THE EPIDEMIOLOGY OF OBSESSIVE-COMPULSIVE DISORDER IN SPANISH SCHOOL CHILDREN

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Abstract

We aimed to assess the prevalence and other epidemiological data of subclinical and clinical OCD in a Spanish non-referred child population. The estimated prevalence of OCD was 1.8% and the estimated prevalence of subclinical OCD was between 4.7% and 5.5 %. We did not find significant differences between genders or academic grade in clinical OCD, but more subclinical prevalence was found in males than in females. The comorbidity between OCD and any psychiatric disorder was high (85%) and higher for emotional disorders than for behavioral disorders. The impairment was associated with comorbidity and was worse for OCD with comorbid emotional problems. Sociodemographic variables were not related to OCD, but academic performance was significantly lower in clinical OCD. The results suggest that OCD is not rare in school children and adolescents and that it has an impact on their personal functioning. We suggest the possibility of an early diagnosis and treatment.

Key words: Epidemiology, obsessive-compulsive disorder, children.

Introduction

In the past few decades, clinical, psychobiological and treatment-related knowledge of OCD has increased substantially. However, in contrast to the extensive clinical literature on OCD, its prevalence and the impact of its severity on the community have been the focus of little research. While these issues have recently been explored in the adult population (Ruscio, Stein, Chiu, & Kessler, 2010), they have not been studied in children. For a long time, the disorder was thought to be rare in children and adolescents, but we now know that OCD often starts in childhood and adolescence and can develop into a chronic disorder with high rates of persistence (Micali et al., 2010). Furthermore, epidemiological data show that OCD is far more common among adolescents than was previously believed (Maggini et al., 2001; Maina, Albert, Bogetto, Vaschetto, & Ravizza, 1999; Valleni-Basile et al., 1994) but may be lower in children (Carter et al., 2010; Heyman et al., 2001) and in young adolescents (Brynska & Wolanczyk, 2005). However, although the first study reporting the prevalence of OCD in children was conducted many years ago (Rutter, Tizard, & Whitmore, 1970), there are few studies reporting recent data on the prevalence of OCD in non-clinical children and adolescents. The National Health and Nutrition Examination Survey conducted from 2001 to 2004 to estimate the prevalence of specific mental disorders in the US, did not refer to rates of OCD in children between 8 and 15 years old (Merikangas et al., 2010).

Rutter et al.'s 1970 pioneer study reported a prevalence of up to 0.3%–0.4% in a population of over 2,000 10- and 11-year-old children in England. Subsequently, a rate of prevalence of between 0.17% and 0.25% was found in children from the USA (Costello et al., 1996; Carter et al., 2010) and from other European countries (Steinhausen, Metzke, Meier, & Kannenberg, 1998; Heyman et al., 2001). However, data on adolescents show that rates of OCD rise as age increases. Flament et al. (1988) reported a lifetime prevalence of 1.9% among high-school students and Zohar et al. (1992) found that the frequency of OCD in 16- and 17-year-old subjects (Israeli Army inductees) was 3.65% and an additional 1.25% reported OCD symptomatology. Later, Apter et al. (1996), studying a sample with the same characteristics in

Israel, determined a lifetime prevalence of 2.3% for OCD and 3.9% for subclinical OCD using DSM-IV criteria. A similar rate of prevalence was identified by Valleni-Basile et al. (1994) who reported a 2.9% prevalence in American adolescents, although a lower prevalence was found by Verhulst, van der Ende, Ferdinand, and Kasius (1997) in Holland (1%). The most recent study that we have found on the epidemiology of OCD in adolescents was published in 2005 by Brynska et al. who reported a prevalence of 0.38% for OCD and of 2.7% for subclinical OCD in children between 13 and 14 years old. So, considering the results of the abovementioned studies, the prevalence of OCD from early adolescence to the end of adolescence seems to range from between 0.2% and 3.6%, or higher if subclinical manifestations are considered. For example, Valleni-Basile et al. (1994) found a prevalence of subclinical OCD of 19%, and Thomsen (1993) and Maggini et al. (2001), using both the Leyton Obsessional Inventory-Child Version (LOI-CV), found that 4.1% of non-referred Danish adolescents between 11 and 17 years old and Italian students between 16 and 21 years old , respectively, showed manifestations of subclinical OCD.

According to the US National Comorbidity Survey Replication, the mean age of onset of OCD in adults is 19.5 years (Ruscio et al., 2010). A study of adolescents by Brynska et al. (2005) found that the mean age of onset was 11.5 years. Delorme et al. (2005) and Geller (2006) proposed a bimodal distribution for age of onset of OCD, with a first peak at the age of 11 (early onset) and a second one at 23.5 years of age (late onset). However, gender differences were found; males make up the majority of the very early onset cases, with nearly one quarter of males experiencing the onset of OCD before the age of 10. In contrast, new cases in females were found after the age of 10, with the highest peak during adolescence (Ruscio et al., 2010). Thus, among the children affected by the disorder, there seem to be more boys than girls (Valleni-Basile et al., 1994; Fontenelle & Hasler, 2008; Masi et al., 2004), although this has not been confirmed in other studies (Heyman et al., 2001). Gender differences are either not apparent from adolescence onward (Walitza, Melfsen, Jans, & Zellmann, 2011) or the prevalence of the disorder is higher in female than males adults (Fontenelle et al., 2008). In subclinical OCD, female subjects between 16 and 21 years old showed more symptoms and

more interference with the degree to which they could personally function than males (Maggini et al., 2001). Gender differences have also been found in relation to the type of obsession; boys had more sexual (Mataix-Cols, Nakatani, Micali, & Heyman, 2008) and order/symmetry obsessions (Masi et al., 2010), while girls had more compulsions of a cumulative type (Mataix-Cols et al., 2008) or of a contamination/cleaning type (Masi et al., 2010).

OCD is a highly comorbid disorder in children and adolescents with rates ranging between 68% and 100% (Walitza et al., 2011). The most common comorbid disorders are anxiety disorders, followed by depressive disorders, disruptive disorders, tic disorders and autistic spectrum disorders (Fontenelle et al., 2008; Langley, Lewin, Bergman, Lee, & Piacentini, 2010; Lewin, Chang, McCracken, McQueen, & Piacentini, 2010; Ruscio et al., 2010; Ruta, Mugno, D'Arrigo, Vitiello, & Mazzone, 2010; Sheppard et al., 2010). While comorbidity in general increases the severity of the illness, the type of comorbidity in OCD can involve varying degrees of severity and different types of intervention. Thus, OCD combined with depression or a disruptive behavior disorder contributes to a higher degree of impairment (Storch et al., 2010a; Storch, Lewin, Geffken, Morgan, & Murphy, 2010b) and , in contrast to adults, tic disorders combined with OCD in children and adolescents does not represent a more severe condition than either disorder alone (Lewin et al., 2010). Because OCD in adults has been found to begin at a later age than most comorbid anxiety disorders and disruptive disorders (Ruscio et al., 2010), the rates of comorbidity with these disorders in children may be higher than those found for other disorders subsequent to OCD, such as depressive disorders. Gender differences have also been reported in relation to comorbidity. Masi et al. (2010) found that tic comorbidity was more prevalent in males, had an earlier onset and a higher rate of comorbidity with attention deficit hyperactivity disorder and other disruptive behavior disorders. Furthermore, the presence of comorbid anxiety and disruptive disorders is associated with greater symptom severity, less favorable academic performance and functional and family impairment (Bloch et al., 2009; Langley et al., 2010; Walitza et al., 2008).

Subjects with early-onset OCD have shown severe adaptive disturbances in the areas of social integration, age-appropriate development of independence from the family, and in

forming relationships. Early diagnosis and treatment of OCD might improve the long-term prognosis, in addition to relieving patients' current symptoms (Micali et al., 2010; Walitza et al., 2011).

Because there are no recent epidemiological studies on OCD in children, the purpose of this work is to assess the prevalence of subclinical and clinical OCD in the Spanish non-referred child population. We provide data about gender and age differences, the comorbidity of the disorder, the degree of severity and the relationship between the disorder and socio-demographic variables.

Method

Sample

Participants were recruited for a two-phase epidemiological study of anxiety and depressive disorders that began in 2007 in Reus (Catalonia, Spain). The children came from 13 primary schools randomly chosen from the town's state schools and state-subsidized private schools. In total, 2,023 children in the 4th, 5th and 6th grades of primary school were invited to participate. In the first phase, 1,514 students (720 boys and 794 girls) aged between 8 and 12 (mean= 10.23; *SD* = 1.23) participated in the study. Children whose parents did not submit the written informed consent form (i.e. non-participants) were not limited to any one school. The questionnaires of 20 children were excluded due to missing test data. Of the children participating in the study, 39.5% were from families with low socioeconomic status, 42.5% were from families with middle socioeconomic status, and 18% were from families with high socioeconomic status; 87.5% of the sample was born in Spain and 85.9% belonged to a nuclear family (Table 1).

In the second phase, 659 students (332 subjects at risk of emotional disorders and 327 controls) were selected and 562 students (235 at risk) participated. The sample consisted of 254 boys and 308 girls aged between 9 and 13 years old (mean=11.25; SD=1.04) (see study design

and sample recruitment in Figure 1). There were no differences in socioeconomic status between participants and selected groups.

PLEASE INSERT TABLE 1

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Instruments

Symptoms of OCD were detected using the Spanish version of the Leyton Obsessional Inventory-Child Version (LOI-CV Survey Form) (Berg, Whitaker, Davies, Flament, & Rapoport, 1988). This instrument is a 20-item self-report questionnaire asking for the presence ("yes") or absence ("no") of a number of obsessive preoccupations and behaviors. For each positive response, a rating of interference in personal functioning must be indicated (range 0-3, no interference–high interference). Two scores can be considered: only the interference score or the total score ("yes" plus interference). The reliability found in the Spanish version was excellent (0.90 for the total score, 0.87 for the interference score) and the validity as a screening test for OCD in a non-clinical population was supported (Canals et al., in press). To detect the manifestations of OCD most studies set the interference score at 25 (Flament et al., 1988; Valleni-Basili et al., 1994; Maggini et al., 2001).

OCD was assessed using the Mini-International Neuropsychiatric Interview for Kids (M.I.N.I.-Kid, Sheehan et al., 1998), a structured diagnostic interview for children aged between 6 and 17 years old based on DSM-IV and ICD-10 psychiatric disorders. With an administration time of approximately 30 minutes, it is a short and accurate instrument for diagnosing 23 axis I disorders. The reliability and validity of MINI-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. We designated a subject as having *clinical OCD* or *OCD* when the child met all the criteria for OCD according to the

DSM-IV. We labeled a subject as having *subclinical OCD* when the interference criteria was not complete.

We used the Children's Global Assessment Scale (CGAS; Shaffer et al., 1983) to measure functional impairment. CGAS scores range between 0 (maximum impairment) and 100 (perfect functioning). Scores lower than 70 are indicators of clinical impairment.

Sociodemographic data were collected by means of a questionnaire designed for this study in which we asked children about their parents' jobs, family structure, and place and date of birth. We asked the teachers for information on the academic performance of the subjects by rating their performance with one of the following five response options: below average (1,2), about average (3), and above average (4,5).

Procedure

We used a two-phase epidemiological study design. In the first phase we assessed anxiety symptoms (SCARED-C, Birmaher et al., 1997; Vigil-Colet et al., 2009), depressive symptoms (CDI, Kovacs, 1985), obsessive-compulsive symptoms (LOI-CV, Berg et al., 1988) and the sociodemographic data of the 1,514 subjects. In the second phase (the next academic year), we selected a sample of subjects at risk of mood and anxiety disorders according to the SCARED (32 cut-off point) and/or CDI (17 cut-off point) and/or LOI-CV scores (25 cut-off point in the interference score) and a sample of not-at-risk controls and paired them by age, gender and type of school. In this phase we again administered the CDI, SCARED and LOI-CV and conducted psychopathological diagnoses using the structured interview (M.I.N.I.-Kid). The researchers scored the CGAS immediately following the interview. The M.I.N.I.-Kid was administered to the child on the same day or, at the most, during the week after the questionnaires were completed. At this stage the interviewers were blind to the test results. To obtain diagnoses we also took into account data from the psychopathological tests completed by the parents (CSI-4,

Gadow & Sprafkin, 1998; SCARED-P; questionnaire of OCD manifestations developed for the study). When we had doubts on diagnoses, we telephoned the children's parents.

Children who participated in this study completed the questionnaires in small groups of three or four. 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.

Before beginning the study, we had to obtain permission from the Catalan Ministry of Education. We then contacted the 13 school boards. None of them declined to participate. Finally, we sent all parents a letter to inform them about the study and ask for their written informed consent. After each child was assessed, we gave him or her an envelope with questionnaires for their parents. These surveys about their children's psychological problems had to be completed and returned to the school.

Results

Prevalence of OCD

Table 2 summarizes our results regarding the prevalence of the various levels of OCD. OC symptomatology was assessed based on an interference score of 25 on the LOI-CV. Therefore, 4.75% (CI 95%: 3.73-5.95) of the subjects presented symptoms, but no significant differences were found in terms of gender or academic grade.

The estimated prevalence of subclinical OCD was found to be 5.5% (CI 95%: 4.3%-6.6%). Subclinical OCD was more prevalent in males (7.6%) than in females (3.8%) (Chi^2 =9.428; p=0.002), but no significant differences were found by academic grade.

The estimated prevalence of OCD was 1.8% (CI 95%: 1.1%-2.4%), without significant differences between genders or academic grades.

PLEASE INSERT TABLE 2

Comorbidity and degree of severity

The rate of comorbidity between OCD and any other psychiatric disorder was 85%. The highest comorbidity was for generalized anxiety disorder (55%), followed by separation anxiety (40%), depression (35%), social phobia (30%), attention deficit/hyperactivity disorder (20%), disruptive behavior disorders (oppositional defiant disorder and conduct disorder – 20%) and panic attack (20%). Of the subjects in which comorbidity was documented, most were found to have one comorbid diagnosis (30%), while 25% had two comorbid diagnoses, and 10% had three, four or five comorbid diagnoses. There were no children with tic disorders.

CGAS scores were significantly lower in children diagnosed with some degree of OCD than in children without the disorder ($F=6.37$, $p<0.001$). Comparing clinical OCD, subclinical OCD and subjects without the disorder, the children diagnosed with clinical OCD had significantly lower scores ($p<0.001$) on the CGAS (mean=61, SD 12) than the children diagnosed as not having the disorder (mean= 93, SD 7). The children with clinical OCD scored significantly lower ($p<0.01$) than children with subclinical OCD (mean= 72, SD 22), who in turn scored significantly lower ($p<0.001$) than children who were not diagnosed with the disorder.

We found that CGAS scores were significantly lower when OCD had comorbidity with other disorders ($F=110.8$; $p<0.001$). OCD impairment was highest in subjects with two or more comorbid disorders (mean= 57, SD 10). The CGAS mean scores were significantly lower in subjects with OCD and two or more disorders than in subjects with OCD without comorbidity (mean=73, SD 15)($p=0.01$), but not significantly different in subjects with OCD and one comorbid diagnosis (mean=61, SD 7). CGAS scores did not differ significantly ($F=2.61$) based on comorbid disorder type. The mean scores on the CGAS of subjects with OCD and comorbid disorders of the externalizing type (ADHD, disruptive disorders) were slightly lower (mean=55, SD 7) than in subjects with OCD and comorbid emotional problems (mean= 62, SD 10).

Sociodemographic correlations and use of mental health services

Social class distribution did not differ significantly between the three groups of OCD diagnoses (subclinical OCD, clinical OCD or no disorder) ($Chi^2=7.49$, $p=0.11$). Furthermore, no

differences were found between the three OCD groups with regard to whether the subjects were Spanish or of another ethnic-cultural group (Chi^2=3.43, p=0.48).

Family structure (nuclear vs. single parent) did not have any significant affect on either the OCD group or the control group (Chi^2=0.085, p=0.95).

No differences were found between students attending state schools and those enrolled in state-subsidized private schools in the three OCD groups (Chi^2=0.99, p=0.61).

Compared to the control subjects, the academic performance of subjects diagnosed with clinical OCD (mean =2.25, SD 0.9) was significantly lower (p=0.003), as these students' performance was below average in general. However, the mean academic performance (2.98, SD= 0.9) of the subclinical OCD subjects did not differ significantly from the mean performance of the control group (3.11, SD=1.0), but was significantly higher than in the clinical OCD group (p< 0.03)(F= 5.77).

Previous contact with mental health services had been made in 85% of the OCD cases and in 60% of the cases of subclinical OCD. It is unknown whether the families consulted mental health services in relation to OCD or for other comorbid manifestations.

Discussion

This study provides new data on the prevalence of OCD in non-clinical subjects in early adolescence. Based on the OCD symptoms detected by means of LOI, our data show a rate slightly higher than that found by Thomsen (1993) and Maggini et al. (2010) who found a prevalence in their studies of 4.1%, and slightly lower than that published by Brynska et al. (2005), who found a prevalence of 5.5%. Although all of these studies used the LOI, the mean age of our sample (11.2 years) was younger than the mean age in any of them. Our findings did not coincide with those of Valleni-Basile et al. (1994), who found 19% of the symptoms in adolescents between 12 and 15 years old. However, the prevalence of subclinical OCD was high (5.5%) in our study and higher than that of Apter et al. (1996) and of Brynska et al. (2005). The prevalence of OCD was higher than that found in studies with samples of similar ages (Costello et al., 1996; Heyman et al., 2001, Brynska et al., 2005), but was in keeping with that found by

Flament et al. (1988) and by Maina et al. (1999), both with samples of older adolescents, while lower than that of other studies also involving older adolescents (Valleni-Basile et al., 1994; Zohar et al., 1992; Zohar et al., 1993). There are several possible explanations for our findings. Firstly, there may be a secular increase of prevalence compared to previous research, an explanation which is also supported by the fact that the rate of prevalence found in our study is more similar to that found in older adolescents in other studies. On the other hand, the mean age of our study coincides with the mean age of onset of OCD (11.5 years) cited in Brynska et al. (2005), so our study may have been conducted with subjects who were at the peak of OCD onset. The prevalence of subclinical and clinical OCD was the highest in the academic grade that the children are in at 11 years of age (5^{th} grade in the first phase and 6^{th} grade in the second phase). Thirdly, we believe that the prevalence of subclinical OCD is most likely higher than the symptoms detected by the LOI would indicate because there are children that present only one or two types of obsessions and compulsions, which is not sufficient to reach the interference score of 25 on the LOI, although these manifestations can be detected in the clinical interview. Reaching the interference score of 25 on the LOI implies the manifestation of multiple symptoms that interfere considerably with the subject's ability to function.

Our findings of equal rates of symptoms and incidence of clinical OCD between the sexes is consistent with those of Heyman et al. (2001) in this age group, but do not agree with the results of other epidemiological studies which report a majority of girls among adolescents (Brynska et al., 2005; Maggini et al., 2001). However, the prevalence of subclinical OCD was higher in boys than in girls, which may indicate that we detected more manifestations in boys during the interview, although those manifestations do not cause severe interference. In children, other authors have stated that more boys than girls seem to exhibit the symptoms of OCD (Valleni-Basile et al., 1994; Fontenelle et al., 2008; Masi et al., 2004) and that the rate increases in females starting in adolescence (Ruscio et al., 2010). Gender differences in the various levels of OCD severity may be explained by the fact that our sample is at the borderline between childhood and adolescence. There is a tendency for the prevalence of all OCD groups to decrease as the subjects get older. As previously mentioned, the age of the children

corresponding to the highest rate of OCD prevalence coincides with the mean age of onset estimated by several authors (Brynska et al., 2005; Toro, Cervera, Osejo, & Salamero, 1992).

The high rates of comorbidity found in our study are in line with the rates reported in other epidemiological and clinical samples (Heyman et al., 2001; Fontenelle et al., 2008; Masi et al., 2010). As expected, the degree of impairment according to CGAS scores was related to comorbidity. The most common comorbid diagnoses were anxiety disorders, which is consistent with other data on children in both non-clinical (Heyman et al., 2001) and clinical populations (Lewin et al., 2010) and on adults (Ruscio et al., 2010). We also found a high degree of comorbidity with depression, which may indicate that the disorder is already severe in early adolescence. According to Torres et al. (2011), adult patients with OCD and comorbid depression are at a high risk for suicidal behaviors, therefore, suicidal inclinations must also be considered in children. On the other hand, our results support comorbidity with ADHD and disruptive disorders, as do other recent studies (Masi et al., 2010, Sheppard et al., 2010; Storch et al., 2010b). However, we did not find comorbidity with tics, a disorder related to ADHD and frequently associated with OCD in children (Masi et al., 2010; Walitza et al., 2011). Heyman et al. (2001) found neither an association with tics nor with ADHD.

We have not found any significant differences in impairment according to the type of comorbid disorder. However, we think that this relationship may be conditioned by a small number of subjects in each comorbidity group. The presence of externalizing disorders was characterized by Langley et al. (2010) as associated with greater functional impairment, which we observed in our study as well.

Functional impairment was significantly higher in all OCD groups than in the control group. However, the CGAS scores were significantly lower in clinical OCD subjects than in subclinical OCD subjects, corroborating the severity of the diagnoses. In clinical OCD, the CGAS mean score is indicative of clinical impairment (<70). Furthermore, clinical impairment was linked to comorbidity, as in these cases the mean CGAS score was below 70.

Our results corroborate previous findings that there is no link between OCD and living with or without both biological parents (Brynska et al., 2005; Toro et al., 1992). Likewise, as in most

epidemiological studies (Brynska et al., 2005; Flament et al., 1988) we did not detect an association between ethnic-cultural group, socioeconomic status or type of school and OCD, which supports the biological basis of OCD. On the other hand, we found a relationship between academic performance and OCD. According to our findings academic performance was significantly lower in children with clinical OCD than in those with subclinical OCD or without the disorder. This association may be explained by how OCD and the interference stemming from the disorder hinder learning due to the impairment from OCD itself, as well as to the probability of having comorbid disorders. Another explanation might be that individuals with OCD seem to have lower IQs than control subjects, as documented in Heyman et al. (2001).

The rate of previous contact with mental health services by the subjects in our study was higher than that in other epidemiological studies (Heyman et al., 2001; Ruscio et al., 2010). However, we do not know whether the motive for the consultation was OCD, the comorbid psychopathology or poor academic performance, and we also had no data on treatment. The information was collected from the children in the interview and was only confirmed by the parents by telephone when we needed more information to support diagnoses.

This work should be viewed in the context of some limitations. One such limitation is that we do not evaluate a national sample, but a representative sample from a single population in Spain and in a two-phase design. This has meant that the sample size of pathological subjects is small and may interfere with some statistical associations. Furthermore, although we think that information on OCD should be collected mainly from the children, the structured interview was done only with the children, without their parents present. Nevertheless, this study provides recent data to the literature on the prevalence of OCD in a non-clinical sample of children/young adolescents. The estimated prevalence of clinical and subclinical OCD was high, with high rates of comorbidity and functional impairment, which supports screening in the non-clinical population and the possibility of early diagnosis and treatment.

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