Risk Factors for Anorexia Nervosa: A Portuguese Case Control Study

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INTRODUCTION

- Eating disorders are between the 10 leading causes of disability among young women with anorexia nervosa reaching the highest mortality rate of all mental disorders (cf., Attia & Walsh, 2007; Bulik, Reba, Siega-Riz & Reichborn-Kjennerud, 2005; Garfinkel & Dorian, 2001; Hoek, 2006; Fairburn e Harrison, 2003; Striegel-Moore & Bulik, 2007; Sullivan, 2002).

- Eating disorders are serious disorders characterized by major changes in eating behaviour associated with extreme preoccupations with weight and physical shape.

- Anorexia nervosa in particular is characterized by the maintenance of an inappropriately low body weight, relentless pursuit of thinness, and distorted cognitions about body shape and weight (Attia & Walsh, 2007).

- A risk factor is a variable that has been shown to prospectively predict a subsequent pathological outcome (Kraemer et al., 1997).

- An improved understanding of the aetiologic process of anorexia nervosa is very important, given that anorexia nervosa is one of the most common psychiatric disorders faced by adolescent and young women (Stice, 2001).
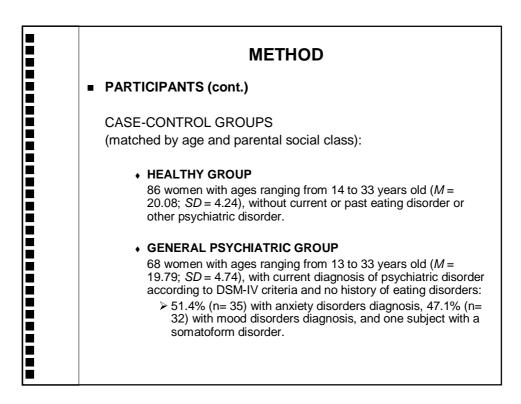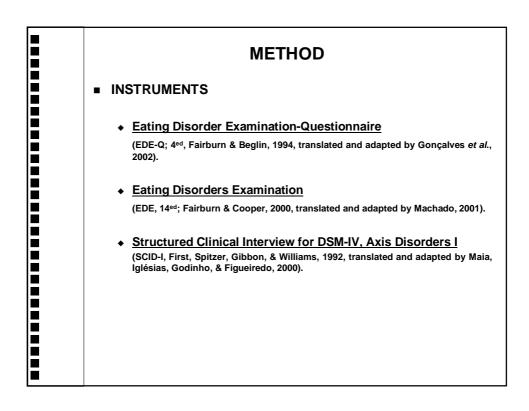
AIMS

- The present study aims to assess the risk factors involved in the development of Anorexia Nervosa in a Portuguese sample.

  - Specific aims:

  - (1) To identify which factors precede the development of anorexia nervosa;
  - (2) To determine which of these factors are specific to anorexia nervosa or if they precede the development psychiatric disorders in general;
  - (3) To compare risk factors for anorexia nervosa with those for bulimia nervosa.

- We predicted that two broad classes of risk factors exist for anorexia nervosa: those that increase the risk of development of psychiatric disorders in general and those that increase the risk of dieting.
- We also believe that the risk factors for anorexia nervosa and bulimia nervosa will overlap substantially.
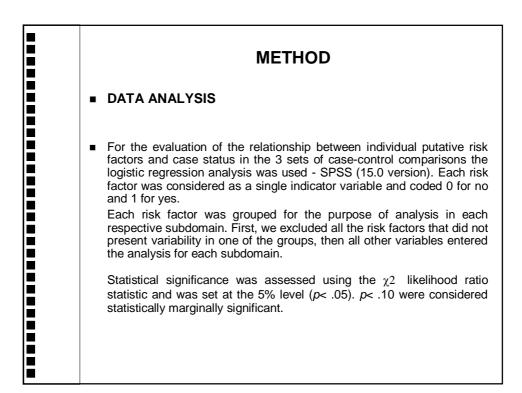
METHOD

- **PARTICIPANTS**

  331 female subjects with ages ranging from 13 to 38 (M= 20.82; SD= 4.92); Parental social class distribution: 106 (32%) in social classes I and II; 108 (32.6%) in social classes III; and 117 (35.3%) in social classes IV and V.

  - **ANOREXIA NERVOSA GROUP**
    98 women diagnosed with current anorexia nervosa (AN) according to DSM-IV criteria, with ages ranging from 14 to 34 years old (M = 20.95; SD = 5.15), recruited in treatment settings:
    - 64.3% (n = 63) restrictive-type and 35.7% (n = 35) purging-type.

  - **BULIMIA NERVOSA GROUP**
    79 women diagnosed with current bulimia nervosa (BN) according to DSM-IV criteria, with ages ranging from 15 to 38 years old (M = 22.37; SD = 5.15), recruited in treatment settings:
    - 91.1% (n = 72) purging-type and 8.9% (n = 7) nonpurging-type.

METHOD

■ **PARTICIPANTS (cont.)**

CASE-CONTROL GROUPS
(matched by age and parental social class):

♦ **HEALTHY GROUP**
86 women with ages ranging from 14 to 33 years old (M = 20.08; SD = 4.24), without current or past eating disorder or other psychiatric disorder.

♦ **GENERAL PSYCHIATRIC GROUP**
68 women with ages ranging from 13 to 33 years old (M = 19.79; SD = 4.74), with current diagnosis of psychiatric disorder according to DSM-IV criteria and no history of eating disorders:
➢ 51.4% (n= 35) with anxiety disorders diagnosis, 47.1% (n= 32) with mood disorders diagnosis, and one subject with a somatoform disorder.

METHOD

■ **PROCEDURE**
A matched case-control design was used with 3 related comparisons:
(1) The first compared 98 participants with AN with 86 Healthy Control Participants recruited from the community;
(2) The second compared the same 98 participants with AN with 68 Control participants with Other Psychiatric Disorders ("General Psychiatric Control Group"), recruited in treatment contexts.
(3) The third compared the same 98 participants with AN with 79 participants with bulimia nervosa recruited in treatment contexts.

■ Exposure to putative risk factors for Anorexia Nervosa was assessed by interviewing each participant of the four samples with the *Risk Factors for Eating Disorders: Interview Schedule* (RFED; Fairburn & Welch, 1990).
■ To match the participants for the time period considered, each participant of Control Groups was questioned about the period up until the age of onset of their particular Anorexia Nervosa matched case.

METHOD

- **INSTRUMENTS**

  - **<u>Eating Disorder Examination-Questionnaire</u>**

    (EDE-Q; 4ed, Fairburn & Beglin, 1994, translated and adapted by Gonçalves *et al.*, 2002).

  - **<u>Eating Disorders Examination</u>**

    (EDE, 14ed; Fairburn & Cooper, 2000, translated and adapted by Machado, 2001).

  - **<u>Structured Clinical Interview for DSM-IV, Axis Disorders I</u>**
    (SCID-I, First, Spitzer, Gibbon, & Williams, 1992, translated and adapted by Maia, Iglésias, Godinho, & Figueiredo, 2000).

METHOD

- **INSTRUMENTS**
  - **<u>Risk Factors for Eating Disorders: Interview Schedule</u>**
    (Fairburn & Welch., 1990; translate and adapted by Gonçalves *et al.*, 2001)

    Semi-structured interview that was designed to identify biological, psychological and social factors believed to put individuals at risk for developing eating disorders.

    Three main domains are evaluated:
    - Domain I (*Personal Vulnerability Domain)*;
    - Domain II (*Environmental Domain);*
    - Domain III (*Dieting Vulnerability Domain*)

    The interview focused on the **period prior to the onset of the eating disorders**.
    Onset was conservatively defined as the age at which the first significant and persistent behavior characteristic of an eating disorder began, rather than the age at which the individual first met full diagnostic criteria for anorexia nervosa.

METHOD

- **DATA ANALYSIS**

- For the evaluation of the relationship between individual putative risk factors and case status in the 3 sets of case-control comparisons the logistic regression analysis was used - SPSS (15.0 version). Each risk factor was considered as a single indicator variable and coded 0 for no and 1 for yes.

  Each risk factor was grouped for the purpose of analysis in each respective subdomain. First, we excluded all the risk factors that did not present variability in one of the groups, then all other variables entered the analysis for each subdomain.

  Statistical significance was assessed using the $\chi2$ likelihood ratio statistic and was set at the 5% level ($p < .05$). $p < .10$ were considered statistically marginally significant.

RESULTS
Logistic Regression Analysis

DOMAIN I PERSONAL VULNERABILITY *Childhood Characteristics*	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
	p	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Negative self-evaluation	.503	.34	(.34-1.71)	.978	1.01	(.49-2.09)	.263	1.46	(.75-2.82)
Shyness	.575	.80	(.37-1.74)	-	-	-	-	-	-
Perfectionism	**.002**	.34	(.17-.67)	**.008**	.40	(.20-.79)	-	-	-
Anxiety	.778	1.16	(.41-3.28)	-	-	-	.101	1.78	(.89-3.56)
More self-consciousness about appearance	**.001**	.03	(.004-.27)	**.003**	.19	(.07-.56)	.582	1.21	(.61-2.42)
Being tall/small as child/teenager with concern	.065[+]	2.59	(.94-7.14)	.263	1.70	(.67-4.28)	-	-	-

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN I **PERSONAL** **VULNERABILITY** *Premorbid Psychiatric Disorder*	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Childhood enuresis	-	-	-	-	-	-	.061[+]	2.42	(.96-6.11)
Drug abuse	-	-	-	-	-	-	-	-	-
Major depression	-	-	-	-	-	-	-	-	-
Alcohol abuse	-	-	-	-	-	-	-	-	-
Manic disorder	-	-	-	-	-	-	-	-	-
Other psychiatric disorders	-	-	-	.073[+]	.15	(.02-1.19)	-	-	-

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN I **PERSONAL** **VULNERABILITY** *Family Psychiatric Disorder (ever)*	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Major depression	.130	.62	(.34-1.15)	-	-	-	.487	1.40	(.55-3.50)
Parental major depression	-	-	-	-	-	-	2.83	.61	(.24-1.51)
Obsessive-compulsive	**.028**	.09	(.01-.78)	**.042**	.12	(.01-.93)	-	-	-
Alcoholism	.133	.52	(.22-1.22)	.926	1.04	(.44-2.46)	-	-	-
Parental alcoholism	.425	1.76	(.44-7.02)	.117	.43	(.15-1.24)	-	-	-
Drug abuse	**-**	-	-	**-**	-	-	**.037**	2.41	(1.06-5.49)

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN II **ENVIRONMENTAL** *Parental Problems*	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Low parental contact	**.031**	.36	(.14-.91)	-	-	-	-	-	-
Parental isolation	**.015**	.33	(.14-.81)	-	-	-	-	-	-
Family avoiding disagreements	**.000**	.12	(.05-.29)	**.013**	.41	(.21-.83)	-	-	-
Negative self-evaluation compared with siblings	.099[+]	.38	(.12-1.20)	-	-	-	-	-	-
Other sibling as favorite	-	-	-	-	-	-	.080[+]	.56	(.29-1.07)
Family tension during meals about food	**.049**	7.18	(1.01-50.91)	.219	1.94	(.68-5.86)	-	-	-

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN II **ENVIRONMENTAL** *Parental Problems (cont)*	*P*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
High parental expectations	-	-	-	-	-	-	**.016**	2.27	(1.16-3.15)
Parental overinvolvement	-	-	-	-	-	-	.077[+]	.29	(.08-1.14)
Maternal overinvolvement	**.028**	10.54	(1.30-85.63)	-	-	-	.164	.55	(.23-1.28)
High maternal expectations	.475	.79	(.42-1.50)	-	-	-	**.041**	1.92	(1.03-3.58)
High paternal expectations	-	-	-	-	-	-	**.010**	2.25	(1.21-4.17)
Paternal underinvolvement	.054[+]	1.94	(.99-3.80)	-	-	-	-	-	-

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN II ENVIRONMENTAL *Disruptive Events*	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Family extensive illness	.444	.66	(.22-1.96)	-	-	-	-	-	-
Parental extensive illness	.374	1.95	(.45-8.57)	.243	2.04	(.62-6.76)	-	-	-
Severe personal health problems	-	-	-	-	-	-	.091[+]	1.97	(.90-4.33)
Severe personal health problem affecting appearance	**.029**	.09	(.01-.78)	-	-	-	-	-	-
Change of parent figure	-	-	-	**.004**	3.81	(1.53-9.52)	-	-	-
Teasing	**.000**	.27	(.13-.56)	**.014**	.42	(.21-.84)	-	-	-

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN II ENVIRONMENTAL *Family Psychiatric Disorder (before index age)*	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Depression	-	-	-	-	-	-	-	-	-
Alcoholism	.142	.53	(.23-1.23)	-	-	-	-	-	-
Parental Alcoholism	.548	1.53	(.39-6.08)	**.013**	.35	(.15-.80)	-	-	-
Obsessive-compulsive	-	-	-	-	-	-	-	-	-
Drug abuse	-	-	-	-	-	-	-	-	-
Manic disorder	-	-	-	-	-	-	-	-	-

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN II **ENVIRONMENTAL** *Teasing and bullying*	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Bullying	-	-	-	-	-	-	.058[+]	2.56	(.97-6.77)
Abuse									
Sexual abuse	.177	.41	(.11-1.49)	-	-	-	-	-	-
Physical abuse	.362	.41	(.06-2.77)	-	-	-	-	-	-
Repeated severe sexual or physical abuse	.550	.57	(.09-3.59)	-	-	-	-	-	-
Psychological abuse	.098[+]	.36	(.11-1.21)	-	-	-	-	-	-

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN III **DIETING VULNERABILITY** *Dieting Risk* *Family and Eating Behavior*	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Parents dieting for shape or weight reasons	**.024**	7.35	(1.30-41.67)	-	-	-	-	-	-
Critical comments by family about shape and weight	.507	.79	(.40-1.58)	.083[+]	.52	(.25-1.09)	**.024**	2.14	(1.11-4.14)
Parents low weight	-	-	-	.201	2.52	(.61-10.35)	**.038**	3.73	(1.07-12.99)
Family eating disorders before index age	.548	.70	(.22-2.25)	.057[+]	.13	(.02-1.06)	-	-	-
Family extreme importance about fitness	.131	.29	(.06-1.45)	-	-	-	**.007**	3.58	(1.42-9.04)
Repeated comments by parents about eating	**.011**	2.43	(1.23-4.80)	.057[+]	1.94	(.98-3.84)	-	-	-

RESULTS
Logistic Regression Analysis

DOMAIN III DIETING VULNERABILITY	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
Dieting Risk Owns Eating Behavior	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Negative attitude to parents weight	**.007**	.05	(.001-.43)	**.014**	.07	(.01-.59)	-	-	-
Felling fat with distress	**.006**	3.08	(1.39-6.80)	**.001**	3.94	(1.72-8.99)	.111	.55	(.26-1.15)
Adolescent overweight with negative consequences	.124	5.38	(.63-45.99)	.772	.85	(.28-2.59)	**.002**	.30	(.14-.64)

RESULTS
Logistic Regression Analysis

DOMAIN III DIETING VULNERABILITY	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
Dieting Risk Others Eating Behavior	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Repeated comments by others about shape weight/appearance	-	-	-	-	-	-	.079+	1.73	(.94-3.20)
Repeated comments by others about eating	**.036**	.34	(.13-.93)	-	-	-	.192	1.60	(.79-3.21)
Teasing about shape/weight, eating/appearance	**.000**	3.92	(1.96-7.85)	**.015**	2.28	(1.18-4.42)	-	-	-
Obesity (before index age)									
Parental obesity	**.09**	.59	(.32-1.09)	-	-	-	-	-	-
Maternal overweight	-	-	-	-	-	-	.097+	1.70	(.91-3.19)
Childhood overweight	**.024**	.38	(.17-.88)	**.045**	.41	(.17-.98)	-	-	-

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN III **DIETING VULNERABILITY** *Obesity Risk*	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Parental obesity (ever)	**.048**	.53	(.29-.99)	-	-	-	-	-	-
Childhood overweight	.153	.52	(.21-1.28)	.166	.51	(.20-1.32)	-	-	-
Adolescence overweight	.126	.46	(.17-1.24)	.339	.62	(.24-1.64)	**.000**	3.54	(1.85-6.77)
Family and Parental History of Eating Disorders									
Family eating disorders (ever)	**.004**	.28	(.12-.67)	**.001**	.13	(.04-.44)	-	-	-

RESULTS
Logistic Regression Analysis

	AN Vs Healthy Controls			AN Vs Psychiatric Controls			AN Vs Bulimia Nervosa		
DOMAIN **ADDITIONAL RISK FACTORS**	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI	*p*	Odds ratios	95% CI
Negative feelings about menarche	**.043**	.42	(.18-.98)	**.003**	.168	(.05-.54)	-	-	-
Precipitating events	**.010**	.23	(.08-.71)	**.006**	.208	(.07-.64)	-	-	-
More than one precipitating event	.103	1.87	(.88-3.96)	-	-	-	.060[+]	.47	(.22-1.03)
Religion importance	-	-	-	**.000**	5.10	(2.19-11.94)	-	-	-

DISCUSSION

- In the development of anorexia nervosa we found risk factors in the three evaluated domains, i.e., personal vulnerability domain, environmental domain and dieting vulnerability domain.
- Taking the comparisons made with the two control samples into account, it is also possible to conclude that, there are both general and specific risk factors involved in the development of this disorder.
- General risk factors, are those variables or factors that contribute to psychiatric disorders vulnerability in general, and are the "*common denominator*" of anorexia nervosa and other psychiatric disorders. Specific risk factors include the risk factors related to eating, food, weight and shape themes and may be called dieting vulnerability factors.

DISCUSSION

- The **general risk factors** included:

  - Parental problems (ENVIRONMENTAL DOMAIN):
    - **Low parental contact;**
    - **Parental isolation;**
    - **Family tension during meals about food;**
    - **Maternal overinvolvement;**
  - Disruptive events (ENVIRONMENTAL DOMAIN):
    - **Severe personal health problem affecting appearance.**
  - Dieting risk (DIETING VULNERABILITY DOMAIN):
    - **Parents dieting**
    - **Repeated comments about eating.**
  - Obesity risk (DIETING VULNERABILITY DOMAIN):
    - **Parental obesity (ever).**

DISCUSSION

■ The **specific risk factors** included:

◆ Childhood characteristics (PERSONAL VULNERABILITY DOMAIN):
  ♦ **Perfectionism;**
  ♦ **More self-consciousness about appearance than peers.**
◆ Family psychiatric disorder (ever) (PERSONAL VULNERABILITY DOMAIN):
  ♦ **Obsessive-compulsive disorder.**
◆ Parental problems (ENVIRONMENTAL DOMAIN):
  ♦ **Family avoiding disagreements.**
◆ Disruptive events (ENVIRONMENTAL DOMAIN):
  ♦ **Teasing.**
◆ Dieting risk (DIETING VULNERABILITY DOMAIN):
  ♦ **Parents repeated comments about eating;**
  ♦ **Negative attitude to parents weight;**
  ♦ **Felling fat with distress;**
  ♦ **Teasing about shape/weight/eating/appearance;**
  ♦ **Overweight in childhood.**
◆ Family eating disorders (DIETING VULNERABILITY DOMAIN):
  ♦ **Family eating disorders (ever).**
◆ Additional Risk Factors
  ♦ **Negative feelings about menarche;**
  ♦ **Precipitating events.**

DISCUSSION

■ Risk Factors that distinguished AN vs BN subjects

◆ Family psychiatric disorder (ever) (PERSONAL VULNERABILITY DOMAIN):
  ♦ **Drug abuse**
◆ Parental problems (ENVIRONMENTAL DOMAIN):
  ♦ **High parental expectations**
  ♦ **High maternal expectations**
  ♦ **High paternal expectations**
◆ Dieting risk (DIETING VULNERABILITY DOMAIN):
  ♦ **Critical comments by family about shape/weight**
  ♦ **Parents low weight**
  ♦ **Family extreme importance about fitness**
  ♦ **Adolescent overweight with negative consequences**
◆ Obesity risk (DIETING VULNERABILITY DOMAIN):
  ♦ **Adolescent overweight**

CONCLUSIONS

- The development of anorexia nervosa is the result of a complex process. The aetiology of this disorder is multifactorial (Cooper, 1995; Fairburn *et al*, 1997), and it seems to happen in several phases or moments.
- Anorexia nervosa is most likely to occur in individuals who simultaneously are at risk of dieting and having a psychiatric disorder in general.
- Risk factors involved in the development of anorexia nervosa in a Portuguese sample do not differ from risk factors found in other studies with western samples (e.g., Fairburn *et al.*, 1999). However, our results do not confirm the fact, suggested by literature that negative self-evaluation (e.g., Jacobi, Hayward, Zwaan, Kraemer & Agras, 2004; Fairburn *et al.*, 1999) is related to the development of anorexia nervosa.
- Factors that increase dieting risk are particular common among anorexia nervosa subjects. When compared with bulimic subjects those factors take a special role, along with the factors associated with a more stressful family dynamics.
- According to our study, preventive and treatment interventions for anorexia nervosa must address different risk factors for multiple outcomes: those that can specifically vulnerabilise subjects, those that turn the developmental context of the individual more challenging and those that increase the dieting risk.

CONCLUSIONS

- **This study has some limitations:**
  - (1) retrospective methodology;
  - (2) using clinical samples in treatment;
  - (3) using unique testimony (e.g., for the collection of family history); and
  - (4) knowing the status of the person evaluated by the researcher (i.e., with AN, BN, healthy control, or general psychiatric control).

  - The methodological design only allows the identification of the risk factors involved in the aetiology of anorexia nervosa, but no conclusions were possible concerning connections between them, and identifying moderate and protective variables.

- **The strong points of this study are:**
  - (1) use of a semi-structured interview to evaluate risk factors;
  - (2) use of three control samples.
    It is important to note that, this study is the first one in Portugal to evaluate the risk factors involved in the development of anorexia nervosa using case control.

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Thank you