SOCIO-DEMOGRAPHIC AND PSYCHOPATHOLOGICAL RISK FACTORS FOR OCD IN CHILDREN.

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ABSTRACT: To investigate the predictive ability of psychopathological and socio-demographic characteristics for clinical Obsessive-compulsive disorder (OCD) and subclinical OCD diagnosis in a follow-up study, we asked 1,514 Spanish non-referred children aged 8-12, to complet questionnaires related to emotional disorders, and then we established the OCD diagnosis at one year later. We found that 20 participants presented clinical OCD and 46 participants presented subclinical OCD diagnoses. Somatic and separation anxiety symptomatology were good predictors for clinical OCD and prior obsessive concern was a predictor for subclinical OCD. Order/checking/pollution symptoms were significantly related with clinical OCD, and both obsessive concern and superstition/mental compulsion were manifestations related with subclinical OCD. Clinical OCD was associated with a lower socioeconomic level. Detection and the follow-up of anxiety symptoms in children may be important for preventing anxiety disorders and OCD in this case.

KEYWORDS. Risk factors. Obsessive-compulsive disorder. Children. Survey descriptive study.

TOC EN NIÑOS: FACTORES DE RIESGO SOCIODEMOGRÁFICOS Y PSICOPATOLÓGICOS.

RESUMEN: Con el objetivo de investigar la capacidad predictiva de características psicopatológicas y sociodemográficas sobre el diagnóstico de Trastorno obsesivo compulsivo (TOC) clínico y TOC subclínico, 1.514 escolares españoles con edades comprendidas entre los 8 y los 12 años, completaron cuestionarios de trastornos emocionales, y fueron seguidos al año siguiente realizándose el diagnóstico de TOC. 20 participantes presentaron TOC clínico y 46 TOC subclínico. La ansiedad de separación y los síntomas de tipo somático resultaron ser buenos predictores para el diagnóstico de TOC clínico; la preocupación obsesiva y los síntomas relacionados con las supersticiones y el pensamiento compulsivo aparecen asociados al TOC subclínico. El TOC clínico está asociado a un nivel socioeconómico bajo. La detección y el seguimiento de los síntomas ansiosos en los niños pueden ser muy importantes para la prevención de los trastornos de ansiedad y en especial para la prevención de trastornos como el TOC.

PALABRAS CLAVE. Factores de riesgo. Trastorno obsesivo-compulsivo. Niños. Estudio descriptivo por encuesta.

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INTRODUCTION

Obsessive-compulsive disorder (OCD) is considered one of the most common serious mental illnesses (Heyman, Mataix-Cols, and Fineberg, 2006).According to some authors, it is indisputable that a significant number of individuals in the community suffer from OCD (Angst *et al*., 2004; Eisen *et al*., 2010; Fontenelle, and Hasler, 2008; Stewart *et al*., 2004) and we know that individuals with OCD are at risk of experiencing other psychiatric conditions (Marcks, Weisberg, Dyck, and Keller, 2011). In addition, Micali *et al*. (2010) state that paediatric OCD can be a chronic condition that persists into adulthood, and that early recognition and treatment might prevent chronicity.

According to Stewart *et al*. (2004), this disorder is now being reported with increased prevalence in the paediatric population than previously, when it was thought rare and OCD is increasingly becoming the focus of interest in child and adolescent psychiatry, because as for adults, it is a condition with important implications for social functioning, school and family and impaired quality of life (Eisen *et al*., 2006; Lochner *et al*., 2003). The prevalence of OCD from childhood to the end of adolescence ranges from 0.1% to 4% (Heyman *et al*. 2001). In a Spanish community sample, we found an estimated prevalence of OCD of 1.8% (Canals, Hernández-Martínez, Cosi, and Voltas, in press).

All the results concerning the epidemiology of OCD have given little consideration to factors related to the development of the disorder. One important issue is that although the terms “risk factors” and “correlates” are used rather freely and interchangeably in the epidemiological literature, appropriate terminologies need to be considered to ensure

that scientists communicate more accurately and consistently, so that the research data are not misunderstood or misapplied (Fontenelle *et al*., 2008). According to Kraemer *et al*. (1997), if the given factor precedes the outcome in question, this justifies use of the term "risk factor." The qualitative review by Fontenelle *et al*. (2008) concluded that there were few data regarding OCD risk factors. However, there is a great deal of research evidence regarding correlates of OCD. These authors suggested that individuals presenting an increased risk for the development of OCD were generally older adolescents, with obstetric problems, people who do not do paid work (especially women), those with substance abuse issues and those presenting a syndrome of major depression (Fontenelle *et al*., 2008).

It is worthwhile taking into account factors such as BMI (body mass index, which was used as an accepted measure for quantifying fat mass) in the study of the correlates of OCD, because several studies have found a possible relationship between this disorder and eating problems (Claes, Nederkorn, Vandereycken, Guerrieri, and Vertommen, 2006; Tanaka *et al*., 2004). Moreover, some studies have demonstrated relationships between appetite regulating peptides with obsessive-compulsive (OC) nature (Hillemacher *et al*., 2007a,b, 2009; Kraus *et al*., 2004).

Kenezloi and Nemoda. (2010) concluded that genetic and environmental factors play an important role in the development of OCD. On the other hand, Kochman, Hantouche, Karila, Bayar, and Baily (2001) talked about a sub-type of OCD that was isolated in children following infection by Group A b-hemolytic streptococci. This sub-type linked to an immunological risk factor has been described as Paediatric Autoimmune Neuropsychiatric Disorder Associated with Streptococcal Infections (PANDAS).

We believe that regardless of the genetic or other type of biological risk factors, the identification of factors that could contribute to the development of this disorder or

ascertaining which variables could be related to OCD is essential for the development of prevention and treatment programs. For this reason, the main aim of this follow-up study was to observe the predictive ability of psychopathological and socio-demographic characteristics for the clinical diagnosis of OCD and subclinical OCD in an epidemiological study.

METHOD

Participants

We invited 2,023 children to participate in a follow-up study of anxiety and depression disorders. The children came from 13 primary schools from Reus (Catalonia, Spain), randomly chosen from the towns' state schools and state-subsidized private schools. The study began in 2007 and 1,514 children with a mean age of 10.23 (SD=1.23) agreed to participate in the first stage (720 boys and 794 girls). Of these 1,514 subjects, a total of 39.5% belonged to families with a low socioeconomic status, 42.5% to families of medium socioeconomic status and 18% to families of high socioeconomic status. 87.5% of the sample were born in Spain, and 85.9% belonged to a nuclear family. One year later, in the second stage, 562 subjects (254 boys and 308 girls) between 9 and 13 years of age (mean=11.25; SD=1.04) were selected either as subjects at risk of emotional disorders (72.1%) or as belonging to a control group with no risk (27.9%). The percentage of experimental death from the first to the second phase was 16%.

Instruments

The Leyton Obsessional Inventory-Child Version Survey (LOI-CV; Berg, Rapoport, and Flament, 1986) is a self-report of a 20-item questionnaire asking about the presence or absence (described in the item Yes/No) of a number of obsessive preoccupations and

behaviors, including a rating of interference with personal functioning for each positive response (range 0-3, no interference-interferes a lot). The LOI-CV was derived from the 44-item LOI-CV (Berg *et al*, 1986). This questionnaire has been proven to be a valid screening instrument to assess OCD or OC symptoms in children and adolescents, and contains four factors that correspond to obsessive symptoms in general, pollution-related symptoms and lucky numbers and related symptoms in school. In another study, Canals, Hernández-Martínez, Cosi, Lázaro, and Toro (2012) found that the factorial structure that fit best was a model using three factors, which accounted for 46.30% of the variance. The factors were as follows: order/checking/pollution, obsessive concern and superstition/mental compulsion (30.15%, 8.53% and 7.62% of the variance, respectively). Total reliability was good (α=0.78).

The Screen for Childhood Anxiety and Related Emotional Disorders (SCARED; Birmaher *et al*., 1997; Vigil-Colet *et al*., 2009; Canals *et al*., in press). The SCARED is a self-report questionnaire that assesses anxiety disorder symptoms in children and adolescents from 8 to 18 years old. It consists of 41 items, and children are asked the frequency of each symptom on a 3-point-scale: 0 (almost never), 1 (sometimes), 2 (often). The reliability of the Spanish version is good (α=0.86) (Vigil *et al*., 2009).

The Children's Depression Inventory (CDI; Kovacs, 1992) is a 27-item, self-report, symptom-oriented scale suitable for youths aged 7 to 17. The CDI is sensitive to changes in depressive symptoms over time, and is a useful index of the severity of the depressive syndrome. The Spanish version demonstrated good reliability in community and clinical samples (α=0.81 to α=0.85) (Figueras, Amador-Campos, Gómez-Benito, and Barrio, 2010).

The Mini-International Neuropsychiatric Interview for Kids (M.I.N.I.-Kid; Sheehan *et al*., 1998) is a structured diagnostic interview for children from 6 to 17 years old based on DSM-IV and ICD-10 psychiatric disorders. The interview takes approximately 30 minutes to administer. It is a short and accurate instrument for diagnosing 23 axis I disorders. The reliability and validity of M.I.N.I.-Kid has recently been demonstrated (Sheenan *et al*., 2010). We assessed OCD as well as depressive, bipolar, anxiety, tic, psychotic, disruptive (ADHD, and conduct disorders), eating and adjustment disorders. The OCD diagnostic agreement (Kappa index) between the M.I.N.I.-Kid and the LOI-CV was 0.45 ($p<0.001$).

Anthropometry, weight and ***height*** were evaluated and we obtained the body mass index (BMI).

In order to assess the socio-demographic characteristics of the sample, we used a ***socio-demographic questionnaire*** designed for this study by the authors. The children answered questions about age, gender, place and date of birth, family type, occupation of parents and other subjects. To assess academic performance, we asked the teachers one question with three response options: academic performance below average, average or above average.

Procedure

We conducted a follow-up study, and the first step was to obtain permission from the Catalan Ministry of Education. We then contacted the 13 school boards, and all agreed to participate in our study. Finally, we sent the parents a letter informing them about the

study, and they signed an informed consent. The parents of children with emotional disorders were informed about this.

First, we assessed anxiety symptoms (SCARED), depressive symptoms (CDI), obsessive-compulsive symptoms (LOI-CV) and collected socio-demographic data for the 1,514 subjects whose parents signed the informed consent. Over the next academic year, we administered the M.I.N.I.-Kid structured interview and re-administered the SCARED, the CDI and the LOI-CV. The interviews were administered to the children on the same day or during the week after the questionnaires were completed and the interviewers were blind to the test results. To obtain diagnoses, we also took into account data from a psychopathological test completed by the students' parents (CSI, Gadow and Sprafkin, 2002), and when we had questions, we telephoned their parents to obtain more information. We considered the presence of DSM-IV-R criteria were present, with the exception of interference criteria, to indicate subclinical OCD. In our sample, we obtained 20 subjects presenting an OCD diagnosis, and 46 subjects with a diagnosis of subclinical OCD.

The participants completed the questionnaires in groups of three or four subjects. Professional child psychologists gave the children instructions on how to answer the surveys and helped them during the session. The M.I.N.I.-Kid (Sheehan *et al*., 1998) was individually administered by the same child psychologists.

RESULTS

Logistic regression models were conducted to examine whether socio-demographic and psychopathological factors were predictive of clinical OCD or of subclinical OCD diagnoses. As regards the clinical OCD diagnosis (see table 1), we entered the psychopathological, the socio-demographical and the anthropometrical data collected in the 1st phase in model 1, and we observed that somatic pain and separation anxiety

factors of the SCARED were good predictors. Model 1 explained 20.3% of the OCD diagnoses. We added the psychopathological data and the academic performance obtained in the 2nd phase to model 2, which accounted for 63.8%, and we found that the best predictors were the socioeconomic level, the somatic pain factor of the SCARED administered in the 1st phase, and the score in the order/checking/pollution factor of the LOI-CV administered in the 2nd phase.

When we performed the logistic regression models for the subclinical OCD diagnosis (see table 2), we found that the best predictor in model 1 was the obsessive concern factor of the LOI-CV, and the model explained 4.5% of the subclinical OCD. When we introduced the 2nd phase variables (model 2), the obsessive concern and the superstition/mental compulsion factors of the LOI-CV were the variables significantly related to the subclinical OCD, and the explained variance increased to 22.6%.

DISCUSSION

The objective of this study objective was to examine the possible predictive ability of psychopathological and socio-demographic characteristics for the subsequent diagnosis of clinical OCD or subclinical OCD. To our knowledge, there are no studies in this area and very few that have used young subjects from community samples. As we know, genetic, immunologic and environmental factors play an important role in the etiology of this disorder, but in our research we focused our attention on the study of psychopathological and socio-demographic variables that could possibly be predictors of the development of the OCD. We also took anthropometric data into account, but despite the known relationship between OCD and eating problems, we found no significant results indicating this in our study. According to the predictive factors of the clinical OCD diagnosis, our results showed that some anxious symptoms such as somatic pain and separation anxiety could be positive predictors. These data are

consistent with those found in adults by Shakya (2010) and Cath, van Grootheest, Willemsen, van Oppen, and Boomsma (2008), which supported the hypothesis that somatic pain was one of the major complaints. Cath *et al*. (2008) showed highest scale scores for somatic complaints in concordant high monozygotic pairs of twins with OC symptoms. Furthermore, Storch *et al*. (2008) using a sample of young people, observed that although research on somatic symptoms in paediatric anxiety disorders was limited, somatic symptoms were highly prevalent among young people with OCD and had a significant impact on the clinical presentation of the disorder. Our results also showed a predictive relation between separation anxiety symptomatology and OCD, supporting the data of Ballesteros and Ulloa (2011) who found that OCD is frequently comorbid with anxiety disorders as separation anxiety, and the data of Kossowsky, Wilhelm, Roth, and Schneider (2012) who found that separation anxiety disorder is one of the most common anxiety disorders in childhood and is highly predictive of adult anxiety disorders. Our results did not support the findings of Angst *et al*. (2004) because they found that the prevalence of OCD was significantly increased in the presence of panic disorder, social phobia and generalized anxiety. However the relation found in our study between the most common anxiety symptoms in children and OC symptoms corroborate the classification of OCD as an anxiety disorder. We know that order/checking/pollution as a manifestation of OC is more severe, and this may be the reason why this type of symptom was predictive of the clinical OCD in our study. These results were consistent with those of Brynska and Wolanczyk (2005), who divided their sample into two groups, of subjects with subclinical OCD and subjects with clinical OCD, and in the latter group they found that the most frequent compulsions were checking, ordering and washing and cleaning. Our results also showed a relation between the lower socioeconomic level and clinical OCD, and were congruent with the

results of Heyman *et al*. (2001) who found that in their sample, subjects belonging to lower socioeconomic classes presented higher rates of OCD. Our results also showed that symptoms like obsessive concern and superstition/mental compulsion were more closely related with the less severe subclinical type of OCD. The results of Corcoran (2007) revealed that appraisals of intrusive thoughts were related to subclinical OC and obsessive beliefs, and a sign of the relationship between the obsessive symptoms type and the subclinical OCD type. The results for subclinical OCD were also consistent with Brynska *et al*. (2005) who found more obsessive symptoms than compulsive symptoms in the subclinical OCD group; the most common obsessions were fear of saying certain things that could be linked with the obsessive concern factor of the LOI-CV, and obsessive symptomatology such as magical thoughts or lucky/unlucky numbers, which are symptoms that could be related with the superstition/mental compulsion factor. Our study presented some limitations that are worth mentioning. We believe that a longer follow-up study could be needed in this area, because as stated by Eisen *et al*. (2010), little is known about the long-term course of OCD. Another limitation could be the sample size, because the number of subjects with diagnoses was limited. However, we believe that the data provided by our study are useful for the prevention of the disorders such as OCD. It is therefore important to detect somatic and separation anxiety symptoms as well as obsessive concern symptomatology in children in order to initiate an early intervention.

REFERENCES

Angst, J., Gamma, A., Endrass, J., Goodwin, R., Ajdacic, V., Eich, D., and Rössler, W. (2004). Obsessive-compulsive severity spectrum in the community: prevalence, comorbidity, and course. *European Archives of Psychiatry and Clinical Neuroscience, 254*, 156-164.

Ballesteros, A.T.B., and Ulloa, R.E. (2011). Estudio comparativo de las características clínicas, demográficas y el funcionamiento familiar en niños y adolescentes con trastorno-obsesivo-compulsivo leve a moderado vs. Grave. *Salud Mental, 34*, 121-128.

Berg, C.Z., Rapoport, J.L., and Flament, H. (1986). The Leyton Obsessional Inventory-Child Version. *Journal of the American Academy of Child and Adolescent Psychitry, 25*, 84-95.

Birmaher, B., Khetarpal, S., Brent, D., Cully, M., Balach, L., Kaufman, J., and Neer, S.M. (1997). The Screen for Child Anxiety Related Emotional Disorders (SCARED): Scale construction and psychometric characteristics. *Journal of the American Academy of Child and Adolescent Psychiatry, 39*, 545-553.

Brynska, A., and Wolanczyk, T. (2005) Epidemiology and phenomenology of obsessive-compulsive disorder in non-referred young adolescents: a Polish perspective. *European Child & Adolescent Psychiatry, 14*, 319-327.

Canals, J., Hernández-Martínez, C., Cosi, S., Lázaro, L., and Toro, J. (2012). The Leyton Obsessional Inventory-Child Version and reliability in Spanish non-clinical population. *International Journal of Clinical and Health Psychology, 12*, 81-96.

Canals, J., Hernández-Martínez, C., Cosi, S., and Voltas, N. (2012). The epidemiology of obsessive-compulsive disorder in Spanish school children. In Press.

Cath, D.C., van Grootheest, D.S., Willemsen, G., van Oppen, P., and Boomsma, D.I. (2008). Environmental Factors in Obsessive-Compulsive Behavior: Evidence from Discordant and Concordant Monozygotic Twins. *Behavior Genetics, 38*, 108-120.

Claes, L., Nederkoorn, C., Vandereycken, W., Guerrieri, R., and Vertommen, H. (2006). Impulsiveness and lack of inhibitory control in eating disorders. *Eating Behaviors, 7*,196-203.

Corcoran, K.M. (2007). *Appraisals of intrusive thoughts: an examination of the cognitive theory of obsessions*. University of British Columbia.

Eisen, J.L., Mancebo, M.A., Pinto, A., Coles, M.E., Pagano, M.E., Stout, R, and Rasmussen, S.A. (2006). Impact of obsessive-compulsive disorder on quality of life. *Comprehensive Psychiatry, 47*, 270-275.

Eisen, J.L., Pinto, A., Mancebo, M.C., Dyck, I.R., Orlando, M.E. and Rasmussen, S.A. (2010). A 2-Year Prospective Follow-Up Study of the Course of Obsessive-Compulsive Disorder. *Journal of Clinical Psychiatry, 71*, 1033-1039.

Figueras, A., Amador-Campos, J.A., Gómez-Benito, J., and del Barrio, V. (2010) Psychometric properties of the Children's Depression Inventory in community and clinical simple. *The Spanish Journal of Psychology, 13*, 990-999.

Fontenelle, L.F., and Hasler, G. (2008). The analytical epidemiology of obsessive-compulsive disorder: Risk factors and correlates. *Progress in Neuro-Psychopharmacology & Biological Psychiatry, 32*, 1-15.

Heyman, I., Fombonne, F., Simmons, H., Ford, T., Meltzer, H., and Goodman, R. (2001). Prevalence of obsessive-compulsive disorder in the British nationwide survey of child mental health. *The British Journal of Psychiatry, 179*, 324-329.

Heyman, I., Mataix-Cols, D., and Fineberg, N.A. (2006). Obsessive-compulsive disorder. *British Medical Journal, 333*, 424-429.

Hillemacher, T., Bleich, S., Frieling, H., Schanz, A., Wilhelm, J., Sperling, W., Kornhuber, J., and Kraus, T. (2007b). Evidence of an association of leptin serum levels and craving in alcohol dependence. *Psychoneuroendocrinology, 32*, 87-90.

Hillemacher, T., Kraus, T., Rauh, J., Weiss, J., Schanze, A., Frieling, H., Wilhelm, J., Heberlein, A., Gröschl, M., Sperling, W., Kornhuber, J., and Bleich, S., (2007a). Role of appetite-regulating peptides in alcohol craving: an analysis in respect to subtypes and different consumption patterns in alcoholism. *Alcoholism: Clinical & Experimental Research, 31*, 950-954.

Hillemacher, T., Weinland, C., Heberlein, A., Gröschl, M., Schaze, A., Frieling, H., Wilhelm, J., Kornhuber, J., and Bleich, S. (2009). Increased levels of adiponectin and resistin in alcohol dependence - possible link to craving. *Drug and Alcohol Dependence, 99,* 333-337.

Kenezloi, E., and Nemoda, Z. (2010). Genetic factors in obsessive-compulsive disorder: summary of genetic studies. *Psychiatria Hungarica, 25*, 378-393.

Kochman, F., Hantouche, E.G., Karila, L., Bayart, D., and Bayly, D. (2001). Obsessive-compulsive disorder in children induced by streptococcal infection. *La Presse Médicale, 35*, 1747-1751.

Kossowsky, J., Wilhelm, F.H., Roth, W.T., and Schneider, S. (2012). Separation anxiety disorder in children: disorder-specific responses to experimental separation from the mother. *Journal of Child Psychology and Psychiatry, 53*, 178-187.

Kovacs, M. (1992). Children's Depression Inventory (CDI). North Tonawanda, NY: Multi-HeBaialth Systems INC.

Kraemer, H.C., Kazdin, A.E. Offord, D.R., Kessler, R.C., Jensen, P.S., and Kupfer, D.J. (1997). Coming to terms with the terms of risk. *Archives of General Psychiatry, 54,* 337-343.

Kraus, T., Reulbach, U., Bayerlein, K., Mugele, B., Hillemacher, T., Sperling, W., Kornhuber, J., and Bleich, S. (2004). Leptin is associated with craving in females with alcoholism. *Addiction Biology, 9,* 213-219.

Lochner, C., Mogotsi, M., du Toit, P.L., Kaminer, D., Niehaus, D.J., and Stein, D.J. (2003). Quality of life in anxiety disorders: a comparison of obsessive-compulsive disorder, social anxiety disorder, and panic disorder. *Psychopatology, 36,* 255-262.

Marcks, B.A., Weisberg, R.B., Dyck, I., and Keller, M.B. (2011). Longitudinal course of obsessive-compulsive disorder in patients with anxiety disorders: a 15-year prospective follow-up study. *Comprehensive Psychiatry, 52,* 670-677.

Micali, N., Heyman, I., Pérez, M., Hilton, K., Nakatani, E., Turner, C., and Mataix-Cols, D. (2010). Long-term outcomes of obsessive-compulsive disorder. Follow-up of 142 children and adolescents. The *British Journal of Psychyatry, 197,* 128-134.

Shakya, D.R. (2010). Clinico-demographic Profiles in Obsessive Compulsive Disorders. *Journal of Nepal Medical Association, 49,* 133-138.

Sheehan, D., Lecrubier, Y., Sheehan, K., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R., and Dunbar, G.C. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry, 59* (Suppl 20), 22-33.

Sheehan, D.S., Sheehan, K.H., Shytle, D.R., Janavs, J., Bannon, Y., Rogers, J.E., Milo, K.M., Stock, S.L., and Wilkinson, B. (2010). Reliability and validity of the Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID). *Journal of Clinical Psychiatry, 71*, 313-326.

Stewart, S.E., Geller, D.A., Jenike, M., Pauls, D., Shaw, D., Mullin, B., and Faraone, S.V. (2004). Long-term outcome of paediatric obsessive-compulsive disorder: a meta-analysis and qualitative review of the literature. *Acta Psychiatrica Scandinavica, 110*, 4-13.

Storch, E.A., Merlo, L.J., Keeley, M.L., Grabill, K., Milsom, V.A., Geffken, G.R., Ricketts, E., Murphy, T.K., and Goodman, W.K. (2008). Somatic Symptoms in Children and Adolescents with Obsessive-Compulsive Disorder: Associations with Clinical Characteristics and Cognitive-Behavioral Therapy Response. *Behavioural and Cognitive Psychotherapy*, *36*, 283-297.

Tanaka, M., Nakahara, T., Kojima, S., Nakano, T., Muranaga, T., Nagai, N., Ueno, H., Nakazato, M., Nozoe, S., and Naruo, T. (2004). Effect of nutritional rehabilition on circulating ghrelin and growth hormone levels in patients with anorexia nervosa. *Regulatory Peptides*, *122*, 163-168.

Vigil-Colet, A., Canals, J., Cosi, S., Lorenzo-Seva, U., Ferrando, P.J., Hernández-Martínez, C., Claustre, M.C., Viñas, F., and Domènech, E. (2009). The factorial structure of the 41-item version of the Screen for Child Anxiety Related Emotional Disorders (SCARED) in a Spanish population of the 8 to 12 years-old. *International Journal of Clinical and Health Psychology, 9,* 313-327.

Table 1. Regression models to predict clinical OCD diagnosis.

	Clinical OCD diagnosis		
MODEL 1	**B**	**Odds Ratio (95% CI)**	**p**
1st phase SCARED Factor somatic pain	0.138	1.148 (1.020-1.293)	0.018
1st phase SCARED Factor separation anxiety	0.173	1.189 (1.032-1.370)	0.011
R2 Negelkerke * 100 = 20.3			
Chi-square 2.510 = 26.991			
p= 0.000			
MODEL 2	**B**	**Odds Ratio (95% CI)**	**p**
Socioeconomic level	-0.717	0.488 (0.262-0.908)	0.003
1st phase SCARED Factor somatic pain	0.222	1.248 (1.053-1.480)	0.002
2nd phase LOI-CV Factor order/checking/pollution	0.553	1.738 (1.355-2.230)	0.000
R2 Negelkerke * 100= 63.8			
Chi-square 3.300 = 56.710			
p =0.000			

Candidate variables to enter into model 1: 1st phase LOI-CV total scores and factors scores→ order/checking/pollution; obsessive concern and superstition/mental compulsion, age (total score), socioeconomic level (total score), body mass index (total score), 1st phase CDI (total score), 1st phase SCARED total score and factor score→ somatic pain; social fobia; generalized anxiety and separation anxiety; gender (1: boy; 2: girl), , family type (0: monoparental; 1: nuclear), birth place (0: foreign; 1: native).

Candidate variables to enter into model 2: In model 1, we added the 2nd phase LOI-CV total score and the factor scores→ order/checking/pollution; obsessive concern and superstition/mental compulsion; the 2nd phase CDI (total score) and the 2nd phase SCARED total score and factor scores→ somatic pain; social phobia; generalized anxiety and separation anxiety and academic performance (3: high; 4: low).

*p<0.01 **p<0.001 ***p<0.0001

Table 2. Regression models to predict subclinical OCD diagnosis.

	Subclinical OCD diagnosis		
MODEL 1	**B**	**Odds Ratio (95% CI)**	**p**
1st phase LOI-CV Factor obsessive concern	0.097	1.101 (1.035-1.173)	0.002
R2 Negelkerke * 100 = 4.5			
Chi-square 1.493 = 9.197			
p= 0.002			
MODEL 2	**B**	**Odds Ratio (95% CI)**	**p**
2nd phase LOI-CV Factor obsessive concern	0.129	1.138 (1.031-1.255)	0.008
2nd phase LOI-CV Factor superstition/mental compulsion	0.229	1.257 (1.100-1.437)	0.001
R2 Negelkerke * 100= 22.6			
Chi-square 2.289 = 31.857			
p =0.000			

Candidate variables to enter into model 1: 1st phase LOI-CV total scores and factor scores→ order/checking/pollution; obsessive concern and superstition/mental compulsion, age (total score), socioeconomic level (total score), body mass index (total score), 1st phase CDI (total score), 1st phase SCARED total score and factor score→ somatic pain; social phobia; generalized anxiety and separation anxiety; gender (1: boy; 2: girl), , family type (0: monoparental; 1: nuclear), birth place (0: foreign; 1: native).

Candidate variables to enter into model 2: In model 1, we added the 2nd phase LOI-CV total score and factor scores→ order/checking/pollution; obsessive concern and superstition/mental compulsion; 2nd phase CDI (total score) and 2nd phase SCARED total score and factor scores→ somatic pain; social phobia; generalized anxiety and separation anxiety and academic performance (3: high; 4: low).

*p<0.01 **p<0.001 ***p<0.0001