



## Incidence of Obsessive-Compulsive Disorder in a Community Sample of Young Adolescents

[Article]

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### ABSTRACT

**Objective:** To investigate the incidence, transition probabilities, and risk factors for obsessive-compulsive disorder (OCD) and subclinical OCD in adolescents.

**Method:** A two-stage epidemiological study originally designed to investigate depression was conducted between 1987 and 1989 in the southeastern United States. For the screening, a self-report depressive symptom questionnaire was administered to a community sample of 3,283 adolescents. In the diagnostic stage, the Schedule for Affective Disorders and Schizophrenia for School-Age Children was administered to 488 mother-child pairs. Baseline screening and diagnostic data from the first year the subject completed an interview and follow-up diagnostic data from subsequent years were used.

**Results:** The 1-year incidence rates of OCD and subclinical OCD were found to be 0.7% and 8.4%, respectively. Transition probabilities demonstrated a pattern of moving from more severe to less severe categories. Of those with baseline OCD, 17% had the diagnosis of OCD at follow-up; 62% moved to the referent group. Of those with baseline subclinical OCD, 1.5% had OCD at follow-up and 75% moved to the referent group. Black race (odds ratio [OR] = 23.38), age (OR = 4.02), desirable life events (OR = 0.78), undesirable life events (OR = 1.21), and socioeconomic status (OR not estimable) were significant predictors of incident OCD. Age (OR = 2.30), desirable life events (OR = 0.92), and undesirable life events (OR = 1.13) were significantly associated with incident subclinical OCD.

**Conclusion:** An initial diagnosis of subclinical OCD was not significantly predictive of a diagnosis of OCD at 1-year follow-up. The overall morbidity remained higher at follow-up in the baseline OCD group than in the baseline subclinical OCD group. The baseline subclinical OCD group was more dysfunctional at follow-up than was the baseline referent group. Further research concerning differences in symptomatology and impairment between OCD and subclinical OCD is warranted. *J. Am. Acad. Child Adolesc. Psychiatry*, 1996, 35(7):898-906.

Key Words: obsessive-compulsive disorder, incidence, adolescent.

Epidemiological studies on obsessive-compulsive disorder (OCD) most often report prevalence data. Furthermore, most studies are on clinical rather than community populations. Clinical studies of adults have found OCD prevalence rates to range between 0.05% and 1.0% (Black, 1974; Goodwin et al., 1969; Hare et al., 1972; Karno et al., 1988; Karno and Golding, 1991; Rudin, 1953) [8,15,18,23,22,38]. Clinical studies of children have estimated the prevalence to range from 0.2% to 1.2% (Berman, 1942; Hollingsworth et al., 1980; Judd, 1965) [6,20,21].

Community prevalence of OCD has been found to be higher than clinical prevalence in all age groups. Community adult studies have reported the prevalence of OCD to fall between 1.0% and 2.6% (Karno et al., 1988; Myers et al., 1984; Robins et al., 1991) [23,28,37]. The prevalence of OCD in adolescents was estimated to be 1.0% (Flament et al., 1988) [11] and 2.95% (Valleni-Basile et al., 1994) [45] in two different US populations, and 3.56% (Zohar et al., 1992) [49] in an Israeli population.

A higher prevalence of OCD in community populations than in clinical populations is a consistent finding and may be attributable to underdiagnosis by health care professionals who, until recently, believed OCD to be rare. Stoll et al. (1992) [42] reported that the frequency of OCD diagnosis increased markedly during the 1980s and was strongly associated with increases in publications about the disorder. People with OCD often do not realize treatment is available, fail to seek treatment until symptoms become so severe as to cause serious loss of functioning, are secretive about symptoms, and turn to nonpsychiatric specialists, further delaying their referral to a psychiatrist (Rapoport, 1989; Rasmussen and Tsuang, 1986; Zohar et al., 1992) [32,33,49].

Incidence OCD data are sparse. Studies indicate OCD usually develops before age 25, most often in early adolescence (Berman, 1942; Black, 1974; Flament et al., 1988; Goodwin et al., 1969; Hollingsworth et al., 1980; Judd, 1965; Kringlen, 1965; Rapoport, 1989; Riddle et al., 1990; Swedo et al., 1989) [6,8,11,15,20,21,24,32,35,43]. Rasmussen and Tsuang (1986) [33] reported a bimodal age of onset with peaks at 12 to 14 and 20 to 22 years.

The natural history of OCD remains unclear. Studies on clinical populations have that shown 50% to 70% of people with diagnosed OCD had unfavorable outcomes (Hollingsworth et al., 1980; Warren, 1960) [20,47]. Rettew et al. (1992) [34] concluded that OCD is an illness with varied clinical manifestations that change over time. They found that the number of OCD symptoms gradually increases during childhood and then decreases during late adolescence and early adulthood. Hanna (1995) [17] reported that OCD tended to be more severe in boys in whom OCD developed before age 10 and in girls in whom OCD developed after age 10.

People with symptoms of obsessions and compulsions often do not experience sufficient impairment to receive the OCD diagnosis; however, they may evidence subclinical disorder (Berg et al., 1989; Flament et al., 1988; Valleni-Basile et al., 1994, 1995; Zohar et al., 1992) [5,11,45,46,49]. Although definitions of subclinical OCD vary, a person is usually considered to have subclinical OCD if he or she experiences a weak manifestation of OCD that is not severe enough to meet clinical OCD criteria (Thomsen, 1993) [44].

Whether those with subclinical OCD progress to OCD is controversial and has been addressed by only a few research groups (Berg et al., 1989; Valleni-Basile et al., 1995; Zohar et al., 1992) [5,46,49]. It is unclear whether subclinical OCD represents a stage of development, i.e., a precursor of clinical disorder, or a level of severity on a continuum, i.e., does not necessarily indicate progression to OCD. Zohar et al. (1992) [49] found that 1.25% of their sample exhibited obsessive-compulsive symptomatology. Valleni-Basile et al. (1994) [45] reported that 19.28% of the adolescents in their sample had subclinical OCD. Flament et al. (1988) [11] found subclinical OCD in 14 of 356 adolescents interviewed and concluded that subclinical OCD may suggest a mild or early form of OCD.

Berg et al. (1989) [5], in a 2-year prospective study of the same data used by Flament et al. (1988) [11], found that of those with diagnosed OCD (n = 16) at baseline, 31% and 25% had OCD and subclinical OCD at follow-up, respectively. In contrast, of the adolescents with a baseline diagnosis of subclinical OCD, only 10% had an OCD diagnosis at follow-up while 40% had a subclinical OCD diagnosis at follow-up. Thus, an initial OCD diagnosis was predictive of OCD at follow-up and baseline subclinical OCD predicted subclinical OCD at follow-up (Berg et al., 1989) [5]. Berg et al. (1989) [5] concluded that subclinical OCD was not a strong predictor of OCD.

Valleni-Basile et al. (1994) [45] found the correlates of subclinical OCD were different from those of OCD. Additional studies are needed to further explore the relationship, if any, between subclinical OCD and OCD and to determine whether other community samples behave similarly to Berg and colleagues' sample (1989) [5]. Longitudinal studies may help determine whether there are factors that enable an adolescent with subclinical OCD to function relatively normally in society (Valleni-Basile et al., 1994) [45].

This report presents analyses to estimate the incidence of DSM-III OCD and subclinical OCD in a community sample of young adolescents; examine transition probabilities in adolescents in the OCD, subclinical OCD, and referent groups over 1 year; and examine risk factors for the incidence of OCD and subclinical OCD. An area of interest is investigating whether subclinical OCD identifies adolescents who are at risk for developing OCD.

## METHOD

The general methods for the study have been described elsewhere (Garrison et al., 1991a) [12]. The data were collected in 1987, 1988, and 1989 as baseline data for a longitudinal study of depression in adolescents. Respondents were students in six public middle and high schools from a single suburban school district in the southeastern United States.

## Screening Sample [▲](#)

Each year seventh-, eighth-, and ninth-grade students enrolled in the participating schools were approached in classroom settings. Ninety-eight percent of the students completed a self-administered questionnaire that included demographic variables, the Center for Epidemiologic Studies-Depression Scale (CES-D) (Radloff, 1977) [131](#), three suicide items (Garrison et al., 1991a) [112](#), a modified version of the Coddington Life Events Scale for Adolescents (Coddington, 1972) [110](#), and the Family Adaptability and Cohesion Evaluation Scales (FACES II) (Olson et al., 1982) [130](#).

The CES-D is a self-report symptom rating scale developed to measure depressive symptomatology. The total CES-D score (range 0 to 60) is obtained by summing 20 item responses. Three suicide items were added to the CES-D and scored separately, resulting in a suicide score ranging from 0 to 9.

Stress or life change was measured using a modified version of the Coddington Life Events Scale for Adolescents (Coddington, 1972) [110](#). Twenty-two undesirable and 19 desirable events were included. Life event scores were calculated as an unweighted sum of the number of events reported having occurred in the previous 12 months. The total maximum possible scores were 90 for undesirable and 56 for desirable life events.

Family environment was assessed using the Family Adaptability and Cohesion Evaluation Scales (FACES II) (Olson et al., 1982) [130](#). Sixteen cohesion items measured the emotional bonding which family members had toward one another, as well as individual autonomy experienced within the family system. The possible range of family cohesion was 16 to 80, with lower scores indicating low emotional bonding and high individual autonomy (disengagement) and higher scores indicating closeness and limited autonomy (enmeshment). Low cohesion scores are related to less functional families and lower levels of personal well-being (Green et al., 1991; Olson, 1991) [116,29](#).

## Diagnostic Sample [▲](#)

The initial diagnostic interviews were completed within 12 months of the initial screening. The following subjects were invited to participate in the diagnostic interviews: (1) subjects with the highest CES-D scores (scores greater or equal to 30, top 10%); (2) subjects with high suicide screening scores (scores greater or equal to 6); (3) subjects without high CES-D scores but meeting a classification indicating probable cases of depression derived by applying a research diagnostic criteria-like classification scheme (Schoenbach et al., 1982) [139](#) to CES-D responses; (4) subjects with a missing CES-D score; and (5) a random sample of remaining students. All students interviewed one year were recruited for interviews during subsequent study years. Subjects were selected to maximize the expected number of depression cases while allowing valid statistical estimation and inference for other disorders. Validation of the CES-D in adolescents has suggested the CES-D performs comparably as a screen for probable cases of any psychiatric disorder as it does for major depression (Garrison et al., 1991b) [113](#). Thus, use of the CES-D should have increased our yield of obsessive-compulsive as well as depressive disorders.

The baseline and follow-up diagnostic evaluation consisted of separate semistructured interviews of the adolescent and mother. The interview included the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present Episode Version (K-SADS-P) (Chambers et al., 1985) [19](#), the Children's Global Assessment Scale (CGAS) (Shaffer et al., 1983) [140](#), and Hollingshead's Two-Factor Index of Social Position (Hollingshead and Redlich, 1958) [119](#).

The K-SADS-P assesses psychiatric disorders during the past year. Items covered permit diagnosis of affective, psychotic, anxiety (including OCD), phobic, conduct, and eating disorders using DSM-III criteria (American Psychiatric Association, 1980) [12](#). Symptoms were counted as being present if reported by either informant. Obsessive-compulsive behavior was categorized into one of seven categories: 0 = no information; 1 = none; 2 = slight: occasional obsessive thoughts or ritualistic acts, but unclear whether clinically significant; 3 = mild: definite obsessions or compulsions but not very frequent and little significant effect on functioning; 4 = moderate: frequent obsessions or compulsions with some impairment in social or occupational functioning or daily routine; 5 = severe: frequent obsessions or compulsions with considerable impairment; 6 = extreme: very frequent obsessions (at least one per hour) or compulsions with marked impairment.

CGAS scores (range 0 to 100) signify the level of impairment experienced in the past year. Lower scores indicate greater impairment. Previous reports suggest that scores of less than 61 are associated with definite maladjustment (Bird et al., 1988) [17](#). The CGAS has been found to be reliable between raters and across time and has demonstrated discriminant and concurrent validity (Shaffer et al., 1983) [140](#).

Computer algorithms were applied to responses on the K-SADS-P to assign DSM-III diagnoses. Cases had to meet DSM-III criteria for OCD (a score of 4 or greater on the K-SADS-P) and receive a CGAS score of less than 61. Subclinical OCD cases were those who had a score of 3 on the K-SADS-P for OCD or met DSM-III diagnostic criteria for OCD (a K-SADS-P score of 4 or more) but were not impaired (CGAS score of greater or equal to 61). The remaining individuals composed the referent group.

## Sample [▲](#)

White and black subjects who had been present at least two consecutive years were used to determine 1-year incidence rates. Other races were excluded because of small numbers. Baseline screening and clinical data were used from the first year the subject completed a diagnostic interview. Follow-up clinical data were used from the subsequent years subjects participated in the study. Longitudinal analyses included three cohorts: (1) subjects interviewed in 1987 and 1988 only (n = 38); (2) subjects interviewed in 1988 and 1989 only (n = 97); and (3) subjects interviewed all three years (n = 112). To maximize the efficiency of the analyses, data from the 112 subjects interviewed all three years were partitioned to contribute two separate observations. For

these individuals the first observation consisted of 1987 baseline and 1988 follow-up data. The second observation consisted of 1988 baseline and 1989 follow-up data. The longitudinal data set consists of 247 subjects contributing 359 longitudinal observations.

## Statistical Analyses [+](#)

All statistical analyses incorporated the stratified two-stage sampling scheme. Weights were calculated by dividing the number of individuals in each stratum in the screening sample by the number of individuals in the corresponding stratum in the clinical sample. The appropriate stratum-specific weight was applied to every individual in the clinical sample, so that all statistical analyses reflected the total screening population. Although the use of a screen not designed specifically for OCD might decrease the obtained point estimates' precision, incorporating the sampling scheme into the statistical analyses provides unbiased estimators for all disorders (Addy et al., 1994) [11](#).

Data were analyzed to determine the stability, progression, and remission of OCD and subclinical OCD over a period of 1 year. Transition probabilities, i.e., the probability that a subject moves to one state conditional on the preceding state, were calculated conditional on the subjects' baseline state (i.e., whether the subject had a diagnosis of OCD, a diagnosis of subclinical OCD, or no OCD).

The relation of various life event, family, and sociodemographic variables to incident OCD and subclinical OCD was explored using observations with no baseline diagnosis of OCD or subclinical OCD. To approximate a polytomous weighted logistic model where the dependent variable has three levels (OCD, subclinical OCD, and no OCD related disorder), two sets of weighted logistic models were completed using PROC LOGISTIC in SUDAAN (Shah et al., 1992) [141](#), one with incident cases of OCD (n = 5) and a second set with incident cases of subclinical OCD (n = 31) (Begg and Gray, 1984) [14](#). The same referent group of individuals with no OCD-related disorder at baseline and at follow-up (n = 249) was used in both analyses. Race and gender (black and female as risk levels) were controlled in all analyses because of prior knowledge that these variables are common risk factors for psychiatric disorders. Baseline predictors of guardian status (living with both natural parents versus living with one or neither natural parent), socioeconomic status (SES) (low versus medium to high), age, cohesion score, desirable life events, undesirable life events, and CES-D score were first examined individually in simple models. All variables were then entered into more comprehensive multivariable models. The final multivariable models for incidence of OCD and subclinical OCD included race, gender, and all variables retaining significance at the .05 level for either OCD or for subclinical OCD.

## RESULTS [+](#)

### Description of Sample [+](#)

Approximately 84% of the 359 observations were of white adolescents and 56% were of female adolescents ([Table 1](#)). Seventy-seven percent were in the seventh and eighth grades, 66% were 13 years of age or younger, 27% had a low SES, and 57% lived with both natural parents.

Variable	No.	Weighted %
<b>Race and gender</b>		
White males	113	37.6
White females	161	46.3
Black males	33	6.3
Black females	52	9.8
<b>Grade</b>		
Seventh	142	35.8
Eighth	148	41.2
Ninth	69	23.0
<b>Age</b>		
≤12 yr	107	28.6
13 yr	142	37.8
14 yr	91	28.6
≥15 yr	19	5.0
<b>Socioeconomic status</b>		
Low	113	26.6
Middle to high	246	73.4
<b>Guardian status</b>		
Both natural parents	186	56.5
Single natural parent	83	21.1
Natural and stepparent	64	16.3
Other guardian	26	6.1

Table 1. Frequencies and Weighted Percentages for the Demographics of 359 Observations in a Community Sample in the Southeastern United States

The weighted means of the continuous variables are given in Table 2. Patterns suggest that females and blacks have higher CES-D scores and lower cohesion scores (with the exception of black males), and blacks reported more undesirable and desirable life events than whites. The mean age was approximately 13 years.

Variable	White		Black	
	Males	Females	Males	Females
CES-D score	12.3 ± 5.7	16.5 ± 6.9	14.4 ± 4.5	17.0 ± 3.7
Cohesion	57.8 ± 10.5	55.6 ± 13.5	59.2 ± 6.3	53.4 ± 6.5
Undesirable life events	7.0 ± 6.0	7.1 ± 5.1	13.6 ± 4.3	9.6 ± 3.5
Desirable life events	12.7 ± 6.9	13.7 ± 7.1	22.5 ± 4.4	18.0 ± 3.7
Age	13.2 ± 0.9	13.0 ± 0.8	13.0 ± 0.4	13.1 ± 0.5

*Note:* Values represent mean ± SD. CES-D = Center for Epidemiologic Studies-Depression Scale.

Table 2. Weighted Means of Continuous Demographic and Screening Variables for 359 Observations in a Community Sample in the Southeastern United States

### Transition Probabilities and Incidence Rates <sup>†</sup>

Twenty-one percent of those with OCD, 24% of those with subclinical OCD, and 91% of those in the referent group remained in the same category the following year (Table 3). Inspection of the transition probabilities demonstrates a pattern of moving from more severe to less severe categories. Seventeen percent of those with a diagnosis of OCD at baseline had a diagnosis of subclinical OCD at follow-up, while 62% moved to the referent group. Of those with subclinical OCD at baseline, 1.5% had OCD at follow-up; 75% moved to the referent group.

Baseline	No.	Follow-up					
		Clinical		Subclinical		Referent	
		%	No.	%	No.	%	No.
Clinical OCD	10	20.6	2	17.1	3	62.3	5
Subclinical OCD	64	1.5	1	23.5	15	75.0	48
Referent	285	0.7	5	8.4	31	90.9	249

Table 3. Frequency and Weighted Transition Probabilities of Clinical Obsessive-Compulsive Disorder (OCD), Subclinical OCD, and Referent Observations over One Year

The weighted 1-year incidence rates for OCD and subclinical OCD are found by examining diagnostic status at follow-up for individuals in the referent group at baseline (Table 3). The weighted incidence was 0.7% (95% confidence interval: 0.12, 1.34) for



OCD and 8.4% (95% confidence interval: 4.99, 11.77) for subclinical OCD.

### Correlates of the Incidence of OCD and Subclinical OCD<sup>a</sup>

Weighted logistic regression analyses explored the possible correlates of incident OCD and subclinical OCD in the sample restricted to those in the referent group at baseline ( $n = 274$ ). In simple models, race (odds ratio [OR] = 5.63), age (OR = 2.94), cohesion (OR = 0.90), desirable life events (OR = 0.91), undesirable life events (OR = 1.06), CES-D score (OR = 1.08), and SES (unestimable odds ratio as all five cases of incident OCD had a medium to high SES) were found to be significant correlates of OCD in the second year (Table 4). Adolescents who were black, older, from middle to high SES, or with lower cohesion scores, fewer desirable life events, greater undesirable life events, or higher CES-D scores were at higher risk of developing OCD. Variables found to be significant correlates of subclinical OCD in the simple models were age (OR = 2.34), cohesion (OR = 0.96), and undesirable life events (OR = 1.09). Older adolescents, those with lower cohesion scores, and those with greater undesirable life events were at higher risk of developing subclinical OCD.

	OR	95% CI
<b>OCD</b>		
Black race	5.63	1.09–28.96
Female gender	0.96	0.18–5.21
<2 parents	2.30	0.50–10.65
Low socioeconomic status	—	—
Age <sup>a</sup>	2.94	1.21–7.16
Cohesion <sup>a</sup>	0.90	0.83–0.98
Desirable life events <sup>a</sup>	0.91	0.86–0.96
Undesirable life events <sup>a</sup>	1.05	1.01–1.12
CES-D score <sup>a</sup>	1.08	1.00–1.16
<b>Subclinical OCD</b>		
Black race	1.02	0.36–2.87
Female gender	1.62	0.60–4.35
<2 parents	1.76	0.70–4.44
Low socioeconomic status	3.10	0.96–10.02
Age <sup>a</sup>	2.34	1.16–4.73
Cohesion <sup>a</sup>	0.96	0.93–0.99
Desirable life events <sup>a</sup>	1.00	0.95–1.05
Undesirable life events <sup>a</sup>	1.09	1.04–1.14
CES-D score <sup>a</sup>	1.03	1.00–1.07

*Note:* Simple models for variables other than race and gender are adjusted for race and gender. The simple models for race and gender contained only race and gender. OCD = obsessive-compulsive disorder; OR = odds ratio; CI = confidence interval; CES-D = Center for Epidemiologic Studies-Depression Scale.

<sup>a</sup> Continuous variables. Odds ratios are reported for a one-unit change in the independent variables.

Table 4. Simple Weighted Logistic Regression Analyses of OCD and of Subclinical OCD with Life Event, Family, and Sociodemographic Variables for One-Year Follow-up

Because the odds ratio for SES was not estimable in the simple model for OCD and was nonsignificant for subclinical OCD, the variable was not considered for the model selection process. The final multiple weighted logistic regression model for OCD (Table 5) consisted of race (OR = 23.38), age (OR = 4.02), desirable life events (OR = 0.78), and undesirable life events (OR = 1.21), indicating that adolescents who were black, who were older, who had experienced fewer desirable life events, or who had experienced greater undesirable life events were at higher risk of developing OCD; this model also included gender as an adjustment factor. Age (OR = 2.30), desirable life events (OR = 0.92), and undesirable life events (OR = 1.13) were significantly associated with subclinical OCD in the final multiple weighted logistic regression model, indicating that adolescents who were older, who had experienced fewer desirable life events, or who had experienced greater undesirable life events were at a higher risk of developing subclinical OCD; this model adjusted for race and gender, although both factors were nonsignificant. No other variables retained significance at the .05 level.



Table 5. Multiple Weighted Logistic Regression Analyses of OCD and of Subclinical OCD with Life Event, Family, and Sociodemographic Variables (Adjusted for Race and Gender) for One-Year Follow-up

To explore further the effect of SES on OCD, the multivariable models were estimated again including SES. As in the simple model, the odds ratio for SES was statistically significant but was not estimable. The odds ratio for race increased notably but within the 95% confidence interval in the earlier model, while other odds ratios were virtually unchanged.

## DISCUSSION

Few studies have reported the incidence and duration of OCD. Only one other study researched the transitory nature of OCD and subclinical OCD in adolescents (Berg et al., 1989) [5]. Our study is the first to report the incidence of OCD (0.7%) in an adolescent population. Follow-up of these adolescents is necessary to determine whether an increase in the incidence of OCD is seen as adolescents move into early adulthood. If OCD incidence increases at a particular age, early detection and treatment can be targeted toward this age.

The majority of the initial OCD and subclinical OCD cases were fairly transitory in nature, with adolescents recovering in short periods of time. Perhaps two distinct groups, transitory and long-term, exist. A single screening for OCD may not be indicative of symptomatology over long periods. This can be shown only through continued longitudinal research on community samples of children and adolescents. The existence of transitory and long-term groups may explain findings that, in spite of the trend toward less severe states, the overall morbidity remained higher in the baseline OCD group and the subclinical OCD group in comparison with the referent group. Consistent with Berg et al. (1989) [5], adolescents with a diagnosis of OCD at baseline had a higher percentage of OCD at follow-up than did those who had subclinical OCD at baseline or were in the referent group at baseline. Similarly, the baseline subclinical OCD group had a higher percentage of subclinical OCD at follow-up compared with the baseline OCD group and the baseline referent group. The baseline OCD and subclinical OCD cases appear to be recovering, although at follow-up the baseline OCD group remains more dysfunctional than the baseline subclinical OCD group and the baseline subclinical OCD group remains more dysfunctional than the baseline referent group.

Our findings agree with those of Berg et al. (1989) [5], who found that subclinical OCD was not a strong predictor of OCD. Our transition data suggest that an initial diagnosis of subclinical OCD was not predictive of a diagnosis of OCD at follow-up. Similar to Berg et al. (1989) [5], a higher percentage of those in the subclinical group progressed to OCD (1.5%) than in the referent group (0%). With a larger sample this relationship might be more clearly delineated.

The finding that most adolescents with an initial diagnosis of subclinical OCD moved to the referent group at follow-up does not support the theory that subclinical OCD is a precursor to OCD. Subclinical OCD may be a level of severity on a continuum and subclinical cases may be more similar to the referent group than to the clinical group. Adolescents with subclinical OCD may exhibit protective mechanisms which prevent them from acquiring OCD and make them more likely to move to the referent group. Consistent with the apparent transitory nature of OCD and subclinical OCD in adolescents, a portion of adolescents with subclinical OCD may be exhibiting normal obsessive-compulsive symptomatology associated with adolescence. Behaviors may be related to typical adolescent coping patterns. Biological susceptibility may play a larger role in adolescents who progress to OCD.

The pattern of predictors for subclinical OCD is similar to that for OCD with the exception of race. Significant risk factors were not as strongly associated with subclinical OCD as with OCD. Black race, increasing age, more baseline undesirable life events, fewer baseline desirable life events, and medium to high SES were all found to be significant predictors of OCD; increasing age, more baseline undesirable life events, and fewer desirable life events were significant predictors of subclinical OCD.

Little has been reported on racial differences concerning OCD. Studies have often been carried out in predominantly white populations (Rapoport, 1989; Swedo et al., 1989) [32,43] or with children and adolescents who have been referred to clinics for care, both of which may lead to ascertainment bias. The finding, in our study, of a significantly higher risk of OCD in black adolescents compared with white adolescents differs from findings of other studies. Valleni-Basile et al. (1995) [46], using prevalence data, found no significant difference by race. An adult epidemiological catchment area study (Karno and Golding, 1991) [22] found no significant difference by race. Riddle et al. (1990) [35] reported that children and adolescents treated for OCD in clinics were most often Caucasian. A strength of this study was that the sample was not exclusively white; thus race differences could be addressed. Future comparisons of whites and blacks may improve our understanding of observed differences.

Several investigators have found a strong relationship between desirable and undesirable life events and the onset of OCD (Judd, 1965; Rasmussen and Tsuang, 1986; Rettew et al., 1992; Swedo et al., 1989) [21,33,34,43]. The significant protective association of desirable life events with OCD and subclinical OCD in the current follow-up study agrees with these investigators' findings. A higher number of desirable life events may serve to counteract the development of OCD and subclinical OCD. There is evidence that a genetic component to OCD may exist (Judd, 1965; Last et al., 1991; Lenane et al., 1990; Rasmussen and Tsuang, 1986; Riddle et al., 1990; Swedo et al., 1989; Woodruff and Pitts, 1964) [21,25,26,33,35,43,48]. Perhaps individuals who are biologically predisposed to OCD can be protected against the development of OCD if they experience a certain quality or quantity of desirable life events. This threshold may vary between individuals. Undesirable life events may act in an opposite manner by exacerbating symptomatology in genetically susceptible individuals.

Predictors found to be significant for OCD and subclinical OCD at follow-up differ from the baseline findings. Baseline data

demonstrated no significant predictors of subclinical OCD; cohesion was the only predictor of baseline OCD (Valleni-Basile et al., 1995) [46]. Cohesion was not found to be significant in this follow-up study. The difference in predictors of OCD and subclinical OCD over a 1-year period of time may indicate that as one ages different factors are important for the development of this disorder. The discovery that predictors of OCD and subclinical OCD changed over a 1-year follow-up period agrees with Rettew et al. (1992) [34], who stated that OCD exhibits varying clinical manifestations that individually change over time. A better understanding of significant risk factors and genetic susceptibility will clarify the etiology of the disorder.

A limitation of our study relevant to the investigation of OCD and symptomatology is that the screening instrumentation was selected to optimize identification of probable cases of depression, not OCD. Had we designed the study to focus primarily on OCD we would have used a screening instrument such as the Leyton Obsessional Inventory (Berg et al., 1989; Flament et al., 1988) [5,11], which optimizes identification of probable OCD cases. Given the weighting scheme used in the analyses, use of a less sensitive screen for OCD should not bias the results (though it may decrease the estimates' precision). Using the K-SADS-P for the second-stage interview should have provided results that were comparable with results obtained using other interview schedules designed to identify a variety of psychiatric disorders.

The relationship between OCD and subclinical OCD has yet to be clearly elucidated. This investigation emphasizes the need for continued research on the relationship between OCD and subclinical OCD, on the possibility of transitory and long-term groups for OCD and subclinical OCD, on the risk factors involved, and on the incidence and duration. More data concerning the differences in symptomatology and impairment between OCD and subclinical OCD are necessary. In addition, future studies that use larger, more heterogeneous samples, where a greater number of cases can be identified, are needed to define more accurately the frequency and correlates of OCD and subclinical OCD. The utilization of analogous psychiatric interviewing tools as well as a consistent definition for subclinical OCD would allow results of different investigations to be more accurately compared. Targeting high-risk individuals would be useful since effective pharmacological and behavioral treatments are available (Apter et al., 1994; Geller et al., 1995; March et al., 1994; Riddle et al., 1992) [3,14,27,36]. Targeting an adolescent at early onset could reduce the stress caused by OCD and improve ability to perform in school and other activities.

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