptoms, and the severity scale (three items) that offers a severity index. The cut-off point for the symptomatology scale scores for the present study were as follows; $\leq$10 = no symptomatology; 10–20 subclinical symptoms and $\geq$20 clinical symptoms. The higher the scores, the greater the severity. This questionnaire has been found to have a high internal consistency (Cronbach's alpha coefficient range: 0.96) and has been adapted to the Spanish population.[54]

Symptom Checklist-Revised

To evaluate a broad range of psychological problems and symptoms of psychopathology,[50] the SCL-90-R was employed. This test contains 90 items and helps to measure nine primary symptom dimensions, which are: Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. In addition, it includes three global indices, which are a global severity index (GSI), designed to measure overall psychological distress;

a positive symptom distress index (PSDI), designed to measure the intensity of symptoms as well as a positive symptom total (PST), which are reports of self-reported symptoms. The Global Severity Index can be used as a summary of the test. This scale has been validated in a Spanish population[55] obtaining a mean internal consistency of 0.75 (Coefficient alpha).

Temperament and Character Inventory-Revised

The TCI-R[56] is a 240-item, five point Likert scale, reliable and valid questionnaire that measures, as in the original TCI version,[57] seven dimensions of personality: four temperament (Harm Avoidance, Novelty Seeking, Reward Dependence and Persistence) and three character dimensions (Self-Directedness, Cooperativeness, and Self-Transcendence). The performance of the Spanish version of the original questionnaire[58] and the revised version have been documented. The scales in the latter showed an internal consistency (coefficient alpha) of 0.87.

Procedures

Experienced psychologists and psychiatrists, with masters or doctoral degrees in a mental health discipline, completed the anamnesis during two structured face to face interviews. The participants were assessed by means of structured face-to-face clinical interviews modeled after the Structured Clinical Interview for DSM-IV, SCID-I[59] covering lifetime presence of impulsive behaviors (namely alcohol and drug abuse, comorbid, impulse control disorder and suicide attempts), as well as additional information regarding family history of obesity [defined as positive when a subject recalled having a first-degree relative (mother or father) who had ever been diagnosed with obesity by a physician].[60] Both interview sessions last ~30 min. The first session established the specific eating disorder diagnosis and related clinical questions (age of onset, duration, course of the disorder, minimum and maximum body mass index [BMI: weight (Kg)/height^2 (m^2)] ever achieved). Weight and height were directly measured by the interviewer during this session to calculate BMI. The second session addressed additional questions about psychopathology and family history of obesity. The above mentioned battery of tests is administered in our unit just after the second interview session and lasts ~60 min.

Statistical Analyses

All the analyses were conducted with SPSS v15. Comparison of sociodemographic, clinical, and personality features among groups was conducted with ANOVA procedures and post-hoc comparisons for quantitative variables (Scheffé). Categorical variables were compared with chi-square tests or Fisher exact test as appropriate, adjusted for age.

We conducted an associative analysis in order to determine which variables were most strongly associated with each diagnosis. Bivariate comparisons between group and clinical and personality variables were first applied to select those variables that would enter the regression analysis. Thus, age of onset of the eating disorder, EAT-40 score, EDI-2 Impulsivity subscale, BITE Severity, suicidal ideation, family history of obesity, lifetime obesity, and the SCL-90-R General Severity Index (GSI), were all entered in the regression model as independent variables, while group (BED, BN-P, BN-NP) was the dependent variable. We applied multinomial logistic regression models (BACKWARD procedure) by using BED as the reference group. To measure the differences between BN-P and BN-NP patients, binary logistic regression analyses were also performed. To correct for multiple comparisons, an alpha level of 0.01 was established.

Results

Sociodemographic Variables

The comparison of the sociodemographic characteristics across all three groups revealed statistically significant differences in age ($F = 15.2$; df = 2; $p < 0.0005$) and marital status ($chi^2 = 16.7$; df = 4; $p = 0.002$). BED patients were significantly older (mean = 34.5; SD = 9.0) than the other two groups (BN-NP: mean = 25.8, SD = 9.5; BN-P: mean = 24.2, SD = 6.0/Scheffe post-hoc comparison: $p <$ .0005 for both BN-P and BN-NP) and were more frequently married (50.0% versus 17.6% BN-NP patients and 9.1% BN-P patients).

Clinical Variables

Table 1 presents descriptive parameters and results of the comparison of clinical variables across the three groups.

ANOVA comparisons yielded significant group differences on age of onset of the eating disorder (later for BED patients), current BMI (higher in BED patients), maximum and minimum BMI ever achieved (higher in BED patients), presence of current and lifetime obesity and presence of family history of obesity (all higher in BED patients). The observed difference in age of onset was not significant after adjustment for age.

Psychometric Tests

Table 2 presents means, standard deviations, and results of ANOVA analyses comparing psychometric variables across groups. In general, BN-P patients reported the most pathological scores on all tests, followed by BN-NP patients, with BED

TABLE 1. Comparison of clinical features among groups (ANOVA and χ^2)

	BED ($N = 34$) Mean (SD)	BN-NP ($N = 34$) Mean (SD)	BN-P ($N = 34$) Mean (SD)	F; df	Significance
Age of onset	27.4 (10.9)[a,b]	19.7 (8.9)	17.6 (4.7)	12.0; 2	<0.001
Duration of ED	6.9 (4.9)	6.1 (5.1)	6.7 (5.0)	0.2; 2	0.803
Weekly bingeing	6.7 (4.2)	7.6 (6.3)	7.7 (5.8)	0.3; 2	0.752
Current BMI	36.2 (4.9)[a,b]	26.5; 5.6	23.9; 6.0	45.1; 2	<0.001
Maximum BMI	37.7 (5.6)[a,b]	28.5; 5.6	27.2; 5.8	33.7; 2	<0.001
Minimum BMI	24.4 (4.0)[a,b]	19.9; 2.6	18.9; 3.1	25.5; 2	<0.001
	BED ($N = 34$) %	BN-NP ($N = 34$) %	BN-P ($N = 34$) %	Chi[b]; df	Significance
Impulsive behaviors	67.6%	66.7%	79.4%	1.7; 2	0.436
Substance abuse	15.2%	24.2%	29.4%	2.0; 2	0.374
Alcohol abuse	5.9%	12.1%	17.6%	2.3; 2	0.325
Current obesity[c]	90.9[1,2]	18.8	9.4	54.1; 2	<0.001
Lifetime obesity[c]	93.9[1,2]	32.3	24.2	38.1; 2	<0.001
Fam.Hist.[d] Obesity	54.5[1]	17.6	29.4	10.6; 2	0.005

BED, binge eating disorder; BN-NP, nonpurging bulimia nervosa; BN-P, purging bulimia nervosa; ED, eating disorder; BMI, body mass index [weight (kg)/ height^2 (m^2)].

[a] Statistically significant in comparison to BN-NP.

[b] Statistically significant in comparison to BN-P.

[c] Obesity defined as BMI >= 30.

[d] Family history.

patients showing the least pathological scores. These differences were statistically significant at $p < .01$ level on the EAT-40 total score, EDI-2 Impulsivity subscale, BITE Severity score, and SCL-90-R Paranoid Ideation and Psychoticism subscales. After adjusting for age, the difference on SCL-90-R Psychoticism subscale was no longer significant.

No statistically significant differences on personality traits (as measured by the TCI-R) were observed across groups.

Associative Analysis

The results of multinomial analyses measuring which combination of clinical variables was associated with clinical diagnosis (BN-P vs. BN-NP vs. BED) are presented in **Table 3**.

BITE severity scores and lifetime obesity were significantly associated with group membership. Thus, the presence of lifetime obesity was associated with a diagnosis of BED, while greater severity of bulimic symptoms (as measured by the BITE) was associated most strongly with BN-P and also with BN-NP diagnoses. The final model explained 56.8% of variability in group membership and was statistically significant (chi^2 = 56.96; df = 4; $p < .0005$). Binary logistic regression analyses comparing BN-P and BN-NP patients (BACKWARD -Likelihood ratio procedure) indicated that higher BITE Severity (OR = 1.187; 95% CI = 1.060–1.328; $p = .003$) and, at a trend level, presence of suicidal ideation (OR = 3.774; 95%CI = 1.094–13.014; $p = .035$) were associated with a BN-P diagnosis in relation to BN-NP. This model was statistically significant (chi^2 = 23.39; df = 3; $p < .0005$) and explained 40.8% (Nagelkerke R^2 = 0.408) of the variability in diagnosis (other variables were automatically selected for the final model but they did not reach statistical significance).

Discussion

We examined clinical, psychopathological and personality differences in three groups of patients with eating disorders (ED), namely BED, BN-P, and BN-NP, to determine the extent to which the three groups represent different diagnostic categories.

Sociodemographic and Clinical Features

As reported in previous studies[12] BED patients were the older than participants with both subtypes of BN. In agreement with previous studies,[16,20] and were significantly more likely to report a family history of obesity and lifetime obesity. Obesity was the one clinical dimension that clearly differentiated BED from both subtypes of BN. After excluding those individuals who developed BED after BN, which could possibly represent a subgroup of patients with residual symptomatology (where a

TABLE 2. Group differences on psychometric variables (SCL-90-R, EAT-40, EDI-2, BITE, TCI-R)

	BED (*N* = 34) (Mean; SD		BN-NP (*N* = 34) Mean; SD		BN-P (*N* = 34) Mean; SD		F; df	Signif.
EAT-40	34.1	10.6[a]	43.2	18.0	52.2	19.6	9.3; 2	<0.001
EDI-2								
Drive for thinness	12.5	4.6	14.4	4.4	14.6	5.8	1.7; 2	0.190
Body dissatisfaction	21.4	5.7	19.8	5.8	18.1	7.7	2.1; 2	0.127
Interoceptive awareness	10.5	6.6	11.2	6.1	12.1	5.9	0.5; 2	0.611
Bulimia	9.2	4.2	10.3	4.6	9.9	5.4	0.4; 2	0.648
Interpersonal distrust	5.2	4.1	5.4	4.3	5.1	4.3	0.0; 2	0.955
Inefficacy	10.1	6.4	10.5	6.1	11.5	6.7	0.5; 2	0.637
Maturation fears	6.1	4.3	7.9	5.0	8.0	4.9	1.6; 2	0.207
Perfectionism	4.4	3.7	4.6	4.0	6.5	3.7	3.0; 2	0.055
Impulsivity	4.4	3.4[a]	7.0	6.1	9.5	6.1	7.1; 2	0.001
Asceticism	6.5	3.1	7.7	3.8	8.0	4.3	1.3; 2	0.285
Social insecurity	6.7	4.3	7.0	5.1	8.2	4.3	0.9; 2	0.431
EDI-2 total	97.1	32.2	105.4	34.0	111.4	34.7	1.4; 2	0.241
BITE								
Symptoms	23.1	4.3	25.1	2.5	24.0	4.3	2.5; 2	0.085
Severity	7.3	3.4[a]	9.5	5.3	15.4	6.3	21.8; 2	<0.001
SCL-90-R								
Somatization	1.9	0.9	1.5	1.1	1.9	0.9	1.4; 2	0.251
Obsessive-compulsive	1.8	0.9	1.8	0.9	2.1	0.8	1.4; 2	0.244
Interpersonal sensitivity	1.8	1.0	1.9	0.9	2.3	0.8	3.1; 2	0.050
Depression	2.2	1.0	2.0	0.9	2.5	0.8	3.4; 2	0.038
Anxiety	1.5	0.8	1.5	0.8	1.9	0.8	3.9; 2	0.023
Hostility	1.2	0.9	1.4	0.9	1.7	0.9	3.5; 2	0.034
Phobic anxiety	0.7	0.7	1.0	0.8	1.3	0.9	3.5; 2	0.035
Paranoid ideation	1.1	0.9[a]	1.3	0.9	1.7	0.8	4.9; 2	0.009
Psychoticism	1.0	0.7[a]	1.2	0.7	1.6	0.8	5.3; 2	0.006
GSI	1.6	0.7	1.6	0.7	2.0	0.6	4.0; 2	0.021
PST	59.0	19.7[a]	58.6	18.0	70.2	14.1	4.8; 2	0.010
PSDI	2.3	0.6	2.3	0.5	2.5	0.5	2.0; 2	0.136
TCI-R								
Novelty seeking	100.8	16.1	103.3	17.2	104.6	13.1	0.5; 2	0.586
Harm avoidance	118.7	16.8	115.0	22.1	120.1	21.3	0.6; 2	0.570
Reward dependence	107.3	16.5	106.3	12.8	105.3	15.0	0.1; 2	0.866
Persistence	103.9	18.4	101.4	19.0	111.0	20.8	2.2; 2	0.115
Self-directedness	121.6	23.6	115.3	23.4	110.9	13.8	2.3; 2	0.108
Cooperativeness	137.1	14.4	137.7	18.6	132.9	15.7	0.9; 2	0.426
Self-transcendence	64.7	15.3	64.6	16.6	68.9	12.7	0.9; 2	0.403

BED, binge eating disorder; BN-NP, nonpurging bulimia nervosa; BN-P, purging bulimia nervosa; EAT-40, eating attitudes test; EDI, eating disorders inventory; BITE, bulimic investigatory test Edinburgh; SCL90-R, symptom checklist- revised; TCI-R, clonninger temperament and character inventory-revised.
[a] Statistically significant in comparison to BN-P.

TABLE 3. Results of multinomial logistic regression analyses (BACKWARD procedure, final step) measuring the contribution of clinical variables to diagnosis (BN-P, BN-NP, BED)

	BN-NP vs. BED			BN-P vs. BED		
	OR	95%CI	Significance	OR	95%CI	Significance
Lifetime obesity	0.032	0.005–0.187	<0.0005	0.016	0.002 to 0.121	<0.0005
BITE severity	1.201	1.014–1.422	0.034	1.417	1.179 to 1.702	<0.0005

Nagelkerke $R^2 = 0.568$. BED, binge eating disorder; BN-NP, nonpurging bulimia nervosa; BN-P, purging bulimia nervosa; BITE, bulimic investigatory test Edinburgh.

combination of subthreshold BN symptoms might be present),[61] rather than a distinct psychiatric syndrome, the greater personal and family history of obesity is remarkable. A bivariate twin study,[44] identified a modest genetic correlation of +.34 (95%CI = 0.19–0.50) between the obesity and binge eating. These results suggest a qualitative difference between BED and BN subtypes on the dimension of obesity.

Psychopathology and Personality Traits

In terms of psychometric results, BN-P patients showed the highest scores on all clinical and psy-

chopathological tests, followed by BN-NP patients and, finally, BED patients, who reported the least pathological profile. Specifically, BN-P patients showed the highest scores on Paranoid Ideation, Impulsivity (EDI-2), severity of bulimic psychopathology, and general eating symptomatology, as measured by the EAT mean score. This confirms previous reports,[11,24,27] in which BN-purging subtype was associated with higher impulsivity and some psychopathological traits. Unlike the findings for obesity, the observed results on psychometric indices suggest more of a continuum of clinical severity across the three diagnostic groups rather than discrete differences, with BED patients on the least severe end and BN-P patients on the most severe.

In the personality domain, no differences were found across groups. These results are intriguing and suggest that none of our measured personality dimensions was able to distinguish among these three diagnostic groups. Personality might represent a shared vulnerability factor for these eating disorders but not play a role in the emergence of differential symptom expression across these three subtypes.

Associative Analysis

The associative analysis yielded few clinical differences across groups. BN-P and BN-NP patients distinguished themselves from BED patients with more severe bulimic symptoms and a lower risk of lifetime obesity, as expected. Therefore, severity of the eating disorder and obesity were the main differential factors between the diagnoses of BED, on the one hand, and BN, on the other.[11,17,62] The only differences between the two BN subtypes were the severity of clinical symptoms (higher in the purging type).

Limitations

Limitations of this study include the relatively small sample size for the subtype comparisons, and the assessment procedures did not allow us to evaluate either specific psychopathological symptoms or comorbid disorders more broadly (namely affective and anxiety disorders). Additional assessments might have been useful for a more comprehensive characterization of eating disorder symptomatology (e.g., the Eating Disorders Examination). Furthermore, the evaluation of nosological accuracy of these three diagnostic categories could be enhanced with the inclusion of biological and genetic indices in adequately powered studies. Our measure of family history of obesity was also imprecise as many individuals may not be aware of discussions between their family members and their physicians-thus leading to an underestimate of the frequency with which family members suffered from obesity. Finally, the use of two different recruitment methods (consecutive admissions for BED patients and randomized selection of BN patients) may have introduced a sampling bias.

Conclusion

Our measurement of three dimensions—sociodemographics, clinical presentation, and personality—allowed us to build a comprehensive picture of commonalities and differences across these three diagnostic subgroups.

Overall, it appears that there are no differences in personality traits across these three disorders. This could suggest an underlying shared personality style that indexes vulnerability to any eating disorder characterized by binge eating. The dimensions of clinical severity suggest dimensional differences across the three diagnosis with BN-P representing the most severe and BED the least severe. The sole but important difference that emerged was on obesity and related family history of obesity. Obesity is much more strongly associated with BED than with either form of BN. Furthermore, since our results point to the similarities and differences across those eating disorders, future studies should explore their response to treatment, and underlying biological indices, allowing enhanced tailoring of interventions (both behavioral and pharmacological).

CIBER Fisiopatología de la Obesidad y Nutrición (CIBERobn) is an initiative of ISCIII. This work is part of the dissertation of A. Nuñez-Navarro at the Department of Clinical Sciences, School of Medicine, University of Barcelona.

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3.3. New Technologies for the treatment of BN symptomatology

3.3.1. Study 4: Nuevas tecnologías en el tratamiento de los trastornos de la alimentación

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Journal: Cuadernos de Medicina Psicosomática y Psiquiatría de enlace 2007, 82, 7-16

English abstract:

Summary

The increasing incidence of eating disorders has yield much research on the efficacy of treatments, both psychological and pharmacological. With respect to psychological treatments, the difficulties derived from the geographical distance between patient and centre of treatment or either from job timetables, have lead to the emergence of a new type of intervention through the use of new technologies. These interventions are generally addressed to less severe cases or either to relapse prevention and can be used alone or additionally to standard treatments. Such therapeutic alternative includes telemedicine, CD-ROM, Internet, virtual reality, PALM, e-mail and SMS. The scarce number of studies focused on the efficacy of these interventions have yield promising results to date, but more research is needed.

Spanish abstract:

Resumen

El aumento en la incidencia de los trastornos de la conducta alimentaria ha dado como resultado la realización de varios estudios dirigidos a evaluar la eficacia de los diferentes tratamientos, tanto psicológicos como farmacológicos. En cuanto a los tratamientos psicológicos, los problemas de accesibilidad derivados de la distancia geográfica entre el lugar de residencia del paciente y el centro de tratamiento, así como de los horarios laborales, han conllevado la aparición de un tipo de intervenciones distintas a través del uso de nuevas tecnologías. Estas intervenciones, generalmente destinadas a los casos menos graves o a la prevención de recaídas, pueden ser utilizadas como único procedimiento o bien de manera adicional a los tratamientos estándar. Dicha opción terapéutica incluye la telemedicina, el CD-ROM, Internet, realidad virtual, PALM, e-mail y SMS. Hasta el momento, el escaso número de estudios entorno a la eficacia de estas intervenciones ha informado de resultados prometedores, pero es necesaria más investigación al respecto.

Catalan abstract:

Resum
L'augment de la incidència dels trastorns de la conducta alimentària ha donat com a resultat la realització de diversos estudis dirigits a avaluar l'eficàcia dels diferents tractaments, tant psicològics com a farmacològics. Respecte als tractaments psicològics, els problemes d'accessibilitat derivats de la distància geogràfica entre el lloc de residència del pacient i el centre de tractament, així com dels horaris laborals, ha comportat l'aparició d'un tipus d'intervencions diferents a través de l'ús de les noves tecnologies. Aquestes intervencions, generalment destinades als casos menys greus o a la prevenció de recaigudes, poden ser utilitzades com a únic procediment o bé de manera addicional als tractaments estàndard. Aquesta opció terapèutica inclou la telemedicina, el CD-ROM, Internet, realitat virtual, PALM, e-mail i SMS. Fins al moment, l'escàs nombre d'estudis entorn de l'eficàcia d'aquestes intervencions ha informat de resultats prometedors, però és necessària una investigació més àmplia sobre aquest tema.

ARTÍCULO

CUADERNOS DE
MEDICINA PSICOSOMÁTICA Y PSIQUIATRÍA DE ENLACE

Nuevas tecnologías en el tratamiento de los trastornos de la alimentación

New technologies in the treatment of eating disorders

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Resumen

El aumento en la incidencia de los trastornos de la conducta alimentaria ha dado como resultado la realización de varios estudios dirigidos a evaluar la eficacia de los diferentes tratamientos, tanto psicológicos como farmacológicos. En cuanto a los tratamientos psicológicos, los problemas de accesibilidad derivados de la distancia geográfica entre el lugar de residencia del paciente y el centro de tratamiento, así como de los horarios laborales, han conllevado la aparición de un tipo de intervenciones distintas a través del uso de nuevas tecnologías. Estas intervenciones, generalmente destinadas a los casos menos graves o a la prevención de recaídas, pueden ser utilizadas como único procedimiento o bien de manera adicional a los tratamientos estándar. Dicha opción terapéutica incluye la telemedicina, el CD-ROM, Internet, realidad virtual, PALM, e-mail y SMS. Hasta el momento, el escaso número de estudios entorno a la eficacia de estas intervenciones ha informado de resultados prometedores, pero es necesaria más investigación al respecto.

Palabras clave: Bulimia nerviosa. Trastornos de la alimentación. Nuevas tecnologías. Tratamiento.

Summary

The increasing incidence of eating disorders has yield much research on the efficacy of treatments, both psychological and pharmacological. With respect to psychological treatments, the difficulties derived from the geographical distance between patient and center of treatment or either from job timetables, have lead to the emergence of a new type of intervention through the use of new technologies. These interventions are generally addressed to less severe cases or either

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to relapse prevention and can be used alone or additionally to standard treatments. Such therapeutic alternative includes telemedicine, CD-ROM, Internet, virtual reality, PALM, e-mail and SMS. The scarce number of studies focused on the efficacy of these interventions have yield promising results to date, but more research is needed.

Key words: Bulimia nervosa. Eating disorders. New technologies. Treatment.

INTRODUCCIÓN

El incremento en la incidencia de trastornos de la conducta alimentaria (TCA) durante las últimas décadas ha conllevado asimismo el aumento de estudios entorno a la eficacia de diferentes modalidades de tratamiento.

En el caso de la anorexia nerviosa, los estudios que comparan la eficacia de distintos abordajes terapéuticos son escasos y se centran en pacientes adolescentes. Los modelos teóricos que se han aplicado más frecuentemente en anorexia nerviosa son: la psicoterapia psicoanalítica breve, la terapia familiar, el tratamiento psicoeducativo-conductual y la terapia cognitivo-conductual.

En cualquier caso, para determinar qué marco sería el más adecuado para tratar a estos pacientes, se aconseja seguir un árbol de decisión (Figura 1) –ver Fernández-Aranda, 2003–.

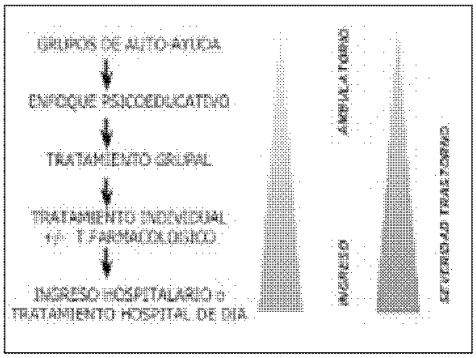
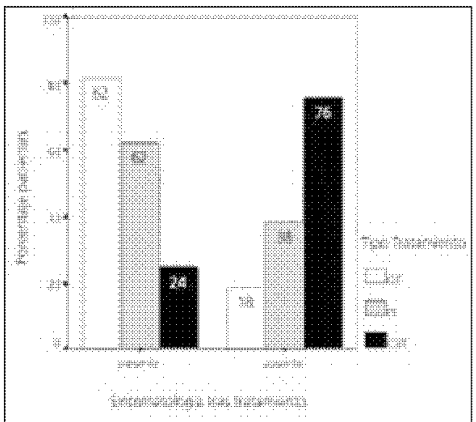


Figura 1
Estrategias terapéuticas recomendadas en TCA

En trastornos de la alimentación, se han descrito procedimientos de autoayuda basados en nuevas tecnologías (Internet y CD-ROM), terapia grupal breve psicoeducativa, tratamiento grupal, tratamiento individual, combinación de ingreso-corto y terapia grupal (Fernández-Aranda, y cols. 2004), así como tratamientos exclusivamente de ingreso hospitalario (Gowers, Weetman, Shore, Hossain, y Elvins, 2000).

En cuanto a la bulimia nerviosa, los cuatro modelos que hasta el momento han sido mayoritariamente aplicados son los siguientes: a) nutricional-psicoeducativo, b) terapia interpersonal, c) exposición con prevención de respuesta y d) tratamiento cognitivo-conductual.

Estudios controlados de tratamiento para este trastorno han demostrado que el tratamiento cognitivo-conductual resulta más eficaz a medio-largo plazo que la terapia dinámica, terapias puramente conductuales o tratamiento farmacológico. En este sentido, se han observado resultados positivos en un 70-80% de los pacientes, los cuales se han mantenido en seguimientos a 5-10 años en el 50-69% de los casos (Fernández, et al., 2004) (ver Figura 3).



Nota: Eficacia con base en puntuaciones del cuestionario BITE (puntuación de corte 20); GC=grupo control; PE=grupo psicoeducativo, CBT= grupo cognitivo-conductual.

Figura 2
Eficacia del tratamiento grupal en Bulimia Nerviosa (GC –N=40– vs. PE –N=50– vs. CBT –N=50–

Aunque la terapia cognitivo-conductual se ha mostrado como el tratamiento más eficaz para abordar la bulimia nerviosa (Fairburn y cols., 1995), las dificultades que en ocasiones existen a la hora de trasladarse al centro de tratamiento (por situación geográfica, motivos laborales, etc.) han llevado a investigar la eficacia de otras opciones terapéuticas como los tratamientos de autoayuda. En otros trastornos psiquiátricos, tales como la agorafobia y la depresión mayor, intervenciones mínimas mediante libros, programas basados en Internet, CD-ROM y cintas de vídeo se han mostrado tan efectivas como el tratamiento convencional (Gosh y Marks, 1987), manteniéndose estos resultados a dos años de seguimiento (Scogin, Jamison y Davis, 1990).

En los TCA y, específicamente, en bulimia nerviosa, cada vez hay mayor evidencia de que los procedimientos de autoayuda, sea cual sea su formato (grupal, papel, Internet o CD-ROM), son efectivos para reducir la sintomatología alimentaria (Agras y cols., 2000; Birchall y Palmer, 2002; Loeb y cols., 1999) (ver Tablas 1 y 2). En la actualidad, tanto para los procedimientos de autoayuda como para los procedimientos clásicos, se han utilizado herramientas basadas en nuevas tecnologías (Myers y cols., 2004) tales como: telemedicina, CD-ROM, Internet, realidad virtual, PALM, e-mail y mensajes SMS. De forma paralela a la aparición y aplicación de estos procedimientos, han comenzado a publicarse cada vez más estudios que se centran en sus ventajas (Budman, 2000), desventajas (Anthony, 2000; Baur, 2000) y aspectos ético-legales (Bloom, 1998; Manhal-Baugus, 2001).

A continuación, pasaremos a describir algunas de estas herramientas para el tratamiento de los TCA, en especial de la bulimia nerviosa.

TELEMEDICINA

La telemedicina surgió con el objetivo de ampliar la accesibilidad a los servicios y programas de tratamiento, especialmente en zonas rurales alejadas de centros urbanos. La primera descripción del uso de telemedicina en psiquiatría corresponde a Wittson y Benschoter (1972), en la Universidad de Nebraska. Posteriormente, se ha utilizado en distintos trastornos, tales como el trastorno obsesivo-compulsivo (Baer y cols, 1995), la esquizofrenia

Tabla 1
Resumen de los resultados principales obtenidos mediante el uso de manuales de autoayuda con y/o sin supervisión

AUTORES	AÑO	N	RESULTADOS
Ghaderi, A. y cols.	2003	31	-Reducción de los atracones: 33%
			Reducción de la conducta purgativa: 25% - 28%
			Índice de abandonos: 42%
Carter, J. y cols	2003	85	Índice de abandonos: 23,5%
			El 53,6% redujeron al menos el 50% de la sintomatología
Mitchell, J. y cols	2001	91	Fluoxetina + Manual de autoayuda > Fluoxetina sola
Vincent, N. y cols.	1999	6	Índice de remisión completa: 16,6%
Cooper, P. y cols.	1996	82	Reducción de los atracones: 80%
			Reducción de los vómitos: 79%
			Remisión completa tras seguimiento: 32,8%
			Índice de abandonos: 18,3%
Treasure, J. y cols	1996	110	Índice de abandonos: 16% (manual) 27% (TCC)
			Remisión completa en ambos grupos: 30%.
Cooper, P. y cols	1994	18	Índice de remisión: 50%
Schmidt, U. y cols.	1993	26	Reducción de los atracones: 57%

Tabla 2
Resumen de los resultados principales obtenidos mediante el uso de programas de autoayuda (PAA)

AUTORES	AÑO	N	RESULTADOS
PAA			
Rathner, G. y cols.	1993	19	- Tras 15 meses, el 50% de la muestra ya no cumplía criterios DSM-III-R de BN
Jones, A.	1992	77	- Índice de mejora: 20%
PAA + TCC quincenal			
Thiels, C. y cols.	1998	62	- 70% no habían tenido atracones la semana antes del seguimiento
Thiels, C. y cols.	2001	62	- Índice de abandonos: 29,3%
			- Las pacientes que hicieron más de dos ejercicios mejoraron más que las que hicieron menos de dos ejercicios
Thiels, C. y cols.	2000	62	- Predictor de mejoría: menor frecuencia de atracones
PAA en CD-Rom			
Murray, K. y cols.	2003	81	- El 74% de pacientes aceptaron el tratamiento a través de un CD-ROM

(Zarate, 1997) y la agorafobia (Bouchard y cols., 2004). Sin embargo, son escasos los estudios que analizan su eficacia en detenimiento. A modo de ejemplo, en un estudio que analizó su eficacia en la evaluación psiquiátrica de adolescentes, se encontraron resultados similares a los obtenidos mediante entrevistas cara a cara (Myers y cols., 2004).

En el caso de los TCA, el grupo que más ha aplicado e investigado la eficacia de procedimiento de telemedicina ha sido el de Bakke y colaboradores (2001), en Dakota del Norte. Este procedimiento consiste en comunicar a terapeutas y pacientes (separados por grandes distancias geográficas) a través de monitores de alta resolución y vídeo-cámaras, en tiempo real, con conexiones seguras y de alta velocidad. Esta técnica les permite realizar el tratamiento ambulatorio correspondiente sin tener que acudir al centro especializado, y debiendo tan solo desplazarse al pueblo más cercano que posea esta tecnología. Ello les permite acceder a una opción de tratamiento que de otra forma sería inaccesible. Los resultados obtenidos con este procedimiento en bulimia nerviosa, en un total de 61 pacientes a lo largo de 20 sesiones (16 semanas), fueron similares a los obtenidos en un grupo de pacientes que habían sido tratados con un procedimiento cognitivo-conductual estándar cara a cara.

Este tipo de abordaje también ha resultado satisfactorio en otros lugares como Escocia (Simpson y cols., 2003), así como también para la realización de reuniones familiares con pacientes aquejados de anorexia nerviosa (Goldfield y cols., 2003).

CD-ROM

Una alternativa al uso de manuales de autoayuda para tratar la bulimia nerviosa es el uso de un programa de autoayuda a través de un CD-ROM, como el desarrollado por Williams y cols. (1998) en el Hospital Maudsley (Londres).

En un estudio de Murray y cols. (2003), se ofreció a los pacientes la posibilidad de realizar este tratamiento, consistente en ocho módulos (cada módulo dura de 30 a 45 minutos) que combinaban componentes de terapia cognitivo-conductual y motivacional. La recomendación era realizar de forma secuencial de 1 a 2 módulos por semana y acabar el programa de tratamiento en un período de 4 a 8 semanas. Un 74% de las pacientes a las que se les ofreció esta alternativa terapéutica aceptaron llevarla a cabo (el 26% restante no aceptaron, porque pensaban que esta opción terapéutica no sería útil en su caso). En la Tabla 2 se pueden observar los principales resul-

tados de diferentes estudios que han evaluado la utilidad de un CD-ROM de autoayuda para tratar la bulimia nerviosa.

INTERNET

Los programas de tratamiento basados en Internet han sido aplicados con éxito en diversos trastornos mentales como la depresión (Griffiths, Christensen, Jorm, Evans, y Groves, 2004), el abuso de alcohol (Saitz, Helmuth, Aromaa, Guard, Belanger, y Rosenbloom, 2004), los trastornos de ansiedad (Lange, van de Ven, Schrieken, y Emmelkamp, 2001) y la demencia (Glueckauf, Ketterson, Loomis, y Dages, 2004). En los TCA, si bien se ha publicado algún estudio prospectivo sobre programas de prevención basados en Internet dirigidos a estudiantes (Winzelberg, y cols., 2000), estos procedimientos han sido escasamente aplicados como opción terapéutica.

A nivel europeo, por primera vez, se han diseñado y aplicado procedimientos basados en Internet a través del programa multicéntrico SALUT en bulimia nerviosa. Esta guía de autoayuda, aplicada en diversos centros de 6 países europeos entre los que se encuentra nuestro grupo del Servicio de Psiquiatría del Hospital Universitario de Bellvitge, está basada en un manual desarrollado por el Hospital Universitario de Ginebra, que introduce conceptos psicoeducativos y de terapia cognitivo-conductual (Carrad, Rouget, Fernández-Aranda, Volkart, Damoiseau y Lam, 2006). Este programa se ha denominado Guía de Autoayuda (SHG) y está basado en 7 etapas (ver Figuras 3 y 4). Los objetivos principales de este abordaje terapéutico son: a) ofrecer información general sobre la bulimia nerviosa (qué es, a qué va asociada, qué consecuencias negativas presenta, cómo solucionar este trastorno y los problemas subyacentes...) y b) enseñar al paciente la importancia que posee para su curación su propia conducta y la adquisición de un rol activo.

Para poder pasar de una etapa a otra, el paciente tiene que realizar una serie de ejercicios y permanecer un determinado tiempo en esa etapa, con el objetivo de practicar en su vida cotidiana lo que ha aprendido. Al final de la etapa ha de contestar una serie de preguntas que, si son respon-

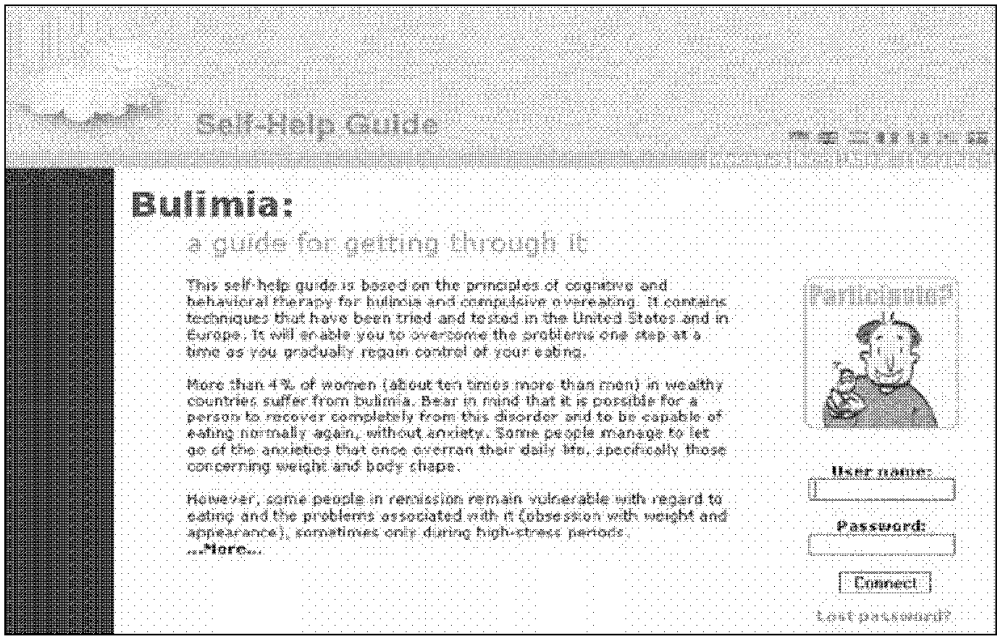


Figura 3

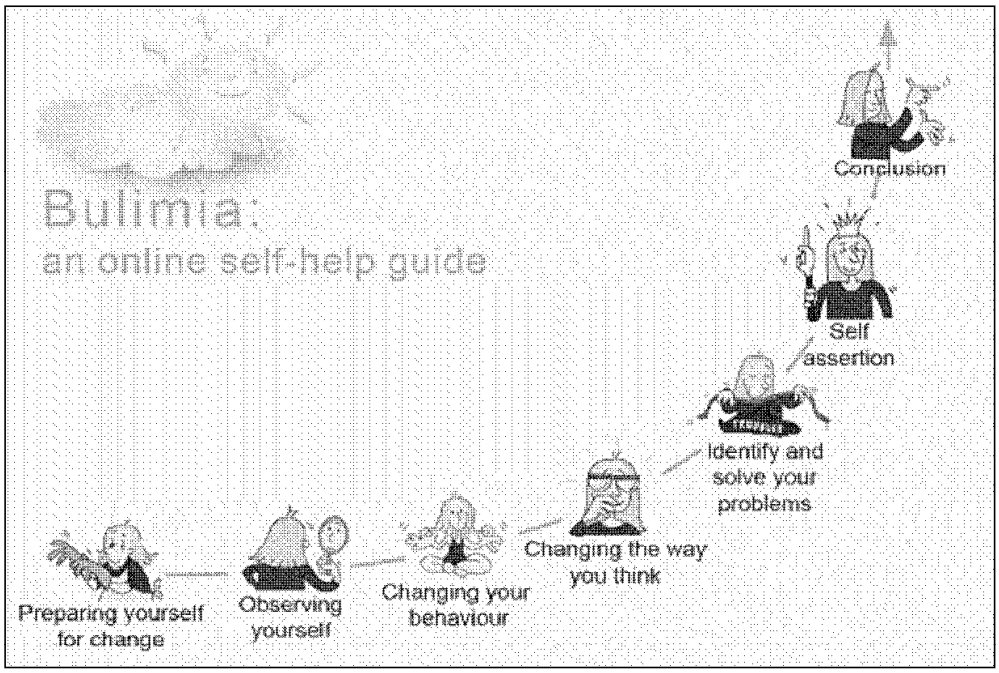


Figura 4

didas correctamente, le permiten avanzar hasta la etapa siguiente. Si no responde de forma adecuada, se le anima a que vuelva al inicio de la etapa y vuelva a leer el contenido de la misma. Paciente y terapeuta mantienen contactos regulares (semanales) a través de e-mail. La función del terapeuta consiste en supervisar y animar a que los pacientes realicen la SHG, responder a sus posibles dudas y solucionar posibles problemas técnicos, reforzarlos por los logros que vayan consiguiendo, revisar el diario alimentario para controlar la frecuencia de ingestas, atracones y conducta purgativa, supervisar la realización los ejercicios y dar feedback al respecto.

Este tipo de abordaje ya ha sido evaluado en distintos estudios piloto a nivel europeo (Rouget y cols., 2005) y su eficacia ha sido comparada con la obtenida en otros tratamientos (Fernández-Aranda, Núñez, Martínez, y Krug, 2005). En un estudio piloto de Fernández-Aranda y colaboradores se comparó la eficacia de tres modalidades de tratamiento en un grupo de pacientes con Bulimia nerviosa: tratamiento por Internet, grupo psicoeducativo ambulatorio y grupo control (lista de espera). Se observó que más de un 30% de pacientes estaban abstinentes de atracones y vómitos tras el tratamiento por Internet (ver Figura 4) y que estos resultados eran similares a los obtenidos en el grupo ambulatorio psicoeducativo.

REALIDAD VIRTUAL

La Realidad Virtual (RV) ya ha sido utilizada como aplicación terapéutica en diversos ámbitos, y con notable éxito en el campo de los trastornos de ansiedad (especialmente fobias) (p.ej., Botella, Baños, Villa, Perpiñá, y García-Palacios, 2000; Carlin, Hoffman, y Weghorst, 1997; Perpiñá, Alcañiz, Lozano, Osma, y Gallardo, 2002).

El trabajo precursor en el tratamiento de la imagen corporal en población no clínica mediante técnicas de RV fue llevado a cabo por Riva, Melis y Bolzoni (1997; The Virtual Body Project). Posteriormente, este mismo equipo (Riva, Bacchetta,

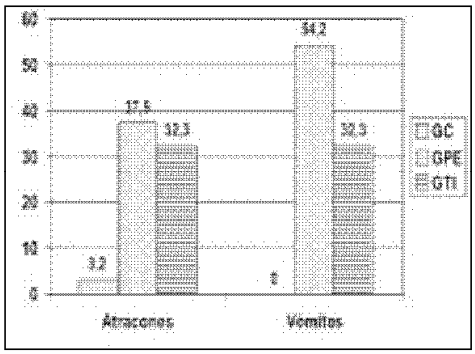


Figura 5
Grado de abstinencia tras tratamiento en Bulimia nerviosa (tratamiento basado en internet –GTI– vs. psicoeducativo grupal –GPE–) al compararlo con grupo control de lista de espera (GC)

Baruffi, Rinaldi y Molinari, 1998) comenzó a aplicar las técnicas de RV en pacientes con anorexia nerviosa. Estas técnicas permitían confrontar a pacientes con estímulos especialmente ansiógenos y difícilmente modificables, como la imagen corporal. La tecnología RV es capaz de representar una figura humana en 3D dentro de un sistema inmersivo, es decir, la persona siente «estar ahí» modelando su propio cuerpo y teniéndolo frente a frente. Además, el cuerpo puede evaluarse en su totalidad o por partes, puede situarse en diferentes contextos (p. ej., en la cocina, antes y después de comer, frente a una persona atractiva, etc.), se pueden realizar tests conductuales en esos contextos y se pueden combinar diferentes índices de discrepancia relacionados con el peso y la figura (Perpiñá, Botella y Baños, 2003).

La mayoría de estudios con esta técnica analizan la eficacia conjunta de procedimientos de RV incorporados en un programa estándar de tratamiento, tanto en anorexia y bulimia nerviosas (Perpiñá, Marco, Botella, y Baños, 2004), como en el trastorno por atracón y la obesidad (Riva y cols., 2000; Riva y cols., 2002). En todos ellos, los resultados obtenidos son satisfactorios incluso tras un seguimiento.

PALM

La tecnología PALM se ha utilizado como procedimiento adicional en programas estandarizados para pacientes con trastornos mentales, específicamente en trastornos de ansiedad (p.ej., Newman, Consoli, y Talyor, 1999). Sin embargo, hasta el momento, su aplicación en los TCA ha sido escasa (Norton, Wonderlich, Myers, Mitchell, y Crosby, 2003).

El uso de esta tecnología en bulimia nerviosa permite disminuir el número de contactos y/o sesiones ambulatorias de tratamiento e incrementar las habilidades y estrategias de afrontamiento del paciente en relación a situaciones desencadenantes de sintomatología bulímica.

El tratamiento mediante PALM incluye cuatro módulos (fases): Fase I) análisis de la motivación del paciente; Fase II) entrenamiento en estrategias cognitivo-conductuales para modificar hábitos alimentarios, pensamientos y creencias en torno al peso, alimentación y figura; Fase III) entrenamiento en reconocer y establecer mejores patrones relacionales; Fase IV) prevención de recaídas. El paciente puede identificar diversos iconos en la PALM que le permiten visualizar estas fases y entrar en el programa. Asimismo, puede personalizar toda una serie de informaciones, como por ejemplo un listado de estrategias alternativas ante problemas. Se realizan sesiones de control ambulatorias en el Centro Hospitalario cada 1-2 semanas.

E-MAIL

La utilización de técnicas de e-mail en trastornos mentales ha sido descrita en escasas ocasiones (p.ej., Rothchild, 1997; Stroem, Pettersson, & Andersson, 2000).

En TCA existen diversos estudios naturalistas que describen la eficacia de este procedimiento como estrategia adicional (Yager, 2001; Robinson y Serfaty, 2001). Las principales ventajas son las siguientes: a) aumenta la frecuencia de contacto entre paciente y terapeuta; b) mejora la alianza terapéutica; c) favorece mayor accesibilidad en pacientes alejados de la Unidad de tratamiento, tanto por razones laborales como por razones de distancia geográfica; d) favorece la espontaneidad comunicativa del paciente; e) posee connotaciones positivas entre los jóvenes, dada la elevada frecuencia con la que lo suelen utilizar. En cuanto a desventajas, se han identificado: a) baja confi-

dencialidad en algunos casos; b) no identificación adecuada, por parte de los clínicos, de situaciones que puedan requerir una determinada urgencia en ser contestadas; c) latencia en el tiempo de respuesta por parte del terapeuta.

En uno de los escasos estudios controlados que existen hasta el momento sobre este tipo de procedimiento (Robinson y Sefarty, 2003), la mayoría de pacientes con bulimia nerviosa que había recibido durante tres meses contacto terapéutico a través de e-mail valoraron positivamente este abordaje y redujeron la sintomatología.

SMS

Generalmente, las intervenciones a través de SMS se han utilizado de forma adicional a tratamientos específicos de TCA y están demostrando su utilidad como estrategia de prevención de recaídas (Bauer, Percevic, Okon, Meermann, y Kordy, 2003).

Bauer y colaboradores han investigado esta técnica como procedimiento adicional tras un tratamiento de ingreso hospitalario en Stuttgart (Alemania). Su propuesta de intervención consiste en breves comunicaciones semanales (a través de SMS) entre el paciente y el centro de tratamiento, que se realizan a una hora concreta cada semana (no se trata de respuestas inmediatas ante un mensaje de un paciente). El supuesto subyacente a este procedimiento es que el contacto regular semanal con el terapeuta mediante SMS puede ser beneficioso para el paciente, ya que le permitirá: a) recibir retroalimentación directa del terapeuta, b) incrementar su motivación para enfrentarse a situaciones de estrés, y c) informar regularmente sobre su situación actual respecto a la problemática alimentaria.

Este procedimiento SMS presenta dos opciones: a) se les pregunta cada semana sobre su sintomatología bulímica durante los últimos 7 días), o b) en cualquier momento de la semana, el paciente puede enviar un mensaje de texto libre sobre cualquier acontecimiento vital, pensamiento, emoción y su evolución. Todos los mensajes enviados-recibidos siguen un protocolo de seguridad establecido.

El uso de esta técnica se encuentra aún en estadios muy iniciales, por lo que es necesaria una mayor investigación en este sentido.

CONCLUSIONES

La literatura sobre TCA demuestra que en los últimos cinco años se ha incrementado el número de estudios que analizan la eficacia de las nuevas tecnologías como procedimiento adicional, en la mayoría de los casos, o como procedimiento único para el tratamiento de pacientes. La mayoría de estudios se centran en pacientes con bulimia nerviosa o trastorno por atracón, dado el mayor potencial de auto-ayuda de estas técnicas en este tipo de pacientes. Estos procedimientos, independientemente de sus características técnicas, se pueden agrupar en dos tipos: a) los utilizados como procedimiento adicional a un tratamiento estándar (RV, e-mail, SMS, PALM) y b) los utilizados como único procedimiento (Internet, Web, telemedicina). En cualquier caso, la mayoría de estudios se encuentran aún en una fase incipiente y adolecen de importantes problemas metodológicos (p.ej., escasos estudios controlados, sesgos de muestra, heterogeneidad de tratamientos utilizados). Las principales ventajas de estas técnicas son: a) favorecer la accesibilidad de tratamientos; b) reducir costes; c) mejorar las estrategias de afrontamiento del paciente y su capacidad de comunicación con el clínico; d) inmediatez; y e) ayudar en la prevención de recaídas. Las desventajas que subyacen son: a) problemas en seguridad de la información y b) disminución de la capacidad para detectar situaciones de crisis.

AGRADECIMIENTOS

Especial mención a Tony Lam y todos los miembros del SALUT consortium. Parte de los estudios aquí descritos han recibido financiación de la Unión Europea (Salut-Project (Intelligent environment for diagnostics, treatment and prevention of eating disorders)-IST 2000-25026.

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3.3.2. Study 5: Internet-based cognitive-behavioral therapy for bulimia nervosa: a controlled study

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Journal: Cyberpsychology & behavior 2009, 12 (1) 37-41

English abstract:

Abstract

The object of this study was to examine the effectiveness of an Internet-based therapy (IBT) for bulimia nervosa (BN) as compared to a waiting list (WL). Sixty-two female BN patients, diagnosed according to DSM-IV criteria, were assigned to either the IBT or a WL. The control participants (WL) were matched to the IBT group in terms of age, duration of the disorder, number of previous treatments, and severity of the disorder. Assessment measures included the EDI, SCL-90-R, BITE, the TCI-R, and other clinical and psychopathological indices, which were administrated before and after the treatment. Considering the IBT, while the mean scores were lower at the end of the treatment for some EDI scales (bulimic, interpersonal distrust, maturity fears, and total score) and the BITE symptomatology subscale, the mean BMI was higher at posttherapy. Predictors of good IBT outcome were higher scores on the EDI perfectionism scale and EAT and a higher minimum BMI. Drop-out (after IBT 35.5% of cases) was related to higher SCL-anxiety scores, a lower hyperactivity, a lower minimum BMI, and lower TCI-reward dependence scores. At the end of the treatment, bingeing and vomiting abstinence rates differed significantly between the two groups. Results suggest that an online self-help approach appears to be a valid treatment option for BN when compared to a WL control group, especially for people who present a lower severity of their eating disorder (ED) symptomatology and some specific personality traits.

Spanish abstract:

Resumen

El objetivo de este estudio fue examinar la eficacia de un programa de tratamiento basado en Internet (TBI) para la bulimia nerviosa (BN), comparándolo con un grupo en lista de espera (LE). Sesenta y dos pacientes mujeres con BN, diagnosticadas según criterios del DSM-IV, fueron asignadas bien al grupo TBI, bien al de LE. Las participantes del grupo control LE fueron emparejadas al grupo TBI por edad, duración

del trastorno, número de tratamientos previos y severidad del trastorno. Las medidas de evaluación incluyeron el EDI, SCL-90-R, BITE, TCI-R y otros índices clínicos y psicopatológicos que se administraron antes y después del tratamiento. En el grupo TBI, si bien al final del tratamiento las puntuaciones medias fueron menores para algunas escalas del EDI (bulimia, desconfianza interpersonal, temor a la madurez y puntuación total) y de la subescala sintomatológica del BITE; la media del índice de masa corporal (IMC) fue más elevada. Predictores de resultados positivos para el TBI fueron: puntuaciones más elevadas en la escala de perfeccionismo y del EAT, así como un mayor IMC mínimo. El abandono del tratamiento (el 35,3% de los casos del TBI) estuvo vinculado con mayores puntuaciones en escalas de ansiedad del SCL, una menor hiperactividad, un menor IMC mínimo y menores puntuaciones en la escala de dependencia a la recompensa del TCI-R. Al final del tratamiento, los niveles de abstinencia en atracones y vómitos se diferenciaron significativamente en los dos grupos. Los resultados sugieren que una aproximación de auto-ayuda a través de Internet parece ser una opción de tratamiento válido para la BN, cuando se compara con un grupo control en LE; especialmente para individuos que presentan menor severidad en la sintomatología alimentaria y en rasgos de personalidad específicos.

Catalan abstract:

Resum

L'objectiu d'aquest estudi va ser examinar l'eficàcia d'un programa de tractament basat en Internet (TBI) per a la bulímia nerviosa (BN), comparant-lo amb un grup de pacients en llista d'espera (LLE). Seixanta-dues pacients dones amb BN, diagnosticades segons criteris del DSM-IV, van ser assignades al grup TBI, o bé al de LLE. Les participants del grup control LLE van ser aparellades al grup TBI per edat, durada del trastorn, nombre de tractaments previs i severitat del trastorn. Les mesures d'avaluació van incloure el EDI, SCL-90-R, BITE, TCI-R i altres índexs clínics i psicopatològics que es van administrar abans i després del tractament. En el grup TBI, si bé al final del tractament les puntuacions mitjanes van ser menors per a algunes escales del EDI (bulímia, desconfiança interpersonal, temor a la maduresa i puntuació total) i a la subescala simptomatológica del BITE; la mitjana de l'índex de massa corporal (IMC) va ser més elevada. Predictors de resultats positius pel TBI van ser: puntuacions més elevades a l'escala de perfeccionisme i del EAT, així com un major IMC mínim. L'abandonament del tractament (el 35,3% dels casos del TBI) va estar vinculat amb majors puntuacions en escales d'ansietat del SCL, una menor hiperactivitat, un menor IMC mínim i menors puntuacions en l'escala de dependència a la recompensa del TCI-R. Al final del tractament, els nivells d'abstinència en afartaments i vòmits es van diferenciar significativament en els dos grups. Els resultats suggereixen que una aproximació d'auto-ajuda a través d'Internet sembla ser una opció de tractament vàlid per a la BN, quan es compara amb un grup control en LLE; especialment per a individus que presenten menor severitat en la simptomatologia alimentària i en trets de personalitat específics.

CyberPsychology & Behavior
Volume 12, Number 1, 2009

DOI: 10.1089/cpb.2008.0123

Rapid Communication

Internet-Based Cognitive-Behavioral Therapy for Bulimia Nervosa: A Controlled Study

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Abstract

The object of this study was to examine the effectiveness of an Internet-based therapy (IBT) for bulimia nervosa (BN) as compared to a waiting list (WL). Sixty-two female BN patients, diagnosed according to DSM-IV criteria, were assigned to either the IBT or a WL. The control participants (WL) were matched to the IBT group in terms of age, duration of the disorder, number of previous treatments, and severity of the disorder. Assessment measures included the EDI, SCL-90-R, BITE, the TCI-R, and other clinical and psychopathological indices, which were administrated before and after the treatment. Considering the IBT, while the mean scores were lower at the end of the treatment for some EDI scales (bulimic, interpersonal distrust, maturity fears, and total score) and the BITE symptomatology subscale, the mean BMI was higher at posttherapy. Predictors of good IBT outcome were higher scores on the EDI perfectionism scale and EAT and a higher minimum BMI. Dropout (after IBT 35.5% of cases) was related to higher SCL-anxiety scores, a lower hyperactivity, a lower minimum BMI, and lower TCI-reward dependence scores. At the end of the treatment, bingeing and vomiting abstinence rates differed significantly between the two groups. Results suggest that an online self-help approach appears to be a valid treatment option for BN when compared to a WL control group, especially for people who present a lower severity of their eating disorder (ED) symptomatology and some specific personality traits.

Introduction

Given the interest of many national health care systems in extending the accessibility of services and treatment programs, especially in rural areas far away from urban centers, telemedicine has started to be applied in many illnesses. To date, the use of new Internet treatment programs has been applied with relative success in diverse mental health illnesses such as depression,[1] alcohol abuse,[2] anxiety disorders,[3] and dementia.[4]

The effective use of new technologies for eating disorders (EDs) has recently been described in studies using telemedicine,[5] CD-ROM,[6] Internet-based programs,[7,8] virtual reality,[9] personal digital assistants (PDAs),[10] e-mail support,[11,12] and mobile text messages (SMS).[13] Additionally, some prospective studies have been published on the delivery of ED prevention programs to student populations via the Internet.[14] The literature on Internet-based programs for BN,[7,8] however, is scarce and therefore warrants further investigation.

Aim of the study

The goals of the present study are threefold: (a) to analyze the short-term effectiveness of an Internet-based cognitive-behavioral therapy (CBT) program for BN; (b) to analyze the treatment results of Internet-based therapy (IBT) when compared to a waiting list control group (WL); and (c) to determine clinical and psychopathological predictors of good and poor short-term outcome after using IBT.

We hypothesized that individuals undergoing the IBT would exhibit better outcomes than patients on the waiting list and that lower severity of ED symptomatology and some specific personality traits will predict better short-term outcome after using IBT.

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Method

Participants

Entry into the study was between September 2003 and December 2004. A total sample of 62 female patients with BN, purging subtype, participated in the current study. All participants were diagnosed according to DSM-IV[15] criteria using a semistructured clinical interview (SCID-I)[16] conducted by experienced psychologists and psychiatrists. Participants were consecutive referrals for assessment and treatment at the Department of Psychiatry of the Bellvitge University Hospital in Barcelona. The initial BN individuals were consecutively assigned to either the treatment group (IBT) or the control condition (WL).

The mean age for the total sample was 23.7 years (SD = 3.6). The mean duration of the illness for the total sample was 6.0 years (SD = 4.2), and the number of previous treatments ranged from 0 to 4. No statistically significant differences between the two groups were observed for any of these variables at the beginning of the study. The Ethics Committee of our institution approved this study, and informed consent was obtained from all participants.

Assessment

ED symptomatology. The participants were given the Eating Disorder Inventory (EDI),[17] the Eating Attitudes Test (EAT-40),[18] the Bulimic Investigatory Test Edinburgh (BITE),[19] and the Temperament and Character Inventory-Revised (TCI-R)[20] prior to and after treatment. All the scales have been adapted and validated in Spanish populations and have demonstrated adequate internal consistency values: 0.74–0.92 (EDI),[21] 0.93 (EAT-40),[22] 0.96 (BITE),[23] and 0.87 (TCI-R).[24]

In addition, throughout the study, participants kept a food diary,[25] which recorded their binge-eating and purging episodes. The IBT group submitted this information using a specially designed section of the Internet-based program, whereas the other group (WL) completed this as a paper-and-pencil task.

Treatments

The IBT was conducted with a guided self-help program developed in the SALUT project. The guide is based on a CBT self-help manual developed by the University Hospital of Geneva.[7,8] The program introduces psychoeducational and CBT concepts in seven sequential steps. After the first evaluation, the participants work by themselves for 4 months. During this time, they are required to maintain a weekly contact with their coach, using a secured messaging module, which is part of the program. Participants are required to have two face-to-face evaluations with their coach during the therapy.

Participants in the WL control condition received no therapy between the initial assessment and the posttreatment assessment 12 weeks later.

Procedure

The therapeutic approach was explained to the participants during these initial sessions, and therapeutic material was provided. Patients were then consecutively assigned to the two conditions. Remission was defined as abstinence from bingeing and purging for a minimum of at least 2 consecutive weeks during the therapy period, as applied in previous studies.[26]

Statistical analysis

SPSS 15.0.1 was used. The short-term efficiency for the IBT was assessed with t tests for paired samples based on the pre- and posttreatment differences. Next, both treatments (IBT and WL) were compared through t tests for independent samples and chi-square procedures, and effect sizes were estimated with Cohen's d. Survival (Kaplan-Meier) functions valued rates to reach 2 whole consecutive weeks without bingeing and vomiting and drop-out from therapy. Backward stepwise (BSTEP) logistic models explored predictors for therapeutic results. Probability for stepwise entry and removal were 0.05 and 0.10 respectively.

Results

Short-term efficiency of IBT

Mean scores were lower at posttreatment than at baseline (Table 1) for some EDI scales (bulimic episodes, $p = 0.001$; interpersonal distrust, $p = 0.025$; and maturity fears, $p = 0.042$), the total EDI score ($p = 0.012$), and the BITE symptoms scale ($p = 0.038$). No pre- and posttreatment differences were found in any of the scores of the SCL-90-R scales.

Comparison of therapy outcome for IBT versus WL

According to the results of Table 1, the mean change in the BITE symptomatology subscale was statistically higher for the IBT (7.20) than for the WL (0.23). Furthermore, patients in the IBT showed a greater decrease in the mean number of vomiting episodes.

The survival analyses for success for the IBT (first graph in Figure 1) indicates that only 15% of the patients achieved complete abstinence rates from bingeing and vomiting during the first month, 35% of the whole sample needed at least 2 months, and 50% of the total sample required 3 months or more. On the other hand, 25% of the patients abandoned the IBT during the first month, and 7% dropped out during the second month. During the rest of the treatment, the rate of drop-out was of little relevance (3% during the third month and 10% after week 12).

Individual survival functions for the event of achieving 2 whole weeks without bingeing and vomiting are shown in the second graph in Figure 1. At the end of the first month, 12% of the participants were abstinent from binges and 32% from vomits; during weeks 4 and 8, the success rate was 40% for binges and 62% for vomits; and after the third month, abstinence rates for binges and vomits were 55% and 73% respectively.

At the end of the study, IBT and WL showed statistical differences for the success proportions (abstinence of both binges and vomits; 22.6% for IBT and 0.0% for WL; $p = 0.005$), and the percentage of participants who were only abstinent from bingeing (32.3% for IBT and 3.2% for WL; $p = 0.003$) or vomiting (32.3% for IBT and 0.0% for WL; $p = 0.001$).

TABLE 1. COMPARISON OF CHANGES: T TEST OF MEAN CHANGES, PRE- AND POSTTREATMENT

	Pretreatment		*Posttreatment*		*Comparison (IBT vs. WL)*			
	IBT	*WL*	*IBT*	*WL*	p*	*Cohen's d*	*Mean changes*	*CI 95%*
EDI: drive for thinness	14.00	15.81	11.55	15.10	0.429	0.25	1.14	(−1.77; 4.05)
EDI: body dissatisfaction	17.03	19.68	15.55	18.71	0.588	0.16	0.88	(−2.37; 413))
EDI: interceptive awareness	10.74	14.81	8.80	12.58	0.913	0.03	−0.18	(−3.39; 3.04)
EDI: bulimic episodes	**9.61**	12.29	**4.20**	10.26	0.060	0.54	2.72	(−0.12; 5.55)
EDI: interpersonal distrust	**5.39**	7.06	**3.70**	6.39	0.272	0.32	1.12	(−0.91; 3.15)
EDI: inefficiency	10.90	12.00	9.65	10.52	0.852	0.05	0.32	(−3.07; 3.70)
EDI: maturity fears	**8.94**	6.16	**6.55**	7.10	0.025	0.63	2.69	(0.35; 5.03)
EDI: perfectionism	5.52	7.06	4.35	7.06	0.610	0.13	0.50	(−1.46; 2.46)
EDI: total score	**82.13**	94.87	**64.35**	87.71	0.198	0.37	9.19	(−4.97; 23.34)
BITE: symptoms scale	**24.60**	24.13	**17.20**	23.97	0.045	1.03	6.97	(0.20; 13.74)
Bingeing episodes	5.48	7.35	1.79	6.94	0.091	0.49	3.11	(−0.52; 6.73)
Vomiting episodes	6.16	7.61	1.42	7.61	0.006	0.78	4.63	(1.37; 7.89)
BMI	22.58	22.50	23.13	22.79	0.962	0.01	0.02	(−0.88; 0.93)

*Significant contrasts at 0.05 level.
Bold indicates pre- and posttreatment comparison statistically significant.
Cohen's d obtained for mean changes.

Predictors of early change after IBT

The odds of achieving 2 whole weeks without bingeing and vomiting during therapy is increased with higher scores on the EDI perfectionism scale ($p = 0.092$, $OR = 1.23$, 95% $CI = 0.95$ to 1.60), EAT total score ($p = 0.090$, $OR = 1.05$, 95% $CI = 0.99$ to 1.15), and minimum BMI ($p = 0.066$, $OR = 1.54$, 95% $CI = 0.91$ to 2.61). Drop-out is related to higher scores in the SCL90-R anxiety scale ($p = 0.021$, $OR = 4.26$, 95% $CI = 1.03$ to 17.65), a lower hyperactivity ($p = 0.053$, $OR = 0.12$, 95% $CI = 0.01$ to 1.24), a lower minimum BMI ($p = 0.053$, $OR = 0.63$, 95% $CI = 0.36$ to 1.11), and lower scores on the TCI-R reward dependence scale ($p = 0.026$, $OR = 0.72$, 95% $CI = 0.51$ to 1.01). Both final logistic models showed adequate adjustment ($p > 0.5$ in Hosmer-Lemeshow's tests).

Discussion

The current study is a novel contribution to the literature on the use of new technologies in the treatment of BN. The main finding in this study is that the use of IBT in patients with BN revealed a significant decrease in psychopathological levels and severity of bulimic behavior, even when compared with a WL control group. Furthermore, higher success rates (measured by the abstinence of binges and/or vomits at the end of the treatment or waiting list) were observed in the IBT (35, 5% of cases) than in the WL (3, 2%). These results are in accordance with a previous study.[8] It therefore appears that the CBT components included in our IBT program helped the patients with BN to reestablish self-control over eating behavior and to reduce the emotional dysfunction associated with this disorder.

On the other hand, with regard to treatment adherence, our results suggest that the highest rates of drop-outs occurred during the first 8 weeks after having started the IBT. By this time, 35.5% of the participants had dropped out of treatment. These results are to some extent higher than those found by Carrard et al.,[8] who reported a drop-out rate of 24.4% after 2 months of treatment. However, the present drop-out rates are not surprising given that other authors have suggested that self-treatments are demanding to accomplish.[27,28]

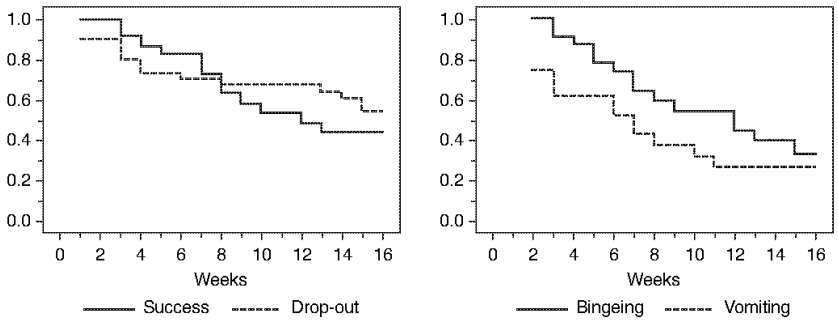

FIG. 1. Survival functions for therapeutic results (Internet modality, IBT). *Success was defined as achieving two whole consecutive weeks without bingeing and vomiting.

In agreement with previous findings,[34,35] our results indicated that more anxious and low-reward-dependent individuals are more likely to abandon the IBT: higher persistence and some degree of emotional stability and attachment with the procedure is needed.

Some shortcomings of the study are noteworthy: (a) lack of medium- to long-term followup data; (b) not having assessed a longer abstinence period; (c) lack of randomization when assigning to the IBT or WL; and (d) not having collected information on additional relevant predicting factors (e.g., frequency of contact with the coach). Future studies should aim to overcome these limitations and should also include followup durations of at least 6 months to a year.

An Internet-based approach such as the one we employed in the present study, has several advantages worth mentioning: (a) the frequency of the contact between the patient and the therapist is increased; (b) the therapeutic alliance is improved; (c) the accessibility of the patients who live far away from eating disorder treatment units (e.g., work reasons, geographical distance) is enhanced; (d) the communicative spontaneity of the patient is favored; and (e) given the high frequency with which the Internet is usually employed among youngsters, a positive connotation is enriched especially in this age group.

The present results also have various clinical implications. Primarily, in order to improve adherence and clinical implementation of the IBT, clinicians should be aware of concerns and negative views related to IBTs and try to challenge these before starting the program. Secondly, clinicians treating BN individuals with such an approach should pay careful attention to the degree of internal motivation to change in this population, especially during the first 8 weeks of treatment, which seems to be a crucial period in order to achieve a correct therapeutic adherence. Finally, clinicians should assess psychopathology and personality profiles before starting the IBT and take them into consideration when deciding which treatment the individual should follow.

Acknowledgments

This project was partially supported by the European Commission (Salut-Project, IST 2000-25026) and Fondo de Investigación Sanitario (FIS, CB06/03/0034). CIBER is an initiative of Instituto Carlos III.

Disclosure Statement

The authors have no conflict of interest.

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4.Discussion

The **overall objective** of the present PhD thesis was to better understand the clinical presentation of BN by investigating three important aspects: gender, phenomenology and therapy response. In this section, the main findings of this dissertation will be discussed. The hypotheses previously outlined were all supported by the present thesis (see at table 8). It is anticipated that this work will contribute to the development of new lines of prevention and treatment for BN.

Table 8: Main findings of the current thesis

Gender in BN:

ED male participants exhibited lower body image concerns and drive for thinness than ED female participants	
There were gender specific differences on personality traits (related to some traits such as harm avoidance or cooperativeness)	

The phenomenology of BN

Individuals with non-purging forms of ED (i.e., BED and non-purging BN) exhibited similar personality traits and psychopathology, while individuals with purging profiles (i.e., BN-P) displayed distinct on clinical and psychopathological test (higher scores than the other two groups) showing greater psychopathology	

New technologies for BN and EDNOS-BN

Individuals undergoing the IBT exhibited better outcomes than patients on the WL	
Lower severity of ED symptomatology and some specific personality traits (higher persistence and emotional stability), predicted better short-term outcome after using IBT	

4.1. Gender differences on ED symptomatology:

In the first study of the present thesis (**study 1**) 60 male and 60 female ED patients were compared to 120 healthy controls to find out similarities and differences in ED clinical features, psychopathology and personality traits by gender.

In line with previous studies (Darcy et al, 2012; Gueguen et al, 2012; Woodside, et al, 2001), the results of this study suggested many similarities between male and female ED individuals; in clinical and symptomatology measures (similar weekly average of binge episodes and similar scores on the majority of EDI-2 scales) in general psychopathology (non significant differences on SCL-90_R scales: obsessive-compulsive, hostility, phobic anxiety, paranoid ideation, psychoticism and PSDI) as well as in personality traits (non significant differences on TCI-R scales: novelty seeking, persistence, self-directedness or self-transcendence).

However when taking into consideration compensatory behaviours, ED male participant showed lower laxative abuse as a weight control method than women with EDs, which is in agreement with previous studies (Braun et al, 1999; Button, Aldridge & Palmer, 2008). The finding that BN male participants reported higher frequency of vomiting episodes than females, disagrees with earlier observations that didn't found differences by gender (Bramon-Bosch et al, 2000; Braun et al, 1999; Fernández-Aranda et al, 2004). Conversely, another review reported that Hispanic male individuals showed more weight loss behaviours than non-Hispanic male individuals, which might be attributable to cultural differences in weight loss strategies (Ricciardelli, McCabe, Williams & Thompson, 2007).

Consistent with the previous literature (Anderson & Bulik, 2004; Fernández-Aranda et al, 2004; Striegel-Moore et al, 2009), males were found less pre-occupied with thinness and body dissatisfaction than females. In line with our clinical experience and literature (Anderson & Bulik, 2004; Benninghoven, Raykowski, Solzbacher, Kunzendorf, & Jantschek, 2007; Gila, Castro, Cesena, & Toro, 2005; Weltzin et al, 2005), our results suggest that men are less disturbed about body size than women; but they are more concerned about body shape and muscularity. A similar trend was observed with the control participants, where males showed lower body image concerns and drive for thinness. This has also been found in previous research assessing a general population. (Sepulveda, Carrobles & Gandarillas, 2008; Striegel-Moore et al, 2009; Thianthai, 2008).

Taken together, although our study showed important similarities between male and female ED participants, a significant aspect that should be considered is the differences on body image concern and on compensative behaviours, because it suggested a different "ideal body" objectives: women were more worried about how to lose fat while men were more focused on how to gain muscles.

4.2 Psychopathology and personality traits on ED males:

A further aim of **study 1** was to assess similarities and differences in comorbid psychopathology and personality traits across gender and between ED participants and healthy controls.

Contrary to some authors (Bean et al, 2005; Bramon-Bosch et al, 2000; Woodside et al, 2001), in our study, males reported lower general psychopathology than females

(showing lower scores on the SCL-90-R scales: somatisation, interpersonal sensitivity, depression, anxiety, GSI and positive symptom total). However, when SCL-90-R scores were assessed across ED subtypes, EDNOS male participants exhibited higher levels on: depression, anxiety, GSI and positive symptom distress index.

Taking in consideration personality traits, results were consistent with the literature (Fassino et al, 2001; Woodside et al, 2004) that compared to females; males showed significantly lower scores on: harm avoidance, reward dependence and cooperativeness. These differences have also been reported in general population studies (Brandstrom, Richter & Przybeck, 2001; Lask, 2000). Moreover, a meta-analysis looking at sex differences in Cloninger's temperament dimensions concluded that women scored higher in reward dependence and harm avoidance (Miettunen, Veijola, Lauronen, Kantojarvi & Joukamaa, 2007). These gender differences have also been found to be consistent in other cultures and languages (Gutierrez-Zotes et al, 2004). This may suggest that these particular personality traits can be real gender bias, which means sex differences per se. Other possible explanation may be related to the structure of some items on the questionnaire that may be more striking for female than for male participants (Stewart, Ebmeier & Deary, 2004).

4.3. ED males and treatment:

The goal of the second study (**study 2**) was to examine the efficacy of CBT treatment delivered in a group for BN male individuals compared with BN female individuals. The CBT therapy consisted in 19 weekly outpatient sessions based on the cognitive model postulated by Fairburn (Fairburn, Welch, Doll, Davies & O'Connor, 1997;

Fairburn et al, 1993). Male and female ED participants were treated in separate groups. It is important to remark that some topics were adapted to fulfill therapeutical needs of ED male patients, such as ways of coping with stress, weight and shape beliefs (related to muscularity), hyperactivity, etc.

A reduction in BN symptomathology was observed in male and female ED groups, showing good therapy outcome in concordance with previous studies (Krug et al, 2008; Muise, Stein, Arbess, 2003; Weltzin et al, 2005). Treatment adherence was also similar across gender, which is in agreement with previous studies (Weltzin et al, 2005).

In agreement with the literature (Joiner, Katz & Heatherton, 2000; Kjelsas et al, 2003), male ED patients showed lower scores on the EDI-2 total score and the subscales drive for thinness, body dissatisfaction and interoceptive awareness subscales as well as the EAT-40 scale. Again results suggested that male ED individuals are less worried about body shape and thinness than females.

To sum up, results indicated that CBT treatment for BN seems beneficial for both male and females for EDs. However, again it would be important to take in account that specific aspects related to their bodies (such as shape or thinness) are differently considered from males than females.

4.4. Clinical features on BN/BED spectrum:

In the third study (**study 3**) females suffering from BED, BN purging and BN non-purging were compared with the objective to explore similarities and differences on clinical, psychopathological and personality variables.

Consistent with the previous literature (Schneider, 2003; Striegel-Moore et al, 2001), results showed that BED participants were significantly older than participants in the other two groups. Moreover, compared to the BN purging and BN non-purging groups, the BED group reported more presence of family history of obesity and also presented more commonly lifetime obesity than the other two groups. Obesity was the clinical variable that most strongly differentiated BED from both subtypes of BN.

In agreement with previous studies (Fontenelle, Mendlowicz, Moreira & Appolinario, 2005; Hay & Fairburn, 1998; Latzer, 2003; Schmidt et al, 2008), we found that the BN-purging group reported the highest scores on the EAT total scores, EDI-2 impulsivity, BITE severity and SCL-90-R paranoid ideation and bulimic symptoms; followed by BN-non-purging group and finally the BED group presented the least pathological scores.

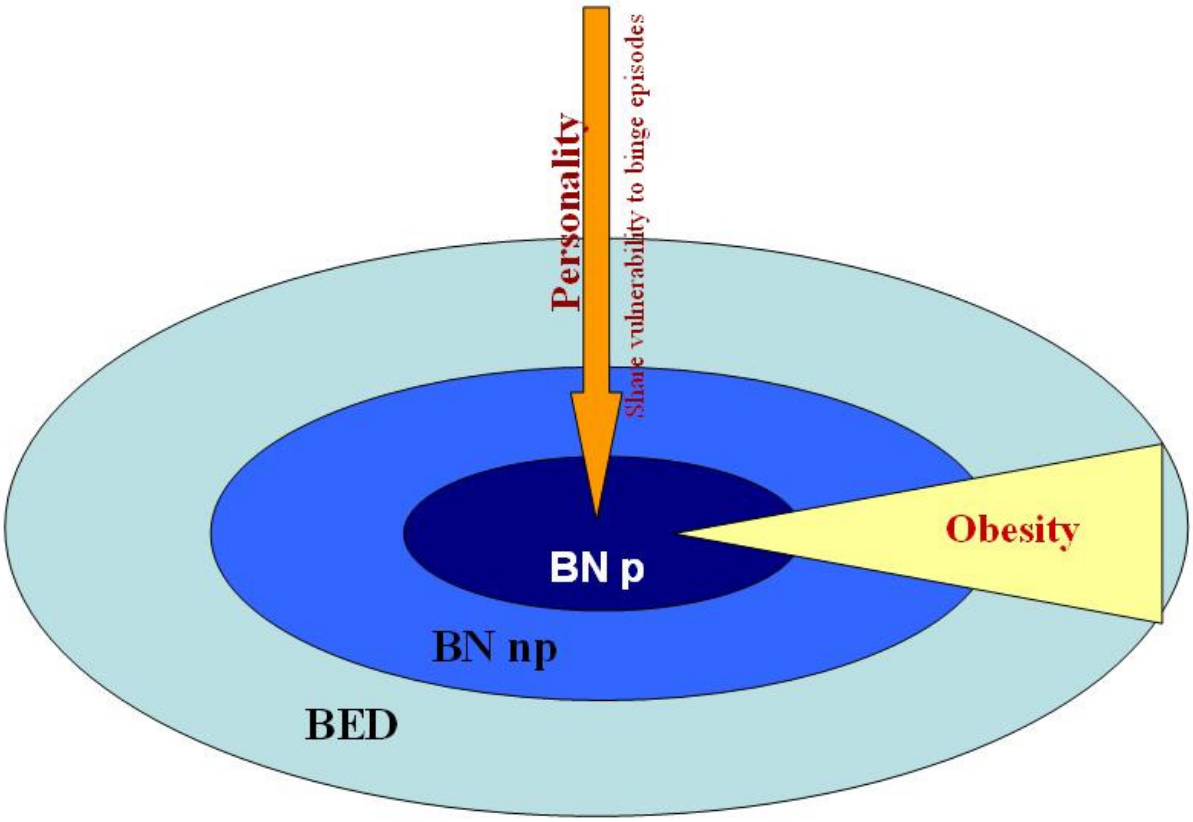
As regards to personality traits no significant differences across groups were obtained. In literature, few studies compared personality traits between BN and BED, and in agreement with our results, non differences between groups were found (i.e. perfectionism) (Pratt, Telch, Labouvie, Wilson & Agras, 2001).

Taken all together, our results showed that none of the personality dimensions assessed were able to distinguish between BED, BN-np and BNp, these could suggest an underlying shared personality style that indexes vulnerability to any ED characterized by binge eating.

To sum up, **study 3** suggests a continuum of clinical severity (see figure 5 below), were BN-purging represents the most severe disorder and BED the least sever ED disorder.

In figure 5, the blue color intensity indicates severity (dark blue represents the highest severity and light blue the lowest). Personality traits are represented by the orange arrow, suggesting an equal vulnerability effect to suffer binge episodes in the three groups. Finally, the amplitude of the triangle figure tries to express the obesity presence in each group, with the BED group displaying highest obesity prevalence rates.

Figure 5: Model of bulimic symptomatology spectrum



4.5. Internet treatment effectiveness for BN symptomathology:

Our forth study (**study 4**) was a book chapter-review of ED interventions (specifically BN and BED) through new technologies, showing the wide range of possibilities and benefits that such approaches offer (e.g., they are cost-effective and instantaneously availability also in rural areas far away from the treatment setting). New types of interventions in EDs include CD-ROM, virtual reality, e-mail, online self-help manuals, Internet, etc, and have been found to complement traditional treatments and help relapse prevention (Budman, 2000; Carrard et al, 2006; Myers et al, 2004; Perpiñá et al, 2004; Rouget et al, 2005).

An effectiveness analysis of an Internet-based therapy program for BN (EDNOS-BN) was made in the last study (**study 5**) of the current thesis. The IBT was conducted with a guided self-help program (Salut Project) based on a CBT self-help manual developed by the University Hospital of Geneva and supported by tailored monitoring (by trained therapist) and automatic feed-back from the program (Carrard et al, 2011; Carrard et al, 2006; Rouget et al, 2005).

Consistent with previous studies (Carrard et al, 2006; Nevonen, Mark, Levin, Lindström & Paulson-Karlsson, 2006; Rouget et al, 2005), our results indicated that the IBT group presented higher success rates (abstinence of binges and vomits) and a significant decrease in BN psychopathology and severity at the end of treatment, when compared to a waiting list. Therefore, data suggests that the IBT program was useful for BN patient by helping them take self-control over eating behaviour and reducing the emotional dysfunctions associated with the disorder.

As regards to treatment adherence, data suggested that the highest rates of drop-out occurred during the first 8 weeks after the IBT program started (35.5% of the participants). These results were partly in line with a parallel study assessing the same IBT program in Switzerland, which showed dropout rates of 24.4% after 8 weeks (Carrard et al, 2006). Therefore, motivation of the participants would be an important issue to take into account especially during the first weeks of IBT treatment. Moreover our data suggests that the following variables are important variables for the IBT adherence: higher persistence, some degree of emotional stability and attachment with procedure.

In line with our results, the literature suggests a better psychological health, a positive change in BN symptoms after IBT treatment (Carrard et al, 2011). In addition, studies have found that IBT programs may be more adequate for patients with less severe psychological co-morbidities (Fairburn & Shafran, 2003; Nevonen et al, 2006). Accordingly our results showed that individuals with higher levels of anxiety and lower reward-dependence were more likely to abandon the IBT program; therefore psychopathology and personality profiles should be taken into account before starting an IBT program.

4.6. Limitations on the studies

The studies outlined for the current thesis present some important limitations, which need to be acknowledged. First, the retrospective and self-report data collection procedures may have limited the validity and reliability of our findings. Second, the cross-sectional design does not allow us to determine causality of the variables assessed.

Thirdly, taking in consideration gender, the shape and body concepts in the ED questionnaires may have different meanings for female than for males (e.g. the EDI-2 body dissatisfaction and drive for thinness subscales don't pay attention to muscularity). Fourthly, in the 4 empirical studies, clinical ED samples derived from a specialized ED Unit were assessed, which might have slightly inflated our findings because of the high comorbidity and symptom severity commonly found in these groups. Finally, study 2 and study 3 presented with a small sample size, that didn't permit to distinguish between clinical outcomes after treatment (Study 2) and also, didn't allow evaluating psychopathological symptoms more broadly between ED subtype comparisons (study 3).

4.7. Clinical implications

The results from the studies undertaken in the present thesis have important implications:

As regards to therapy for males with EDs, a similar CBT treatment would be recommended for both males and females with EDs, but a special focus on muscularity should be warranted in males with EDs. In addition ED assessment tools should be adapted to include these body concerns in males.

In terms of Internet-based therapy, motivational enhancement therapy is recommended before and during the intervention (especially during the first 8 weeks of treatment) to improve therapeutic alliance and also to deal with difficulties from the users like to avoid the sensation of "being without support". Moreover, personality profiles should be considered before deciding if an individual should embark or not in an IBT program.

4.8. Future studies on eating disorders

Future studies should try to: (1) use longitudinal studies to analyze risk factors on ED males; (2) work on ED assessment tools suitable for all, males and females; (3) evaluate follow-ups after IBT programs (6 month up to a year) and (4) analyze the predictors of "dropouts" and "finishes" of an IBT program.

5. Conclusions

5.1. English:

In the present thesis four empirical studies and one review were presented in order to better understand three specific aspects of EDs with bulimic symptomatology: (1) gender differences in ED symptomatology, associated traits and therapy outcome (**study 1** and **study 2**), (2) phenomenology and boundaries of BN-purging, BN-non-purging and BED diagnoses (**study 3**) and (3) new technological approaches for the treatment of EDs with bulimic symptomatology (**study 4** and **study 5**).

Results of the first research line (study 1) suggested that the clinical presentation between males and females with EDs is fairly similar. However, a few gender differences were observed, which included: females and males employed different compensative behaviours due to different objective. Females were more prone to lose fat (desire to be thin), while the aim in males was to gain muscle mass (desire of being muscelous).

The differences found in personality traits by gender (lower harm avoidance, reward dependence and cooperativeness in males) appeared to be more related to gender differences in the general population rather than to ED per se.

In study 2, CBT treatment for BN was found to be beneficial for females as well as for males, both genders present with similar positive response to treatment based on psycho-educational information, strategies to manage binge episodes and compensative behaviours, problem solving strategies, identify cognitive errors and working on cognitive adaptive thoughts, etc. But it is also important to take into account the differences on “ideal body” for each gender, so treatment should pay attention on the way to treat body dissatisfaction and body images topics (such as muscularity).

In terms of our second line of investigation (study 3), a linear trend in general psychopathology was observed between disorders, showing a continuum with BN purgative being the most severe and BED being the least severe ED disorder. Personality was a shared vulnerability factor in all of the assessed ED diagnoses (BN-purging, BN-non purging and BED), characterized by binge eating. Moreover, obesity was strongly associated with BED, much more than with either BN-purging or BN-non-purging.

Last but not least, in the last line of research (study 4-5), potential options of using new technologies for the treatment of EDs (specifically BN symptomatology) were reviewed. Our main findings of IBT intervention were that individuals undergoing this program showed significant decrease in psychopathological indexes and severity of bulimic behaviours, even when they were compared to a waiting list control group.

Specific motivation strategies were recommended especially during the first 8 weeks of treatment because it was found to be a crucial period for achieving therapeutic adherence. Finally, our results suggested that personality profiles should be taken into account before deciding which is the best treatment for an individual that suffer from an eating disorder (IBT program, traditional therapy or other option).

To conclude, the findings presented on the current thesis represent a major enhancement in the state of the art of EDs, and lead to the development a new model of bulimic symptomatology spectrum, as well as, new treatment strategies.

5.2. Spanish:

En la presente tesis se han presentado cuatro estudios empíricos y una revisión con el objetivo de comprender en mayor profundidad tres aspectos específicos de los trastornos de la conducta alimentaria (TCA) con sintomatología bulímica: (1) diferencias de género en sintomatología TCA, rasgos asociados y respuesta a la terapia (e**studio 1** y e**studio 2**), (2) fenomenología y límites entre BN-purgativa, BN no-purgativa y TA (e**studio 3**) y (3) enfoque basado en nuevas tecnologías para el tratamiento de los TCA con sintomatología bulímica (**estudio 4** y **estudio 5**).

En nuestra primera área de investigación, los resultados sugieren que la presentación clínica entre varones y mujeres con TCA es bastante similar. Sin embargo, se observaron algunas especificidades de género: mujeres y varones utilizarían diferentes comportamientos compensatorios por tener objetivos diferentes: las mujeres serían más propensas a perder grasa (el deseo de delgadez), mientras que los varones a ganar masa muscular (deseo de musculatura).

Las diferencias encontradas en los rasgos de personalidad por género (menor evitación del daño, dependencia de la recompensa y el cooperativismo en varones) parecen estar más relacionados con las diferencias de género en la población general que con los TCA en sí mismos.

En el segundo estudio, el tratamiento con terapia cognitivo-conductual (TCC) para la BN se ha encontrado beneficioso tanto para mujeres, como para varones, ambos sexos presentan una respuesta similar y positiva al tratamiento, basado en: información psico-educativa, estrategias de control de atracones y conductas compensatorias, técnicas de resolución de problemas, identificación de errores cognitivos y trabajo de pensamientos adaptativos, etc. A pesar de ello también es importante tener en cuenta las diferencias de

género en cuanto al "cuerpo ideal", por lo que el tratamiento debe prestar atención a la manera de tratar la insatisfacción corporal y los temas de imagen corporal (como por ejemplo el tema de la musculación).

Considerando nuestra segunda línea de investigación (estudio 3), se observó una tendencia lineal en la psicopatología general de los trastornos estudiados, mostrando un continuo donde la BN-purgativa era la de mayor gravedad y el TA el de menor. La personalidad mostró ser un factor de vulnerabilidad compartida por todos ellos (BN-purgativa, BN no-purgativa y TA), caracterizándose por la presencia de atracones. Además, la obesidad apareció fuertemente asociada con el TA, mucho más que con cualquier forma de BN (purgativa o no purgativa).

Por último, pero no menos importante, en la última línea de investigación (estudios 4 y 5), se revisaron las potentes posibilidades de las nuevas tecnologías como intervenciones específicas en TCA (concretamente para sintomatología bulímica). Nuestros principales hallazgos en la intervención basada en Internet (TBI) fueron que las personas que participaron en el programa mostraron una disminución significativa en los índices psicopatológicos y en la gravedad de las conductas bulímicas, incluso cuando se compararon con un grupo control en lista de espera.

Se recomendaron estrategias específicas de motivación especialmente durante las primeras 8 semanas de tratamiento, ya que resultó ser un período crucial para lograr una correcta adherencia terapéutica. Finalmente, los resultados sugirieron que los perfiles de personalidad deberían de tomarse en cuenta antes de decidir el mejor tratamiento para un individuo que padece un trastorno alimentario (sea un programa TBI, terapia tradicional u otra opción).

En conclusión, los resultados presentados en esta tesis ayudan al conocimiento actual de los TCA, y contribuyen al desarrollo de un nuevo modelo de espectro sintomatológico bulímico, así como, nuevas estrategias de tratamiento.

5.3. Catalan:

A la present tesi s'han presentat quatre estudis empírics i una revisió amb l'objectiu de comprendre en major profunditat tres aspectes específics dels trastorns de la conducta alimentària (TCA) amb simptomatologia bulímica: (1) diferències de gènere en la simptomatologia TCA, trets associats i resposta a la teràpia (**estudi 1** i **estudi 2**), (2) fenomenologia i límits entre la BN-purgativa, BN-no-purgativa y TA (**estudi 3**) i (3) enfocament basat en noves tecnologies per al tractament dels TCA amb simptomatologia bulímica (**estudi 4** i **estudi 5**).

A la nostra primera àrea d'investigació, els resultats suggereixen que la presentació clínica entre homes i dones amb TCA es força similar. No obstant això, algunes especificitats de gènere deuen tenir-se en compte: dones i homes utilitzarien diferents comportaments compensatoris per tenir objectius diferents: les dones serien més propenses a perdre greix (el desig de primesa)mentre que els homes a guanyar massa muscular (desig de musculatura).

Les diferències trobades als trets de personalitat per gènere (menor evitació del dany, dependència de la recompensa i el cooperativisme en els homes) semblen estar més relacionats amb les diferències de gènere a la població general que amb els TCA en ells mateixos.

Al segon estudi, el tractament amb teràpia cognitiu-conductual (TCC) per a la BN s'ha trobat beneficiós tant per a dones, com per a homes, tots dos sexes presenten una resposta similar i positiva al tractament, basat en: informació psico-educativa, estratègies de control d'afartaments i conductes compensatòries, tècniques de resolució de problemes, identificació d'errors cognitius i treball de pensaments adaptatius, etc. Malgrat això també és important tenir en compte les diferències de gènere en quant al "cos ideal", per la qual cosa el tractament ha de parar atenció a la manera de tractar la insatisfacció corporal i els temes d'imatge corporal (com per exemple el tema de la musculació).

Considerant la segona línia d'investigació (estudi 3), es va observar una tendència lineal en la psicopatologia general dels trastorns estudiats, mostrant un continu on la BN-purgativa era la de major gravetat i TA el de menor. La personalitat va mostrar ser un factor de vulnerabilitat compartida per a tots ells (BN-purgativa, BN no-purgativa y TA), caracteritzant-se per la presència d'afartaments. A més, l'obesitat va aparèixer fortament associada amb el TA, molt més que amb qualsevol forma de BN (purgativa o no-purgativa).

Finalment, però no menys important, en l'última línia d'investigació (estudis 4 i 5), es van revisar les potents possibilitats de les noves tecnologies com a intervencions específiques en els TCA (concretament per a la simptomatologia bulímica). Les nostres principals troballes a la intervenció basada en Internet (TBI) van ser que les persones que van participar en el programa van mostrar una disminució significativa en els índexs psicopatològics i en la gravetat de les conductes bulímiques, fins i tot quan es van comparar amb un grup control en llista d'espera .

Es van recomanar estratègies específiques de motivació especialment durant les primeres 8 setmanes de tractament, ja que va resultar ser un període crucial per aconseguir una correcta adherència terapèutica. Finalment, els resultats van suggerir que els perfils de personalitat deurien prendre's en compte abans de decidir el millor tractament per a un individu que pateix un trastorn alimentari (sigui un programa TBI, teràpia tradicional o una altra opció).

En conclusió, els resultats presentats en aquesta tesis ajuden al coneixement actual dels TCA, i contribueixen al desenvolupament d'un nou model d'espectre simptomatològic bulímic, així com noves estratègies de tractament.

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Woodside, D.B., Garfinkel, P.E., Lin, E., Goering, P., Kaplan, A.S., Goldbloom, D.S. & Kennedy, S.H. (2001). Comparisons of men with full or partial eating disorders, men without eating disorders and women with eating disorders in the Community. *Amercian Journal of Psychiatry*, 158(4), 570-574.

Zabinski, M., Wilfley, D.E., Pung, M.A., Winzelberg, A.J., Eldredge, K. & Taylor, C.B. (2001). An Interactive Internet-Based Intervention for Women at Risk of Eating Disorders: A Pilot Study. *International journal of eating disorders*, 30, 129-137.

APPENDIX I: Curriculum Vitae

Name: **Araceli Núñez Navarro**
E-mail: anuneznavarro@gmail.com
Place of birth: Barcelona, Spain

EDUCATION

2011 Ret Institute, Spain

Postgraduate Degree in Rational Emotive Behaviour Therapy (REBT)

2008 University of Lleida, Spain

Master in Equal-Opportunity Agents for Women in the Rural Environment

2006 University of Barcelona, Spain

DEA: Master in Advanced Research Methods

2002 UNED University, Spain

Psychology Degree

PROFESSIONAL EXPERIENCE

2008-2011 **Marie Curie Research Fellow at the University of Minho (Portugal)**
Psychology researcher on eating disorders

2006-2008 **IMPO Badalona (Municipal Institute, Spain)**

Psychologist with women subjected to gender violence and dealing with social exclusion.

2003-2006 **University Hospital of Bellvitge (Spain)**

Psychologist collaborator on eating disorders (outpatient and inpatient group therapy & research).

2005-2007 **Various Private health Institutions, Barcelona and Girona (Spain)**

Psychologist collaborator on anxiety and phobic disorders as well as eating disorders (outpatient group and individual therapy).

2005 **Fundació Privada per a la recerca i la Docencia University Hospital of Sant Joan de Deu (Spain)**

Collaboration as a psychologist researcher on mental health disorders in Public Health Institutes (primary care patients): psychological evaluations with different tests assessing cognitive and emotional functioning (SCID, MINI and SF-12).

PUBLICATIONS

1) **Núñez-Navarro, A.**; Agüera, Z.; Krug, I.; Jimenez-Murcia, S.; Sánchez, I.; Araguz, N; Gorwood, P.; Granero, R.; Penelo, E.; Karwautz, A.; Moragas, L; Saldaña, S; Treasure, J.; Menchon, J.M. and Fernández-Aranda, F. (2012). Do males with eating disorders differ in clinics, psychopathology and personality? *European Eating Disorders Review 20 (1) 23-31*

2) **Núñez-Navarro, A.,** Jiménez-Murcia, S., Álvarez-Moya, E., Villarejo, C., Sánchez, I.; Masuet, C., Granero, R., Penelo, E., Krug, I., Tinahones, FJ. Bulik, C. & Fernández-Aranda, F. (2011). Differentiating purging and nonpurging bulimia nervosa and binge eating disorder. *International Journal of Eating Disorders 44(6)488-496*

3) Fernández-Aranda, F.; **Núñez, A.**; Martínez, C.; Krug, I.; Cappozzo, M.; Carrard, I.; Rouget, P.; Jiménez-Murcia, S.; Granero, R.; Penelo, E.; Santamaría, J. and Lam, T. (2009). Internet-based cognitive-behavioural therapy for bulimia nervosa: a controlled study. *Cyberpsychology & behavior 12 (1) 37-41*

4) Fernandez-Aranda, F.; Krug, I.; Jimenez-Murcia, S.; Granero, R.; **Núñez, A.**; Penelo, E.; Solano, R. and Treasure, J. (2009). Male eating disorders and therapy: a controlled pilot study with one year follow-up. *J. Behav. Ther. & Exp. Psychiat. 40 (3) 479–486*

5) Ribasés, M; Fernández-Aranda, F.; Gratacòs, M.; Mercader, J.; Casasnovas, C.; **Núñez, A.**; Vallejo, J. & Estivill, X. (2008). Contribution of the serotoninergic system to anxious and depressive traits that may be partially responsible for the phenotypical variability of bulimia nervosa. *Journal of Psychiatric Research, 42(1):50-57*

6) Fernández Aranda, F.; Martínez, C.; **Núñez, A.** & Jiménez-Murcia, S. (2007). Nuevas tecnologías en el tratamiento de los trastornos de la alimentación. *Cuadernos de Medicina Psicosomática y Psiquiatría de enlace, 82, 7-16*

7) Fernández-Aranda, F.; Casasnovas, C.; Jiménez, S.; Krug, I.; Martínez, C.; **Núñez, A.**; Ramos, MJ.; Sánchez, I. & Vallejo, J. (2004). Eficacia del tratamiento ambulatorio cognitivo-conductual en la bulimia nerviosa. *Psicología conductual: Revista internacional de psicología clínica y de la salud, ISSN 1132-9483, Nº3, 501-518*

BOOK CHAPTERS

Martínez, C.; **Núñez, A.**; Fernández-Aranda, F.; Casasnovas, C.; Ramos, MJ.; Sánchez, I.; Jiménez-Murcia, S.; Krug, I. & Vallejo Ruiloba, J. (2005). Nuevas tecnologías en el tratamiento de los trastornos de la alimentación. *En J. Vallejo (Ed.). Update Psiquiatría. Ed. Masson, Barcelona; Cap7., p. 105-118*

POSTERS

1) **Núñez, A**.; Fassnacht, D.; Vaz, A.R.; Conceição, E.; Lindenberg, K.; Bauer, S. & Machado, P.P. (2012). New Technologies, Prevention and Eating Disorders: ACEITA-TE. *International Conference of Eating Disorders, Centre de Congrès Valpré, Ecully-Lyon,* ***France***

2) **Núñez, A**.; Fassnacht, D.; Vaz, A.R.; Conceição, E.; Lindenberg, K.; Bauer, S. & Machado, P.P. (2010). Prevention of Eating Disorders and New Technologies: ACEITA-TE. *International Conference on Eating Disorders, Salzburg,* ***Austria***

3) **Núñez, A**.; Fassnacht, D.; Vaz, A.R.; Conceição, E.; Lindenberg, K.; Bauer, S. & Machado, P.P. (2009). ACEITA-TE: an Internet based program for the prevention of eating disorders. *1st INTACT Symposium, University of Minho, Braga,* ***Portugal***

4) **Núñez, A.**; Fassnacht, D.; Vaz, A.R.; Conceição, E.; Lindenberg, K.; Bauer, S. & Machado, P.P. Vaz, Eva Conceição; Katajun Lindenberg; Stephanie Bauer & Machado, P.P. (2009). Internet based program for the prevention of eating disorders: Aceita-te. *Eating Disorders Research Society 15th Annual Meeting, New York,* ***USA***

5) Aguera, Z.P.; **Núñez-Navarro, A.**; Krug, I.; Jiménez-Murcia, S.; Granero, R.; Penelo, E.; Karwautz, A.; Collier, D.; Treasure, J. & Fernández-Aranda, F. (2007) Rasgos psicopatológicos y de personalidad en una muestra española de varones con trastorno de la conducta alimentaria: estudio comparativo de casos y controles. *I Symposium Santiago de Compostela,* ***Spain***

6) Villarejo, C.; **Núñez-Navarro, A.**; Álvarez-Moya, E.; Bueno, B.; Jiménez-Murcia, S.; Granero, R.; Krug, I.; Masuet, C.; Tinahones, F.; Bulik, CM. & Fernández-Aranda, F. (2007). Bulimia nerviosa vs trastorno por atracón: diferencias y semejanzas clínicas de personalidad. *I Symposium Santiago de Compostela,* ***Spain***

7) **Núñez, A.**; Ramos, MJ.; Vallejo, J. & Fernández-Aranda, F. (2006). Spanish purging and non-purging bulimia nervosa vs. binge eating disorder: common and differential characteristics. *International Conference on Eating Disorders, Barcelona,* ***Spain***

8) Fernández-Aranda, F.; Martínez, C.; **Núñez,A.**; Krug, I.; Casasnovas, C. & Vallejo, J. (2005). Brief-psychoeducational therapy for EDNOS: a short-term effectiveness comparison study. *International Conference on Eating Disorders, Montreal,* ***Canada***

9) **Núñez, A.**; Martínez, C.; Badia, A.; Casasnovas, C.; Ramos, MJ.; Sánchez, I.; Solano, R. & Fernández-Aranda, F. (2004). Tratamiento de autoayuda a través de internet en bulimia nerviosa. estudio piloto sobre analisis de su eficacia. *XIX Jornada Anual de la Societat Catalana de Recerca i Terapia del Comportament (SCRITC), Barcelona,* ***Spain***

10) Badia, A.; **Núñez, A.**; Solano, R.; Casasnovas, C.; Jiménez, L. & Fernández-Aranda, F. (2004). Diferencias temperamentales y caracteriales en pacientes diagnosticadas de BNp, BNnp y trastorno por atracon. *XIX Jornada Anual de la Societat Catalana de Recerca i Terapia del Comportament (SCRITC), Barcelona,* ***Spain***

ORAL COMUNICATIONS

1) Communication 25/06/2010: Aceita-te: The use of new technologies for the prevention of eating disorders. *41st SPR International Meeting, Assilomar,* ***USA***

2) Communication 25/03/2010: Aceita-te: noves tecnologies per a la prevenció de Trastorns de la Conducta alimentaria. *XXV Symposium on Behavioral Medicine and Behavior Therapy in Clinical Practice*, *Barcelona,* ***Spain***

3) Communication 05/02/2010: Aceita-te: Um programa de prevenção das perturbações alimentares. *VII Simpósio Nacional Investigação em Psicologia, University of Minho,* ***Portugal***

4) Communication 9/06/2006: Personality and psychopathological traits in Spanish eating disorder males: a comparative study. *AED 2006 International Conference on Eating Disorders, Fira Palace Hotel, Barcelona,* ***Spain***

5) Communication 25/10/2005: Los jóvenes y los trastornos de la conducta alimentaria. ¿Los conocemos? *Casal L'Olivera, Ayuntamiento Sant Boi del Llobregat Barcelona,* ***Spain***

6) Communication 14/07/2005: Prevención de Trastornos del comportamiento alimentario. *Európolis Gym -Holmes Place, Barcelona,* ***Spain***

7) Communication 17/03/2005: Eficacia del tratamiento ambulatorio en la Bulímia Nerviosa. *XX Jornada de Terapia del Comportament i Medicina Conductual en la Pràctica Clínica, Auditori Novartis Farmaceutica, Barcelona,* ***Spain***

8) Communication 10/11/2004: Tratamiento de Autoayuda a través de Internet. *Rovira Virgili University, Tarragona,* ***Spain***

9) Communication 28/10/2004: Prevención en los Trastornos de la Conducta Alimentaria. *I.E.S. de Sant Just D'Esvern,* **Spain**

10) Communication 6/05/2004: Trastornos de la Conducta Alimentaria: la abundancia en nuestra sociedad. *Casal L'Olivera, Ayuntamiento de Sant Boi del Llobregat, Barcelona,* ***Spain***

TEACHING EXPERIENCE

1) Lecture 15/12/2008**: "**Prevenção das Perturbações Alimentares" (Prevention of ED) Included on a master's degree course at *University of Minho*, **Portugal**

2) Lectures 10/01/2005: "Tratamiento de Bulimia Nerviosa a través de Internet" (BN treatment within an online program) Included on a master's degree course at *University of Barcelona,* **Spain**

GRANTS & RESEARCH FINANCING

1) Redes de Grupo
Funded by: Ministeri de Sanitat i Consum (FIS).
Project: Plataforma de Genotipació en Salud Mental i Psiquiatria (G03/ 184)
Place: Department of Psychiatry, University Hospital of Bellvitge, Barcelona.
Period: 01.2003-12.2005
Coordinator: Dr. Estivill

2) External colaboration on the **Projecte d'Investigació I+D del V-Projecte Marco**
Funded by: European Commission
Project: Salut-Project (Intelligent environment for diagnostics, treatment and prevention of eating disorders)-IST 2000-25026.
Place: Department of Psychiatry, University Hospital of Bellvitge, Barcelona.
Period: 07.2003-04.2004
Coordinator: Dr. Fernández Aranda

3) Marie Curie Research Fellow
Funded by: European Commission
Project: INTACT (Individually Tailored Stepped Care for Women with Eating Disorders) is a Research Training Network in the Marie Curie Program (MRTN-CT-2006-035988)
Place: University of Minho, Portugal
Period: 04.2008-04.2011
Coordinator: Dr. Pinto Machado

PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS

Catalan Official School of Psychologists (COPC) psychologist official member (Since 2002)

Spanish Society on Rational Emotive Behavior Therapy (AETREC) regular member (since 2011)

Academy for Eating Disorders (AED) regular member (2006-2011)

Society for Psychotherapy Research (SPR) regular member (2008-2011)

Catalan Society for Research and Therapy (SCRITC) regular member (2003-2011)

Member of the AED Development Committee (2010-2011)

LANGUAGE SKILLS

Spanish (native) / Catalan (native)

English (fluent)

Portuguese (fluent)

COMMUNITY SERVICE

Present	**Voluntaris 2000 and Voluntaris per Barcelona**
	Volunteer (different events and activities for the community)
2002/2003	**Terrassa Hospital**
	Volunteer (monitoring work and assistance on different eating disorder group sessions)
2000/2004	**ACAB** Eating Disorder Associations
	Volunteer (call assistance, psychologist work collaboration and family support)
1996	**AVA** Autism Association
	Volunteer (autism children supervision and family support)
1992/1995	**BRI** Children with social exclusion problems Association
	Volunteer (tutoring and support to children with school difficulties)