ORIGINAL REPORT

Prevalence Rates of Obsessive-Compulsive Symptoms and Psychiatric Comorbidity Among Adolescents in Iran

Giti Shams[1], Elham Foroughi[2], Yaghoob Esmaili[3], Homayoon Amini[1], and Narges Ebrahimkhani[1]

[1] Department of Psychiatry, Roozbeh Hospital, Tehran University of Medical Sciences. Tehran, Iran

[2] Department of Psychology, School of Behavioral Science, University of Melbourne, Melbourne Australia

[3] Department of Psychology, Rodhen Azad University, Tehran, Iran

Received: 26 Apr. 2010; Received in revised form: 27 Nov. 2010; Accepted: 8 Jan. 2011

Abstract- Recent epidemiological studies show that obsessive-compulsive disorder (OCD) and its comorbidity with psychiatric problems is more prevalent among children and adolescents than was previously believed. The primary aim of the current study is to investigate the point-prevalence rate of obsessive compulsive symptoms in a sample of adolescent high school student in Iran. A two-stage epidemiological study was carried out through a clustered random sampling method. All participants went through a two-stage assessment procedure, in the first screening phase, the Maudsley Obsessive-Compulsive Inventory (MOCI) was administered to 909 randomly selected students (in the age range 14-18 years). Participants were considered possible sub-clinical or clinical OCD cases, if they obtained a score of MOCI≥15. In the second stage, the Symptoms Checklist -90-revised (SCL-90-R) was administered to student who fulfilled the screening criteria. The prevalence of OC symptoms was found to be 11.2 percent for the total sample. The most prevalent comorbid conditions were depression and anxiety with prevalence rates of 91.2 and 78.4 percent respectively. Gender, age, birth-order, parent's education and family income had no statistically significant association with OC symptoms. Further research in this area is warranted in order to establish a set of comprehensive global assessment and measurement tools, which would allow cross-cultural studies in the field of OCD.

Acta Medica Iranica, 2011; 49(10): 680-687.

Keywords*:* OC symptoms; Adolescents; Co morbidity; Psychiatric problems; Epidemiology

Introduction

Obsessive-compulsive disorder is a chronic condition characterized by recurrent intrusive thoughts and/or repetitive ritualistic behaviors that are distressing and cause a high degree of impairment (1). Reported as the tenth leading cause of disability in the world by the World Health Organization (WHO) in 1996, OCD causes disrupted development, social withdrawal, family and relationship problems, difficulties with concentration and academic performance (2,3). Thus, the identification of early onset OCD is vital since results from treatment outcome studies in children and adolescents are in line with those obtained for adult samples and the overall findings indicate that cognitive behavior therapy is also efficacious in the younger population (4,5).

Obsessive-compulsive disorder is more common among children and adolescents than was previously believed (6,7). In a review of epidemiological studies of OCD in children and adolescents by Fontenelle and Hasler (8), the authors reported a range of very diverse findings from studies in several different countries. With prevalence rates varying from as low as 0.6 % in USA (9), 0.5% and 0.6% in Greece and Germany respectively (10,11), 0.7% in Spain (12), 2.0% in Italy (13) and one of the highest prevalence rates was 3.56% in Israel (14). There are relatively few adult OCD epidemiological studies in Iran and to our knowledge, there are no published epidemiological studies specifically targeting the child and adolescent populations in Iran. A recent adult epidemiological study by Mohammadi (15) found a nation-wide prevalence of 1.8 % among the general population. The reported adult prevalence rates range between 1.49 to

Corresponding Author: Giti Shams
Department of Psychiatry, Roozbeh Hospital, Tehran University of Medical Sciences. Tehran, Iran
Tel: +98 21 55419151, Fax: +98 21 55419113, E-mail: gkshams2000@yahoo.com, shamsgit@tums.ac.ir

2.99 (16-18), however several of these studies have been carried out in various geographical locations with very diverse socio-cultural make-up, making generalisation a complicated endeavour. For example, Mohammadi (17) found a prevalence rate of 1.49% (0.48% among male and 2.56 % among female) in their sample of 5311 Tehranian participant. While in a study carried out by Sadeghi (18), in a city of Kermanshah (south-west of Iran), the prevalence rate of OCD was found to be almost twice this rate at 2.99 (3.7% in females and 2.16% in males). Although this study did include adolescent participants (age range 15-65), the findings did not provide any specific information regarding the younger sample. This is due to the fact that the results of the study were presented for two aggregated age group comprising individuals, 15 to 44, and above 45 years, age bands.

In several epidemiological studies of OCD in children and adolescents, associations between OCD with demographic variables such as age, gender, socio-economic status and environmental factors such as birth order, have also been investigated and have yielded interesting findings .While most studies determine the average age of onset of OCD to be during late adolescence and early adulthood (19), a pattern of gender differences has emerged; where males have been consistently noted to have an earlier onset relative to their female counterparts . With a few exceptions (20, 21), several epidemiological studies undertaken in various countries such as Egypt, Australia and Spain have found a similar pattern of predominance of males with OCD in the child and adolescent populations (12,22,23).

In addition, studies in the adolescent's population suggest that older adolescents maybe are at higher risk for developing OCD (24,25). For example, Thomsen (26) reported that Danish students in the highest grades to show significantly more OC symptoms than those of the lowest grades. Zohar and Bruno (27) also found that; there were significantly higher rates of children with very high scores on the Maudsley Obsessive-Compulsive Inventory (MOCI) amongst the eighth grade students in comparison to the sixth and fourth graders in their sample.

Although clinical studies indicate that individuals with OCD, especially children, may come from families with higher socioeconomic status (28), these findings may reflect greater availability and access to treatment for these individuals due to their socioeconomic standing (6). In contrast to clinical studies, epidemiological studies in the community suggest that the family's socio-economic status does not determine the prevalence rate of OCD (29). Douglass (30) also reported that the parental education and socioeconomic status of 18-year-olds with OCD were not significantly different from those of healthy controls and from individuals with other mood and anxiety disorders. Likewise, in a study by Çilli (31) in Turkey, the authors reported that family income did not exhibit any significant effect on the prevalence rate of OCD.

Earlier studies on the association between birth order and OCD have suggested that OCD is disproportionately represented in individuals who were either firstborn or only children (32,33). However most of the more recent epidemiological studies have not provided support for these initial findings and did not report any evidence of increased rates of first-born children among individuals with OCD (20,31,34).

OCD is characterised by high rates of comorbidity with other psychiatric disorders such as depressive, anxiety, personality and neuropsychological disorders. Childhood-onset OCD has been associated with greater levels of co-morbid tic disorders such as Torrente's syndrome (35). The comorbidity rate between OCD and major depressive disorder and dysthymia has been found to be between 20% and 60% (26,36,37), a finding which seems to apply to the children and adolescents population as well as adults. In addition, there is also a high degree of comorbidity between OCD and other anxiety disorders. In long-term follow-up studies of children and adolescents, it was found that approximately 50% of the OCD patients fulfilled the criteria for another form of anxiety disorder (most commonly panic disorder) at some stage during the course of their illness (26,38).

The aims of the present study are threefold; the primary aim of the current study is to investigate the point-prevalence rate of obsessive-compulsive symptoms in a sample of adolescent high school student in Iran. The second objective is to examine the association between OC symptoms with demographic variables such as age, socioeconomic status, and finally to examine the extent of psychiatric co morbidities (depression and anxiety symptoms) among those students with OC symptomatology.

Materials and Methods

Sample

Nine hundred and nine high school students from the cities of Ardakan and Maybod, a semi-rural area in the province of Yazd (south- east of Iran) were recruited for

this study using cluster random sampling method. The sample consisted of 60.8 percent females, in the age range of 14 to 18 years, and the mean age was 15.92 years (SD=1.05). A two-stage epidemiological study was employed in order to investigate the point prevalence rates of OC symptoms as well as comorbid psychiatric symptoms with nine psychiatric symptoms among this sample of high school students. In the first stage, all participants completed the Farsi version of the demographic form and the MOCI. In the second stage, those participants who obtained a MOCI score equal or greater than 15 completed the SCL-90-R.

Assessments

The Maudsley Obsessional-Compulsive Inventory (MOCI, 39) is a 30-item true-false questionnaire for assessment of obsessive and compulsive symptoms, developed by Hodgson and Rachman (39). Maximum scores for the five scales (total, checking, washing, slowness-repetition, and doubting-conscientious) are 30, 9, 11, 7 and 7, respectively. This inventory was found to have adequate validity and reliability (40) and is widely used. The test-retest reliability of MOCI is particularly good (r=0.98). This test has been translated and used in previous studies in Iran and has shown to possess adequate psychometric properties (41,42).

The Symptom Checklist Questionnaire –Revised (SCL-90-R, 43) - The SCL-90-R is a 90-item, self-report measure of clinical functioning tapping nine domains of distress and symptoms (i.e., Somatisation, Obsessive-compulsive symptoms, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobia, Paranoid Ideation and Psychoses) within previous 7 days. Subjects rate items on a 5-point scale of distress ranging from 0 (not at all) to 4 (extremely). The compared groups on raw scores because no standardized, t-score value norms exist for adolescent. Raw scores were computed by summing each item on a factor and dividing by the number of items making up the factor. Thus, each factor score could range from 0 to 4. The Persian version of this measure is also widely used in Iran and all subscales have demonstrated to have good internal consistency with standardized alphas for the subscales ranging from 0.76 to 0.86 (44). In the absence of standardized t-score values for the adolescent population in Iran, the comparisons across groups in this study were based on raw scores for each subscale. Raw scores were computed by summing each item on a factor and dividing by the number items making up the factor. Thus, each factor score could range from 0 to 4. Scores at the 90th percentile were considered as the cut-off point for each subscale (Somatisation >1.45, Obsessive-compulsive symptoms >2, Interpersonal Sensitivity >2, Depression >2, Anxiety >1.56, Hostility >1.67, Phobia >1.56, Paranoid Ideation >1.24 and Psychoses >2.33).

Results

Demographic characteristics of the sample such as age, gender, birth order in the family, parent's education and family income levels, are presented in Table 1.

Table 1. Demographic characteristics of the sample (N= 909)

Variables		Age groups					
		14 years	15 years	16 years	17 years	18 years	Total
Sex	Male	41 (4.5%)	146 (16.1%)	85 (9.4%)	70 (7.7%)	14 (1.5%)	39.2%
	Female	42 (4.6%)	94 (10.3%)	224 (24.6%)	154 (16.9%)	39 (4.3%)	60.7%
Birth Order	First	10 (1.1%)	58 (6.4%)	63 (6.9%)	40 (4.4%)	6 (.7%))	19.5%
	none first	73 (8%)	182 (20%)	246 (27.1%)	184 (20.2%)	47 (15.2%)	80.5%
Parent's	Father & Mother Under Diploma						
Education	Father Under Diploma	46 (5/1%)	154 (16.9%)	200 (22%)	155 (17.1%)	35 (3.9%)	64.9%
	Mother Diploma & Upper	2 (2%)	9 (1%)	11 (1.2%)	3 (0.3%)	2 (0.2%)	3%
	Father Diploma & Upper						
	Mother Under Diploma	23 (2.5%)	57 (6.3%)	64 (7%)	41 (4.5%)	13 (1.4%)	21.8%
	Father & Mother Diploma & upper	14 (1.5%)	19 (2.1%)	33 (3.6%)	25 (2.8%)	3 (0.3%)	10.3%
Family	Low income	18 (2%)	50 (5.5%)	66 (7.3%)	54 (5.9%)	20 (2.2%)	22.9%
Income	< 60000						
(Tooman)	Medium income	52 (5.7%)	165 (18.2%)	209 (23%)	140 (15.4%)	28 (3.1%)	65.3%
	60000- 2000000						
	High income	13 (1.4%)	25 (2.8%)	34 (3.7%)	30 (3.3%)	5 (.6%)	11.8%
	> 2000000						

Table 2. Point prevalence rates of birth order, parent's education, and family income for the total sample

Variables		Without OCD *f*,%	With OCD *f*,%	χ^2	*df*	*P*
Gender	Male	313 (34.4)	43 (4.7)	0.432	1	0.511
	Female	494 (54.3)	59 (6.5)			
Birth Order	First	164 (18.5)	13 (1.4)	3.316	1	0.07
	None first	643 (70.7)	89 (9.8)			
Parent's Education	Father & Mother Under Diploma					
	Father Under Diploma	522 (57.2)	70 (7.7)	4.978	3	0.173
	Mother Diploma & Upper	22 (2.4)	5 (0.6)			
	Father Diploma & Upper	176 (19.4)	22 (2.4)			
	Mother Under Diploma					
	Father & Mother Diploma & upper	89 (9.8)	5 (0.6)			
Family Income (Toman)	Low income < 60000	183 (20.1)	25 (2.8)	5.222	2	0.073
	Medium income 60000 To 2000000	522 (57.4)	72 (7.9)			
	High income > 2000000	102 (11.2)	5 (0.6)			

The prevalence of OC symptoms in the sample (age 14-18 year old) indicated that 10.8 percent of the fourteen year olds, 11.7 percent of the 15 year olds, 11.3 percent of 16 year olds, 9.8 percent of 17 year olds, 15.1 percent of the 18 year olds and 11.2 percent of the total sample exhibited symptoms of OC and has obtained a MOCI score greater than 15. Chi-Square test did not reveal any significant differences across the age groups (range=14-18 years) in the proportion of participant presenting with OC symptoms (χ^2=1.302, *df* =4, *P*=0.86). Gender differences were also examined. In the female participants, the 18 year old age group had the largest proportion of subjects with OC symptoms (15.41%), while the 15 year old participants were the least affected group (8.5%). Similarly for their male counterparts, the 18 year old group, had the highest prevalence of participants with OC symptoms (14.3%), however for boys, the 17 year old participants were the group least affected by OC symptoms. For both the female and the male groups Chi-Sq test revealed, no significant relationship between the age group of the participant and the proportion of participants reporting OC symptoms.

Participants were divided into two groups consisting of those subjects with OCD symptoms below the mean MOCI score of 15 and those who obtained scores above the average score. Chi-square comparisons were performed on nominal variables such as birth order in the family, parent's education level and the family income across the two groups. The results are presented in Table 2. No significant differences were observed between the two groups across any of these variables. However it is interesting to note that the participants in the most affluent group with the highest family income contained the lowest number of participant with OCD symptoms (0.6%), more than five times less than the other lowest income group.

Table 3 demonstrates the comorbidity of the OC symptoms with other psychiatric problems. As can be seen in the following table, the majority of individual with OC symptomatology presented with comorbid depressive (91.2%) and anxiety (78.4%) symptoms.

Table 3. Point prevalence rates of comorbid psychiatric disorders as assessed by SCL-90-R

MOCI Subscales / Psychiatric Symptoms	Washing (*f*, %)	Checking (*f*, %)	Doubting (*f*, %)	Slowness (*f*, %)	Total (*f*, %)
Somatization	11 (10.8%)	17 (16.7%)	20 (19.6%)	3 (2.9%)	21 (20.6%0
Obsessive compulsive (OC)	30 (29.4%)	30 (29.4%)	86 (84.3%)	16 (15.7%)	97 (95.1%)
Interpersonal Sensitivity (INT)	5 (4.9%)	8 (7.8%)	9 (8.8%)	2 (2%)	9 (8.8%)
Depression (DEP)	31 (30.4%)	51 (50%)	81 (79.4%)	15 (14.7%)	93 (91.2%)
Anxiety (ANX)	25 (24.5%)	48 (47.1%)	72 (70.6%)	11 (10.8%)	80 (78.4%)
Hostility (HOS)	12 (11.8%)	18 (17.6%)	20 (19.6%)	4 (3.9%)	20 (19.6%)
Phobia (PHOB)	8 (7.8%)	9 (8.8%)	10 (9.8%)	2 (2%)	10 (9.8%)
Paranoid Ideation (PAR)	2 (2%)	3 (2.9%)	3 (2.9%)	1 (1%)	3 (2.9%)
Psychoticism (PSY)	1 (1%)	2 (2%)	2 (2%)	0 (0%)	2 (2%)

Table 4. Simple Multiple Regression on MOCI-Total

Predictor Variables	Standardised Beta	sr^2	*t*	*P*
Somatisation	0.266	0.391	5.483	000.0
Obsessive compulsive (OC)	0.0052	0.088	1.337	0.188
Interpersonal Sensitivity (INT)	- 0.40	0.222	-0.873	0.385
Depression (DEP)	0.083	0.376	1.777	0.079
Anxiety (ANX)	- 0.111	0.462	-1.853	0.067
Hostility (HOS)	0.592	0.790	8.260	0.000
Phobia (PHOB)	0.260	0.442	5.483	0.000
Paranoid Ideation (PAR)	0.069	0.382	1.374	0.173
Psychoticism (PSY)	0.007	0.100	0.173	0.863

In order to ascertain the relative contribution of each of these symptom domains to the OC symptoms as measured by the MOCI, a standard multiple regression was carried out. Overall, collectively the nine IVs significantly predicted MOCI variance, accounting for 87 percent of the variance in MOCI-Total ($R=0.939$, $R^2=0.882$, Adjusted $R^2=.087$, $F(9,92)=76.41$, $P<0.000$). The highest unique contribution were made by somatisation, hostility and phobia which respectively accounted for an additional 88.2%, 79%, 44% of the variance in OC symptoms, over and above the other factors. The results are presented in Table 4.

Discussion

Overall the results from this study are well in line with outcomes of previous studies suggesting that OCD is more prevalent in childhood and adolescent population than was previously believed (6). It has been estimated that 30-50% of adult with OCD recall the onset of their symptoms beginning before the age of 18 (45,23). As many as 50% of obsessive compulsive disorder cases have had onset by age 15 (11). In this study, the point prevalence rate of OC symptoms, as assessed by the MOCI, was found to be 11.2% for the total sample. This finding was almost identical to the findings reported by Mania (13), where the authors reported a prevalence rate of 12.3% in their Italian sample of older adolescents. Slightly higher rates were reported by Valeni-Basil (46), who found OCs in 18% of their American sample of 12-15 year olds, and by Humaida (47) where a prevalence rate of 18.4 % for their adolescent sample in rural Egypt was reported. The observed difference in these findings may be due to a number of factors including the characteristics of the sample under investigation (i.e. ethnicity, age group) and the use of various diagnostic instruments and methodological approaches employed in these studies. While most OCD studies in adult populations report a predominance of females in their clinical and epidemiological samples, there is limited research and conflicting findings with regard to gender differences in children and adolescents samples. In contrast to those studies that report a predominance of males with OCD in adolescent samples (with an average of 3:2 male to female ratio) (20,47,29,48), in this study the prevalence of OCs was almost equally distributed among the male (12.1%) and female (10.7%) cohorts. The findings of this study however, provides further support for those studies that did not report any gender differences (5,49,30).

While previous studies suggest that older adolescents maybe particularly prone to develop OCD (24,36,46,50) no evidence of an association between age and OC symptoms, was found across the age groups for the total sample. Even when male and females cohorts were considered separately, no significant relationship between the age group of the participant and the prevalence of OCs was found. Nevertheless some support for the proposed association between age and OCS, was found by the observation that for both gender groups, the highest OCs prevalence rates was obtained by the older adolescents in the 18 year old age band (51,48,52).

As with previous epidemiological studies (31,29), socioeconomic status and parent's education level was not found to have any association with the prevalence rate of OC symptomatology in this sample group of adolescents. This is in sharp contrast to the findings reported by Heyman (53) in which 74% of their community child and adolescents subjects with OCD belonged to the lower social classes compared with 47% of the normal controls. In addition, the result of the present study supports previous studies, which did not find increased rates of first-born children among individual with OCD (20,31,34). Therefore it appears that in this Iranian sample, the socio-demographic risk

factors under the investigation did not show any association with the prevalence of OCD symptoms , suggesting that other risk factors relevant to this sample may need to be identified and investigated in future research. Psychiatric comorbidity is common in adults with OCD and as indicated, studies of juvenile OCD have similarly found high rates of co morbid major depression (10-73%, anxiety disorder (26-736), and tic disorders (17-59%). A notable finding of this study was the high association between OC symptomatology and other psychiatric symptoms. The two highest reported psychiatric problems associated with OC symptomatology were found to be depression (91.2%) and anxiety (78.4%) symptoms. Results of this study are in line with previous findings (26,36,37). In a study by Swedo (54), 35% of their OCD sample received a comorbid diagnosis of depression, and 40% obtained an additional diagnosis of another anxiety disorder. In other clinical studies of children and adolescents a similar proportion (60-80%) had other lifetime diagnosis a part from OCD (55, 56). Zohar (14) also found high rate of comorbidity in their epidemiological sample, reporting that about two-third of young people with OCD have at least one other psychiatric diagnosis. Overall, the research findings from both epidemiological and clinical settings in various countries suggest that affective and anxiety disorders are common comorbid problem in OCD. Meanwhile, Harwath and Weismann (36) also suggests the need to consider co morbid illness in youth who have OCD or to consider OCD and its possible origins in children who initially present with symptoms of anxiety, depression or aggression. The results of this study suggest that the child/ adolescent presenting with symptoms of somatisation, hostility or phobia needs to be also assessed for symptoms of OCD and vice versa. This consistent finding across different cultures have important clinical implication on the diagnosis, early detection and the formulation of appropriate treatment plan for the individual with OCD.

One major limitation of this study is that despite a large sample size, the distribution of the participants across the age groups was not equal and resulted in a small number of subjects in certain age groups. There is a need for replication studies including larger samples in various sites in order to attain a better understanding regarding the generalibility of these findings. Another limitation of this study, as with previous studies, is the choice of different measures, which makes direct comparison with other studies from different countries a difficult endeavour.

In addition, longitudinal studies are needed in order to investigate the progression of these subclinical symptoms into adulthood, particularly to address the culture specific factors that correlate with OCD and may contribute to the development and maintenance of OCD into adulthood. In conclusion, to advance our knowledge on the epidemiology of OCD, it is imperative to establish a set of global assessment tools in order to carry out research specifically aimed at comparing the prevalence rates, demographic characteristics and the risk factors associated with OCD across different countries. Meanwhile more Iranian studies are needed in order to determine the possibility of idiosyncratic risk factors associated with OCD in children and adolescents with OCD this culture.

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