CHAPTER - II

REVIEW OF LITERATURE
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A literature review is a text of a scholarly paper, which includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. Any scientific investigation starts with a review of literature. It inspires researcher for the further research. It surveys scholarly articles, books, dissertations, conference proceedings and other resources which are relevant to a particular issue, area of research, or theory and provides context for a dissertation by identifying past research.

Review of Literature is the process of reading, analyzing, evaluating, and summarizing scholarly materials about a specific topic. It is an evaluative report of studies found in the literature related to selected area. The reviews describe, summarize, evaluate and clarify this literature. It gives a theoretical basis for the research and helps us to determine the nature of our own research.

The purpose of the review of literature is to identify gaps in current knowledge. Helps us to avoid reinventing the wheel by discovering the research already conducted on a topic. Sets the background on what has been explored on a topic so far. Increases our breadth of knowledge in our area of research. Helps us to identify seminal works in our area. Allows us to provide the intellectual context for our work and position of our research with other related research. Provides us with opposing viewpoints. Helps us to discover research methods, which may be applicable to our work.

The researcher has carefully studied the literature and review of researches related to the Obsessive Compulsive Disorder, Effect of Cognitive Behavior therapy and pharmacotherapy on obsessive-compulsive disorder, studies on genetics, and other related factors also.
Accordingly, we will review the role of cognitive behavior therapy and pharmacotherapy on Obsessive Compulsive Disorder taking into consideration following factors: onset age, co morbidity, and role of genetics, family studies, and other psychotherapies.

Chad T, Wetterneck, Monnica T Williams, Ghazel Tellawi, Simone Leavell Bruce (2016) had done case study of obsessions of suicide in obsessive-compulsive disorder with comorbid major depressive disorder suggested that although suicidal thoughts are often associated with depression, individuals may experience suicidal obsessions, a type of suicidal thought, within obsessive compulsive disorder (Obsessive Compulsive Disorder). They present the case of “Paul” (pseudonym), a Cuban-American high school teacher in his mid-40s, who struggled with treatment-resistant Obsessive Compulsive Disorder. Paul sought treatment due to obsessive thoughts concerning committing suicide, and fears about the effect it would have on his family. To treat Paul, they used Foa et al.’s (Exposure and response (ritual) prevention for obsessive-compulsive disorder, 2nd ed, Oxford University Press, New York, 2012) protocol on exposure and response prevention (E/RP), an evidence-based treatment for Obsessive Compulsive Disorder. Paul habituated to the exposure exercises but maintained a depressed mood and avoided sharing emotions. To complicate treatment, there were several moderately significant stressors at home, which exacerbated his inclination to think negatively. To combat his depression, Functional Analytic Psychotherapy (FAP) was utilized to augment Paul’s interpersonal skills, increase his receptiveness to his emotions, and increase his social support. Paul experienced reductions in his Obsessive Compulsive Disorder severity and his depressive symptoms throughout the course of his treatment.

Bethany M Wootton, Blake F Dear, Luke Johnston, Matthew D Terides, Nickolai Titov (2015) examined remote treatment of obsessive-compulsive disorder. They conducted randomized controlled trial. They observed that Obsessive compulsive disorder is a common anxiety disorder, although effective treatments exist many patients experience difficulties accessing treatment so treatments that are delivered
remotely, such as bibliotherapy-administered Cognitive Behavior Therapy and internet-administered Cognitive Behavior Therapy (iCognitive Behavior Therapy) have the potential to improve access to treatment. In this study there was a three group, randomized controlled trial that aimed to examine the benefits and acceptability of these two remote treatment options in the treatment of Obsessive Compulsive Disorder, compared to a waitlist control group. In the bCognitive Behavior Therapy and iCognitive Behavior Therapy groups they gave participants to read five lessons and received twice-weekly contact from a remote therapist and the control group did not receive any clinical contact during this time. They found that participants in both remote treatment conditions (bCognitive Behavior Therapy and iCognitive Behavior Therapy) improved from pre-treatment to post-treatment and pre-treatment to 3-month follow-up on the Yale-Brown Obsessive Compulsive Scale. And once the bCognitive Behavior Therapy and iCognitive Behavior Therapy groups completed treatment, the control group was provided the iCognitive Behavior Therapy protocol but with clinician contact only once per week. They showed that Results from the control group, after receiving iCognitive Behavior Therapy treatment, indicates that large effect sizes can be obtained with weekly contact. Hence they concluded that these results provide preliminary support for the use of either bCognitive Behavior Therapy or iCognitive Behavior Therapy in the remote treatment of Obsessive Compulsive Disorder.

Kisely S, Hall K, Siskind D, Frater J, Olson S and Crompton D (2014) examined Deep Brain Stimulation for obsessive-compulsive disorder and carried out a systematic review and meta-analysis. They stated that Deep brain stimulation is increasingly being applied to psychiatric conditions such as obsessive-compulsive disorder, major depression and anorexia nervosa. Double-blind, randomized controlled trials of active versus sham treatment have been limited to small numbers. They therefore undertook a systematic review and meta-analysis of the effectiveness of Deep Brain Stimulation in psychiatric conditions to maximize study power. They also conducted a systematic literature search for double-blind, randomized controlled trials of active versus sham treatment using Pubmed/Medline and EMBASE up to April 2013. Where possible, they combined results from studies in a meta-analysis. Also assessed differences in final
values between the active and sham treatments for parallel-group studies and compared changes from baseline score for cross-over designs. Inclusion criteria were met by five studies, all of which were of Obsessive compulsive disorder. Forty-four subjects provided data for the meta-analysis. The main outcome was a reduction in obsessive symptoms as measured by the Yale-Brown Obsessive Compulsive Scale. Patients on active, as opposed to sham, treatment had a significantly lower mean score [mean difference -8.93, 95% confidence interval -13.35 to -5.76, p < 0.001], representing partial remission. However, one-third of patients experienced significant adverse effects (n = 16). There were no differences between the two groups in terms of other outcomes. They stated that Deep Brain Stimulation may show promise for treatment-resistant obsessive compulsive disorder but there are insufficient randomized controlled data for other psychiatric conditions. Hence they concluded that Deep Brain Stimulation remains an experimental treatment in adults for severe, medically refractory conditions until further data are available.

Derg T P, Safak Y, Karadere ME, Ozdel K, Ozcan T, Türkçapar MH, Kuru E, Yücens B. (2014) studied the effectiveness of cognitive behavioral group psychotherapy for obsessive-compulsive disorder. The aim of this study was to determine the effectiveness of cognitive behavioral group therapy (CBGT) in the treatment of the obsessive-compulsive disorder (Obsessive Compulsive Disorder). The study included 82 patients diagnosed as Obsessive Compulsive Disorder according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR). In all, 37 patients that had their diagnosis confirmed via the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) and agreed to participate were provided group therapy as 14 weekly 90-120-min sessions. The Yale-Brown Obsessive Compulsive Scale (Y-BOCS), Yale-Brown Obsessive Compulsive Scale-Symptom Checklist (Y-BOCS-SC), Beck Depression Inventory (BDI), and Beck Anxiety Inventory (BAI) were administered to the patients prior to group therapy (baseline) and again after sessions 2, 5, 8, 12, and 14. In all, 8 patients dropped out of the study for various reasons and 29 completed the group therapy. There were significant reductions in BAI, BDI, and Y-BOCS scores in the patients that completed the group therapy. Additionally, BAI, BDI, and Y-BOCS score did not
differ according to age, gender, or level of education. CBGT was associated with significant improvement in Obsessive Compulsive Disorder symptoms. Neither demographic characteristics (age, gender, and education level), nor clinical characteristics (disease duration, type of obsession, compulsion type, treatment history, and comorbidity pattern) had an effect on treatment outcome. In light of these findings, we think CBGT is an effective option for the treatment of Obsessive Compulsive Disorder.

Monnica T. Williams, Beth Mugno, Martin Franklin, and Sonya Faber (2013) studied Symptom Dimensions in Obsessive-Compulsive Disorder. They explored phenomenology and Treatment Outcomes with Exposure and Ritual Prevention. According to them Obsessive-compulsive disorder (Obsessive Compulsive Disorder) is a severe condition with varied symptom presentations. The cognitive-behavioral treatment with the most empirical support is currently exposure and ritual prevention (EX/RP); however, clinical impression and some empirical data suggest that certain Obsessive Compulsive Disorder symptoms are more responsive to treatment than others. They discussed prior work identifying symptom dimensions within Obsessive Compulsive Disorder, including epidemiological findings, factor analytic studies, and biological findings. Symptom dimensions most reliably identified include contamination/cleaning, doubt about harm/checking, symmetry/ordering, and unacceptable thoughts/mental rituals. The phenomenology of each of these subtypes is described and research literature is summarized, emphasizing the differential effects of EX/RP and its variants on each of these primary symptom dimensions. To date they found that EX/RP is an effective treatment for the various Obsessive Compulsive Disorder dimensions, although not all dimensions have been adequately studied (i.e., symmetry and ordering). They suggested modifications to treatment may be warranted for some types of symptoms Also Clinical implications and directions for future research were discussed.

Alfano CA, Kim KL. (2011) Observed other areas of investigation include sleep patterns and the role of insight and reported that, in a series of children with Obsessive
Compulsive Disorder, the occurrence of sleep fragmentation with a reduced total sleep time and longer wake periods after sleep onset.

**Palermo SD, Bloch MH, Craiglow B, et al. (2011)** concluded in a longitudinal cohort study of 36 children with Obsessive Compulsive Disorder that 42% experience a remission by early adulthood and that primary hoarding symptoms predicted a poorer life quality. Storch et al examined 99 youth with Obsessive Compulsive Disorder for predictors of functional impairment; contamination/cleaning and aggressive/checking dimensions were significantly associated with a poorer outcome as well as low insight, Obsessive Compulsive Disorder symptom severity, family accommodation, and depressive symptoms. An important study by Micali et al on 142 children and adolescents assessed over 9 years at the Maudsley Hospital in London showed a 41% persistence rate (main predictor being the duration of illness); 40% were found to have a psychiatric comorbidity at follow-up.

**Dr. James F. Leckman, MD, Dr. Robert A. King, MD, Dr. Donald L. Gilbert, MD, Dr. Barbara J. Coffey, MD, MS, Dr. Harvey S. Singer, MD, Dr. Leon S. Dure, 4th, et al (2011)**, in a prospective longitudinal study of streptococcal upper respiratory tract infections and exacerbations of tic and obsessive compulsive symptoms in 31 PANDAS and 53 non-PANDAS subjects, found no evidence of a temporal association between GABHS infection and tic and Obsessive Compulsive Disorder exacerbations in children with PANDAS. Alexander et al published an interesting case of a 9-year-old boy with PANDAS and recurrent streptococcal infections whose neuropsychiatric symptoms resolved after tonsillectomy.

**Micali M, Hilton K, Natatani E, Heyman I, Turner C, Mataix-Cols D (2011)** reported on risk factors for eating disorders, identifying female gender and family history of eating disorders as specific factors when associated with a history of childhood Obsessive Compulsive Disorder, raising the possibilities of predictors (among others) and early intervention. They suggested that even if Cognitive Behavior Therapy is recognized, along with SSRI and psychoeducation, as the basis of treatment, new modes of distribution appear such as intensive, family-based, and even Web-based interventions, providing treatment to a larger number of patients. They also found that
understanding of (and work on) family dynamics and developmental level is fundamental for the development of therapeutic alliance, compliance, and success of treatment with their patients, even if they know more about the genetic, neurological, and pharmacological aspects of anxiety disorders. Finally they suggested that for sure, in the future, fascinating discoveries and changes in practice will occur in the field of pediatric Obsessive Compulsive Disorder, but an integrative approach will most probably remain essential.

T.K. Murphy, E.A. Storch, A. Turner, J.M. Reid, J. Tan, and A.B. Lewin (2010), examined the medical history of the biological mothers of 107 children with Obsessive Compulsive Disorder and/or tics and found a rate of 17.8% of autoimmune diseases, compared with 5% in the general population.

Edna B Foa (2010) cited Dollard and Miller’s adopted Mowrer's two stage theory to explain the development and maintenance of fear/anxiety and avoidance in Obsessive Compulsive Disorder. Mowrer's theory maintains that a neutral event stimulus (conditioned stimulus, CS) comes to elicit fear when it is repeatedly presented together with an event that by its nature causes pain/distress (unconditioned stimulus; UCS). The CS can be a mental event, such as a thought, and/or a physical object, such as a bathroom or trash cans. After fear/anxiety/distress to the CS is acquired, escape or avoidance behaviors are developed to reduce the anxiety. They observed that in Obsessive Compulsive Disorder, the behavioral avoidance and escape take the form of repeated compulsions or rituals. Like other avoidance behaviors, compulsions are maintained because they indeed reduce the distress. Not only does Mowrer's theory adequately explain fear acquisition, it is also consistent with observations of how rituals are maintained. In a series of experiments, Rachman and colleagues demonstrated that obsessions increase obsessional distress and compulsions reduce this distress. This conceptualization of a functional relationship between obsessions and compulsions influenced the definitions of Obsessive Compulsive Disorder in DSM-III and its successors.

Foa and Kozak (2010) proposed that Obsessive Compulsive Disorder is characterized by erroneous cognitions. The first one they found is Obsessive Compulsive Disorder
sufferers assign a high probability of danger to situations that are relatively safe. For example, an individual with Obsessive Compulsive Disorder will believe that if he or she touches a public doorknob without washing his or her hands thoroughly, the germs on the doorknob will cause serious disease to him or her and/or to people whom he or she touched with dirty hands. The second one they found is individuals with Obsessive Compulsive Disorder exaggerate the severity of the bad things that they think can happen. For example, contracting a minor cold is viewed as a terrible thing. They also pointed out that individuals with Obsessive Compulsive Disorder conclude that in the face of lack of evidence that a situation or an object is safe, it is dangerous, and therefore Obsessive Compulsive Disorder sufferers require constant evidence of safety. For example, in order to feel safe, an Obsessive Compulsive Disorder sufferer requires a guarantee that the dishes in a given restaurant are extremely clean before eating in this restaurant. People without Obsessive Compulsive Disorder, on the other hand, conclude that if they do not have evidence that a situation is dangerous, then it is safe. According to them a person without Obsessive Compulsive Disorder would eat from the dishes in the restaurant unless he or she has clear evidence that they are dirty.

**Edna B Foa (2010)** observed that Salkovskis offered a cognitive theory of Obsessive Compulsive Disorder. He proposed that five assumptions are characteristic of Obsessive Compulsive Disorder: (i) thinking about an action is the same as doing it; (ii) failing to prevent harm is morally equivalent to causing harm; (iii) responsibility for harm is not diminished by extenuating circumstances; (iv) failing to ritualize in response to a thought about harm is the same as an intention to harm; and (v) one should exercise control over one's thoughts. Therefore, he concluded that while the patient may feel their obsessions are unacceptable, the compulsions used to reduce the anxiety are deemed acceptable.

**Butwicka A, Gmitrowicz A (2010)** assessed on a total of 44 adolescents, 43 late-onset adults, and 45 early-onset adults with Obsessive Compulsive Disorder; adolescents showed more religious, sexual, and miscellaneous obsessions than late-onset adults; contamination obsessions were seldom found in adolescents, and cleaning compulsions were more frequent in early-onset adults than in adolescents. Checking compulsion was
the rarest in the younger age group. In an article on clinical features in children, Vera et al pointed out that young children with Obsessive Compulsive Disorder often heard an inner voice ordering ritualizations, were often doubtful on trivial matters, indecisive, exhibited an unusual slowness in everyday activities, and felt greatly relieved upon completion of compulsions. In a study of 93 subjects, aged 6 to 17 years, Canavera et al found that obsessive-compulsive symptoms are usually minimized by children when compared with reports by their parents.

**Mack H., Fullana MA., Russell AJ., Mataix-cols D., Nakatani E., Heyman I (2010)** reviewed Mataix-Cols et al conducted study on 238 children and adolescents with a mean age of 13.8 years using the CY-BOCS scale. The mean for onset of illness was 10 years old; 16% had Tourette syndrome, 11% chronic tic disorder, and 9.7% had a positive family history. They found that sexual obsessions were more frequent in boys than girls (34% vs 18%), obsessions with symmetry and rituals involving ordering were more often associated with tics and Tourette disorder. They concluded that Obsessive thoughts involving fears of contamination were found in equal frequency in girls and boys.

**Masi G., Pfanner C., Millepiedi S., Berloffa S (2010)** found in a series of 257 patients (mean age: 13.6 years old), that patients with Obsessive Compulsive Disorder onset before 12 years presented a higher frequency of tic and disruptive behavior. They investigated that in the types of obsessions, order and symmetry were more frequent in boys, and contamination and cleaning were observed more often in girls. Hoarding was present in 53% in girls vs 36% in boys, and was associated with pervasive slowness, increased responsibility, indecisiveness, and pathological doubt, as well as a less than optimal treatment response, either pharmacology or cognitive-behavior therapy. And in very young children they reviewed study by Garcia on 58 children age 4 to 8; mean age at onset was 5 and mean age of presentation was between 6 and 7. They found aggressive, catastrophic, and contamination obsessions, as well as washing and checking rituals, were the most frequent.

**Lewin AB., Caporino N., Murphy TK., Geffken GR., Storch EA. (2010)** explored that in general, clinicians and research show that multiple obsessions and rituals can
coexist. Some clinical dimensions, such as low insight, significant avoidance, indecisiveness, pervasive slowness, and excessive sense of responsibility remain understudied, and are significantly related to functional impairment. As shown in their study in 89 youths, clinical improvement in Obsessive Compulsive Disorder severity was related to reduction in avoidance, doubting, and sense of responsibility. As reported by Leonard et al, 90% of patients, in a NIMH study, exhibit changes in content and severity of obsessions and compulsions over time; early-onset Obsessive Compulsive Disorder is viewed as a unique subtype, sometimes related to tic disorders.

Lewin AB, Lindsey Bergman R, Peris TS, Chang S, McCracken JT, Piacentini J (2010) carried out study of correlates of insight on 71 youths (mean age 11.7 years old) with Obsessive Compulsive Disorder; they found poorer intellectual functioning, a decreased perception of control over the environment, younger age, higher levels of depressive symptoms, and lower levels of adaptation were significantly associated with low insight.

Langley AK., Lewin AB., Lindsey Bergman R., Lee JC., Piacentini J. (2010) studied 215 subjects aged 5 to 17 referred to university-based Obsessive Compulsive Disorder clinic, examining anxious and externalizing disorder. They found no age or gender differences were found across groups. Higher Obsessive Compulsive Disorder severity and lower rates of tics were associated with co morbid anxiety disorders and the co-occurrence of externalizing disorders predicted lower family cohesion and greater functional impairment.

Canavera KE., Ollendick TH., Ehrenreich May JT., Pincus DB (2010) compared 2 groups of 28 subjects aged 10 to 17, one with Obsessive Compulsive Disorder only and the other with Obsessive Compulsive Disorder and comorbid depressive disorder; the latter was associated with more severe internalizing problems and obsessive-compulsive symptomatology, as well as higher family conflict. Janowitz et al has studied 252 adults with Obsessive Compulsive Disorder and found that early onset (before 10 years old) was associated twice as much (53.7%) with tic and Tourette disorder than late onset (after 10 years old). Joshi et al examined the co-occurrence of bipolar disorder with Obsessive Compulsive Disorder; two samples of referred youths
(one with bipolar disorder and the other with Obsessive Compulsive Disorder) were investigated for comorbidity. He found that 21% (17/82) of bipolar patients had co-occurring Obsessive Compulsive Disorder and 15% (19/125) of subjects with Obsessive Compulsive Disorder also had a bipolar illness. The presence of both disorders was more often associated with hoarding, greater comorbidity, and poorer functioning. When these two illnesses co-occurred, a higher frequency of multiple anxiety disorders, especially generalized anxiety disorder, and social phobia, as well as an earlier onset and greater impairment, were found. Peris et al investigated a sample of 71 youths for, 62% male at a mean age of 12.7 years old, and found 21% scoring on a self-report measure of depression, associating depressive symptoms with older age and more severe Obsessive Compulsive Disorder.

Storch E A, Lewin A B, Geffken G R, Morgan J R, Murphy T K (2010) explored the impact of disruptive behavior disorder comorbidity in 192 children and adolescents with Obsessive Compulsive Disorder; and they found that comorbid DBD was related to greater family accommodation and less symptom resistance, augmented Obsessive Compulsive Disorder severity, and internalizing problems and a 3.6 times greater chance of having been prescribed an atypical antipsychotic. Sheppard et al reported on the strong association between ADHD and significant hoarding behavior in individuals with childhood-onset Obsessive Compulsive Disorder. Children with Asperger's syndrome or high-functioning autism improved their functioning when their comorbid Obsessive Compulsive Disorder was alleviated through treatment.

Dr. Abbe Marrs Garcia, Ph.D, Dr. Jeffrey J. Sapyta, Ph.D, Dr. Phoebe S. Moore, Ph.D, Dr. Jennifer B. Freeman, Ph.D, Dr. Martin E. Franklin, Ph.D, Dr. John S. March, M.D., et al (2010) reported on predictors and moderators of treatment outcome in 112 patients in the Pediatric Obsessive Compulsive Treatment Study, randomly assigned to sertraline therapy, Cognitive Behavior Therapy, or combination treatment; they found that subjects with a family history of Obsessive Compulsive Disorder were not likely to benefit from Cognitive Behavior Therapy alone, but responded to combination therapy; those with a less severe illness, less functional impairment, greater insight, fewer externalizing symptoms, and lower levels of family
accommodation showed greater treatment response. Whiteside and Jacobsen described a 5-day (week-long) intensive treatment based on exposure and response prevention, along with family counseling on Cognitive Behavior Therapy techniques to be applied at home. The results showed that Obsessive Compulsive Disorder symptoms were shown to be improved up to 5 months post-treatment. Also a study of D-cycloserine (partial agonist of glutamate receptor to enhance exposure therapy) augmentation of Cognitive Behavior Therapy in 30 youths with primary Obsessive Compulsive Disorder showed small to moderate treatment effects, warranting further investigation.

Mancuso E, Faro A, Joshi G, Geller DA (2010) studied psychopharmacology. In severe cases, pharmacological intervention, with SSRI s is indicated; and in the absence of clinical response, they followed their usual protocol i.e. the successive use of 3 different SSRIs followed by a trial of clomipramine. 21 studies of over 1300 pediatric patients report the efficacy of serotonergic medications in the short-and medium-term treatment of Obsessive Compulsive Disorder. Fluoxetine (20 to 60 mg/day), fluvoxamine (50 to 200 mg/day), and sertraline (50 to 200 mg/day) were all found to be efficacious, as well as citalopram and paroxetine, sometimes at high dosages. Leonard et al. suggested in the drug regimen that appropriate medications should be started at low dosages and increased every 3 weeks for a trial of 8 to 12 weeks; once sufficient symptom reduction is achieved, medication should be maintained for 6 to 12 months and then tapered slowly over months. They also recommended Long-term maintainance after 2 to 3 severe relapses.

Masi G, Pfanner C, Millepiedi S, Berloffa S, Hezel DM, Beattie K, Stewart SE (2010) assessed augmentation strategies for SSRI involve Cognitive Behavior Therapy and reported that whenever possible, as well as the addition of low-dose atypical antipsychotics such as risperidone; less often reported are the uses of clonazepam and low-dose clomipramine. A study by Masi et al on the use of aripiprazole augmentation in 39 adolescents showed effectiveness in more than half of the patients. Also Hezel et al reported that successful SSRI augmentation in an adolescent patient is with the help of memantine, a drug used in Alzheimer's disease.
**Krebs G., Heyman I (2010)** in their interesting article on treatment strategies of Obsessive Compulsive Disorder in young people yielded the following recommendations: treatment resistance should initiate a reformulation of the case regarding diagnosis, co morbidity, and environmental factors; failure of Cognitive Behavior Therapy relates more to a faulty technique than a patient characteristic; motivation enhancement strategies, intensive or home-based Cognitive Behavior Therapy, and the addition of a low-dose atypical antipsychotic to an SSRI are useful measures; and they also stated that special attention should be given to treatment and identification of co morbid disorders (such as externalizing disorders) as they influence treatment response in Obsessive Compulsive Disorder patients.

**Bernstein GA., Victor AM., Pipal AJ., Williams KY (2010)** in NIMH studies named Standard Obsessive Compulsive Disorder treatment (cognitive behavioral therapy, SSRI) should also be provided for PANDAS cases. They compared 21 children with PANDAS with 18 non PANDAS Obsessive Compulsive Disorder patients. They found that PANDAS children presented more often with urinary urgency, hyperactivity, impulsivity, deterioration in handwriting, and decline in school performance, as well as motor and vocal tics. Non-PANDAS Obsessive Compulsive Disorder subjects were found to have a higher prevalence of separation anxiety disorder and social phobia.

**Hirani V, Serpell L, Willoughby K, Neiderman M, Lask B. (2010)** examined the type of Obsessive Compulsive Disorder symptoms in children and adolescents with anorexia nervosa; they found that d, and aggressive and somatic obsessions, were prevalent, and ordering, arranging, and checking compulsions were common. Lafleur et al reported a higher rate of PTSD and trauma exposure in children with Obsessive Compulsive Disorder than matched controls. Grant et al studied 70 subjects with Obsessive Compulsive Disorder (mean age 13.8 years) and found an association with impulse-control disorders, the most common being pathological skin-picking (12.8%) and compulsive nail-biting (10%); trichotillomania cooccurred in 1.4% of cases.

**Ornstein TJ, Manassis K, Mendlowitz S, Schachar R Bloch, Vloet et al (2010)** studied neuropsychological factors and stated that although there are conflicting results regarding neuropsychological deficits owing to the fact that tests may not have the
necessary sensitivity to detect frontostriatal dysfunction or that cognitive deficits would not appear early in the course of the illness in children, executive function deficits have been implicated. Ornstein et al compared 14 Obsessive Compulsive Disorder children with 24 healthy controls on a series of neuropsychological tests; Obsessive Compulsive Disorder subjects appeared to have deficits in cognitive flexibility and planning abilities. Bloch et al assessed 24 children over a 7.5-year period with various neuropsychological tests including the WISC-III; poor fine-motor and visuospatial skills predicted persistence of pediatric-onset Obsessive Compulsive Disorder into adulthood. Vloet et al compared neuropsychological data of ADHD, Obsessive Compulsive Disorder, and healthy controls aged 10 to 18 years old and found that Obsessive Compulsive Disorder subjects showed impaired implicit learning.

Grant P, Song JY, Swedo SE (2010) tried the glutamate antagonist, riluzole (used in adults with amyotrophic lateral sclerosis) in 6 pediatric patients who failed standard treatment; 4 of 6 were much improved but 2 patients developed pancreatitis, warranting caution and further study.

Y. C. Janardhan Reddy, Naren P Rao, Sumant Khanna (2010) reviewed that Obsessive-compulsive disorder (Obsessive Compulsive Disorder) was considered a relatively rare disorder until about two decades ago. Since then, considerable advance has been made in understanding the various aspects of Obsessive Compulsive Disorder that include epidemiology, clinical features, comorbidity, biology and treatment. They also found that last one decade, there has also been interest in a group of related disorders called obsessive-compulsive spectrum disorders. Also there is substantial research from India on various aspects of Obsessive Compulsive Disorder, particularly from the National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore. They attempted to review all the relevant Indian data on Obsessive Compulsive Disorder. There is only one epidemiological study from India. The study found lifetime prevalence of 0.6%. This rate is considerably lower compared to the 2-3% rate reported in the European and North American studies. However, they found similar low rate ranging from 0.5-0.9% in a study from Taiwan. It is not clear why lifetime prevalence rate of Obsessive Compulsive Disorder is lower in some countries...
although the rates are not very low compared to the conservative estimate of 1% rate of Obsessive Compulsive Disorder. However, further research is needed into the epidemiological aspects of Obsessive Compulsive Disorder in India since the data available is limited.

Michele Fornaro, Filippo Gabrielli, Claudio Albano, Stefania Fornaro, Salvatore Rizzato, Chiara Mattei, Paola Solano, Valentina Vinciguerra and Pantaleo Fornaro (2009) had done comprehensive survey wherein they suggested that the most common age of onset of Obsessive Compulsive Disorder is reported to be between 22 and 35, while affected patients spend an average of 17 years before receiving a correct diagnosis and treatment, with most Obsessive Compulsive Disorder and OCRDs often showing a waxing and waning course, frequently increasing in severity when left untreated. They also explored that increasing the burden of Obsessive Compulsive Disorder is the fact that affected subjects, along with many psychiatric patients, often experience discrimination and stigmatization due to a non-medical perception of the phenomenon. Yet Obsessive Compulsive Disorder and OCRDs represent relevant medical conditions. They also explored that findings provided by recent studies, mainly focusing on the role played by the amygdala and its links to the 'fear circuits' and other structural and functional abnormalities of several corticostriatal pathways, also indicate a relationship between Obsessive Compulsive Disorder manifestations and its neurobiological basis, suggesting new therapeutic strategies. They suggested that treatment of Obsessive Compulsive Disorder typically involves the use of medications in combination with other modalities (such as cognitive behavioural therapy (Cognitive Behavior Therapy), psychoeducation and support groups and so on): first line treatments options include both serotonin reuptake inhibitors (SRIs) medication and Cognitive Behavior Therapy, but anxiolitics and antipsychotics, among other classes of drugs, are used as well. Finally, they found that the identification of Obsessive Compulsive Disorder and its appropriate treatment is essential to improve the quality of assistance and to reduce the waste of health care resources through unnecessary medical care.
Bhattacharyya S, Khanna S, Chakrabarty K, Mahadevan A, Christopher R, Shankar S (2009) explored the contribution of immunological mechanisms in the manifestation of Obsessive Compulsive Disorder that investigated the presence of auto antibodies directed against the basal ganglia or thalamus in the serum as well as CSF of 23 Obsessive Compulsive Disorder patients compared with 23 matched psychiatrically normal controls using western blot. They further investigated CSF amino acid (glutamate, GABA, taurine, and glycine) levels and examined the extent to which these levels were related to the presence of auto-antibodies. They found the evidence of significantly more binding of CSF auto-antibodies to homogenate of basal ganglia as well as to homogenate of thalamus among Obsessive Compulsive Disorder patients compared to controls. They stated that there was no significant difference in the pattern of binding between patients and controls using serum. CSF glutamate and glycine levels were also significantly higher in Obsessive Compulsive Disorder patients compared with controls, and CSF glycine levels were also significantly higher in those Obsessive Compulsive Disorder patients who had auto-antibodies compared to those without. The study implicates autoimmune mechanisms in the pathogenesis of Obsessive Compulsive Disorder and also provides preliminary evidence that auto antibodies against basal ganglia and thalamus may cause Obsessive Compulsive Disorder by modulating excitatory neurotransmission. In support of the possible immunological mechanisms in the causation of at least some forms of Obsessive Compulsive Disorder, they have studied a few clinical studies wherein they have examined the association between infections and Obsessive Compulsive Disorder. A study reported Obsessive Compulsive Disorder in some cases of Herpes Simplex encephalitis. In another study of 20 subjects with rheumatic chorea, four subjects (20%) had Obsessive Compulsive Disorder. The relationship between Obsessive Compulsive Disorder and rheumatic chorea and Pediatric, Autoimmune, Neuropsychiatric Disorders Associated with Streptococcal infections (PANDAS) is well known. They have considered the association between rheumatic fever and Obsessive Compulsive Disorder, and possible long term neuropsychiatric sequel in those with history of rheumatic fever because of possible autoimmune insult to basal ganglia, a study recently examined the prevalence of Obsessive Compulsive Disorder in adults with
Rheumatic Heart Disease (RHD). Of the 100 subjects with RHD, 10 had clinical Obsessive Compulsive Disorder. This rate is at least five-fold higher than the reported global general population rate of Obsessive Compulsive Disorder and over 15-fold higher than the 0.6% rate of Obsessive Compulsive Disorder in India. The finding lends support to the hypothesis that Obsessive Compulsive Disorder could be a long term complication of autoimmune basal ganglia insult in childhood just as RHD is a long term sequel of autoimmune damage to the heart. The results of this study need to be replicated in a controlled study.

Chakraborty S, Singh OP, Dasgupta A, Mandal N, Nath Das H (2009) examined the role of oxidative stress in pathogenesis of Obsessive Compulsive Disorder. They estimated serum Thiobarbituric Acid Reacting Substances (TBARS) formed as a result of free radical lipid peroxidation in 39 newly diagnosed drug free Obsessive Compulsive Disorder patients and 33 disease free control subjects. They found that patients had significantly higher TBARS than controls. In addition, there was a strong positive correlation between TBARS and the disease severity. The study result shows that oxidative stress induced increased free radical are generated in Obsessive Compulsive Disorder patients.

Kalra SK, Swedo SE (2009) examined the role of neuroimmune dysfunction in pediatric Obsessive Compulsive Disorder. As stated, antibody formation may trigger an inflammatory reaction in the basal ganglia following GABHS, as well as possibly other micro-organisms such as viruses, borrelia, and mycoplasma. They characterize IJANDAS by 5 clinical features: presence of Obsessive Compulsive Disorder or tic disorder, prepubertal symptom onset, abrupt onset or exacerbation of symptoms with an episodic course, temporal association between presence of symptoms and infection with GABHS, and associated neurological abnormalities such as chore form movements. They found that Mean onset occurs at 7.4 years, and boys outnumber girls 2.6 to 1.
Calvo R, Lazaro L, Castro-Fornieles J, Font E., Moreno E, Toro J. (2009) looked at obsessive-compulsive personality disorder (OCPD) traits and personality dimensions in 63 parents of 32 children with Obsessive Compulsive Disorder compared with matched controls; a greater incidence of OCPD traits was found in the parents, especially hoarding, perfectionism, and preoccupation with details. They reported that counting, ordering and cleaning compulsions in Obsessive Compulsive Disorder children were associated with higher levels of perfectionism and rigidity in their parents.

Viswanath B, Janardhan Reddy YC, Kumar KJ, Thennarasu K, Chandrashekar CR (2009) they conducted study on 25 unaffected siblings of probands with familial Obsessive Compulsive Disorder in comparison with 25 matched healthy controls and they found that this samples had significant deficits in tests of decision making and behavioral reversal but not in other tests of attention, executive function, intelligence and memory. They also found that their deficits were consistent with the proposed neurobiological model of Obsessive Compulsive Disorder involving the orbitofrontal cortex and suggested that the deficits could be potential endophenotypes in Obsessive Compulsive Disorder.

Peris, Tara S, Bergman, R. Lindsey, Langley, Audra, Chang, Susanna, McCracken, James T, Piacentini, John (2008) studied parental accommodation in 65 children and adolescents and their families in which they reported that 46% of parents often participate in rituals. The results were that parental psychopathology (particularly Obsessive Compulsive Disorder), low family cohesion and organization, and greater severity of obsessive-compulsive symptoms in children were particularly associated with accommodation.

Wilcox HC, Grados M, Samuels J, et al (2008) gathered data from 465 families involved in an Obsessive Compulsive Disorder genetics project; they have used the Parental Bonding Instrument to assess different factors like parental care, overprotection, and control. They found that maternal overprotection was associated with Obsessive Compulsive Disorder in offspring with a familial history of illness if
neither parent was affected with the disease; paternal care was found to be a protective factor in subjects without a clear genetic risk.

Rosa-Alcázar, AI, Sánchez-Meca J, Gómez-Conesa A, Marín-Martínez F (2008) had done a meta-analysis examining data from 19 controlled psychotherapy studies for Obsessive Compulsive Disorder. EX/RP and CT as well as their combination were found to be highly effective, with no significant differences between treatments. The authors noted that the similarity of the findings for EX/RP and CT may have been due to the fact that both treatments included the same techniques. For example, CT most often included behavioral experiments that involved in vivo exposure to obsession-evoking situations to challenge irrational thoughts, thereby incorporating in-vivo exposure and ritual prevention. On the other hand, the application of EX/RP involves processing that help patients question their unrealistic beliefs and irrational thoughts. The results were that it is possible that EX/RP is more effective than CT, but the studies that compare EX/RP with CT have taken special care to avoid the use of cognitive elements in EX/RP, resulting in an incomplete application of EX/RP, whereas CT in research studies usually includes elements of exposure.

Bloch MH., Landeros-Weisenberger A., Rosario MC., Pittenger C., Leckman JF. (2008) studied a meta-analysis by Bloch on 21 studies in over 5000 participants yielded four symptom factors, namely: (i) symmetry: symmetry obsessions and repeating, ordering, and counting compulsions; (ii) forbidden thoughts: aggressive, sexual, religious, and somatic obsessions, and checking compulsions; (iii) cleaning: cleaning and contamination; and (iv) hoarding: hoarding obsessions and compulsions. The results were found that factor analysis of child-only studies showed that checking loaded highest on the symmetry factor and somatic obsessions on the cleaning factor.

MacMaster FP, O'Neill J, Rosenberg DR (2008) in his neuroimagining studies reviewed article and reported on the results of an extensive literature search based on imaging techniques such as functional magnetic resonance (fMRI) and voxel-based morphometry, and concluded that the cortical-striatal-thalamic circuits are the most implicated in pediatric Obsessive Compulsive Disorder. Glutamatergic signals from the frontal cortex would stimulate striatal activity, diminishing thalamic inhibition. Results
The Effect of Cognitive Behavior Therapy In Obsessive Compulsive Disorder.

of this meta-analysis included the following findings in youth with Obsessive Compulsive Disorder: the cingular gyrus was found to be of greater volume and more active, the striatum is diminished, gray matter density in the orbitofrontal cortex is more elevated and voluminous on the right side, and thalamic volume and corpus callosum are larger. Evidence from drug therapy studies indicates a role for the dopaminergic (use of atypical antipsychotics), serotoninergic (use of clomipramine and selective serotonin reuptake inhibitors, SSRIs), and glutamatergic (use of riluzole) systems. Also Lazaro et al report on an fMRI study of 12 children with Obsessive Compulsive Disorder compared with matched subjects; Obsessive Compulsive Disorder patients presented significantly higher brain activation bilaterally in the middle frontal gyrus with decreased activation in the left insula and putamen after clinical improvement with 6 months of pharmacological treatment. MacMaster et al studied 28 treatment-naive pediatric Obsessive Compulsive Disorder patients compared with 21 controls using magnetic resonance imaging; They found that Obsessive Compulsive Disorder patients were found to have a larger right orbit frontal cortex.

March and Mulle, Watson and Rees (2008) studied cognitive-behavioral therapy (Cognitive Behavior Therapy) such as exposure and response prevention, and in a meta-analysis of 161 young patients by Watson and Rees they suggested that cognitive-behavioral therapy should be the first approach to treatment, along with family counseling and psychoeducation. Finally according to them with younger patients, it is important to take into account the cognitive level of development in order to use an age-appropriate technique such as family-based Cognitive Behavior Therapy.

Storch E A, Merlo L J, Larson M J, et al (2008) had carried on an open trial of intensive family-based Cognitive Behavior Therapy in 30 young patients, either partial responders or nonresponders to medication; after 14 sessions (3 months of treatment) 54% showed symptom reduction. In a another study on 96 youths with Obsessive Compulsive Disorder (aged 7 to 19 years old), they studied the impact of comorbidity on Cognitive Behavior Therapy response; in which 74% met criteria for one or more comorbid diagnoses; ADHD and major depression and the number of comorbid
conditions were negatively related to outcome. Study on Group Cognitive Behavior Therapy in 41 pediatric patients was found effective. Another study on the effect of Cognitive Behavior Therapy using fMRI compared 25 youths with Obsessive Compulsive Disorder with healthy controls and showed normalization of planning impairments and a significant decrease in right posterior prefrontal activity after Cognitive Behavior Therapy

**Mancebo C M, Garcia A M, Pinto A, et al (2008)** with data collected from 257 participants with juvenile-onset Obsessive Compulsive Disorder (20 children, 44 adolescents, and 193 adults), reported that children were less likely than either adolescents or adults to report aggressive obsessions and mental rituals. Males were over-represented in younger subjects. The equal distribution of Gender was done in adults. The results were found that compared with lifetime comorbidity patterns of adults, patterns in juveniles showed elevated rates of attention deficit hyperactivity disorder and lower rates of mood, substance, and eating disorders. Additionally, 70% of juveniles reported a continuous course of Obsessive Compulsive Disorder. Ninety percent of participants reported multiple obsessions and compulsions. Across all age groups, the most common obsessions were over-responsibility for harm/catastrophic thoughts, contamination, and symmetry obsessions. The most common compulsions were checking, repeating routine activities, and ordering/arranging objects. There were no age differences in hoarding symptoms. One fifth of the sample met lifetime criteria for a tic disorder and half had a concurrent anxiety disorder.

**Ginsburg G S, Kingery J N, Drake K L, Grados M A (2008)** suggested that according to metanalysis externalizing and tic disorders are key comorbidities in nonresponders to medication and also it has been found that sex, age, duration of illness, and comorbid internalizing disorders do not have a significant impact on treatment response.

**Jaisoorya TS, Janardhan Reddy YC, Srinath S, Kandavel T (2008)** examined gender differences in Obsessive Compulsive Disorder. In which they observed that males had an early onset of Obsessive Compulsive Disorder, and had a higher prevalence of symmetry/religious obsessions, miscellaneous compulsions, and
comorbid attention deficit hyperactivity disorder (ADHD) whereas females had higher prevalence of cleaning compulsions and comorbid trichotillomania

Gururaj GP, Bada Math S, Janardhan Reddy YC, Chandrasekhar CR (2008) assessed the family burden, quality of life and disability in Obsessive Compulsive Disorder patients and compared them with patients with schizophrenia of comparable severity. Patients with schizophrenia had higher family burden but were comparable to Obsessive Compulsive Disorder patients with respect to quality of life and disability. The study showed that Obsessive Compulsive Disorder patients were associated with significant disability, poor quality of life and high family burden comparable to schizophrenia.

Rajkumar RP, Janardhan Reddy YC, Kandavel T (2008) studied the clinical profile of schizophrenic patients with and without comorbid Obsessive Compulsive Disorder (50 in each group). Wherein they found that schizo-obsessive patients had higher rates of paranoid symptoms and first-rank symptoms of schizophrenia. They had lower inertia, higher depression scores, more comorbid personality disorders, and disability. Significant correlations were observed between Obsessive Compulsive Disorder severity scores and schizophrenia symptom dimension scores. Authors concluded that "schizo-obsessive" schizophrenia may be a distinct subtype with unique clinical characteristics. They had prepared a retrospective chart analysis of 15 cases in which Obsessive Compulsive Disorder with psychosis found that obsessive doubts, washing and checking compulsions were the most common OC symptoms. Twelve cases had a diagnosis of schizophrenia, while three had atypical psychosis. About half the patients had First Rank symptoms of schizophrenia. The results were that early three-fourth of the sample showed significant improvement on treatment with a combination of antipsychotic and anti obsessional drugs.

Jaisoorya TS, Reddy YC, Srinath S, Thennarasu K (2008) reviewed that obsessive-compulsive (OC) spectrum disorders have over the past few years emerged as a unique and fascinating category of related conditions. They examined the prevalence of putative OC spectrum disorders in a large sample of Obsessive Compulsive Disorder
subjects (n=231) in comparison with relatives of neurologically ill patients (n=200). Prevalence of tic disorders (39% vs. 12%), hypochondriasis (13% vs. 0), BDD (3% vs. 0) and trichotillomania (3% vs. 0) were significantly greater in Obsessive Compulsive Disorder subjects compared to controls. However, the prevalence of sexual compulsions, pathological gambling, eating disorders, and depersonalization disorder was not greater in the Obsessive Compulsive Disorder subjects compared to controls. The findings of this study suggest that tic disorders, hypochondriasis, BDD, and trichotillomania are perhaps part of the OC spectrum disorders. The evidence for exclusion of other disorders from the hypothesized OC spectrum is not conclusive because of the rarity of the occurrence of some of these disorders in the study sample. The findings are somewhat similar to those of a study that reported high rates of BDD, hypochondriasis and low rate of eating disorders and most impulse control disorders other than pathological skin picking. Only one patient in the sample had an eating disorder. Finally they stated that the finding is in sharp contrast to a previous study that reported high rates of eating disorders among Obsessive Compulsive Disorder patients and this divergence should be viewed in the light of the rare reporting of eating disorders in Asian countries but could well be a correlate of cultural beliefs and attitudes that have been identified as significant contributing factors in the development of eating disorders.

Jaisoorya T S, Reddy Y C, Srinath S, Thennarasu K (2008) examined the differences between tic related and non tic related Obsessive Compulsive Disorder with respect to sociodemographics, symptom profile, and comorbidity. They found that Tic related Obsessive Compulsive Disorder had an early age at onset, over representation of males, aggressive obsessions, cleaning compulsions and comorbid trichotillomania. They had done a chart review of comorbidity in 218 Obsessive Compulsive Disorder subjects, 17% had major depression, 6% dysthymia, and 7% any anxiety disorder. Also Comorbidity rates were low and there were not many differences between those with and without comorbidity except that female subjects were more likely to have depression. Kalra et al. compared Obsessive Compulsive Disorder with and without comorbid Axis I disorders in a sample of 54 subjects and found that those with comorbidity had higher scores on depression and Obsessive Compulsive Disorder
severity scales. They suggested that the study findings were in tune with earlier literature from rest of the world.

**Trivedi J K, Dhyani M, Goel D, Sharma S, Singh A P, Sinha P K, et al (2008)** examined executive functions, vigilance and spatial working memory in 30 Obsessive Compulsive Disorder patients and 30 age and education matched control subjects. They observed that Obsessive Compulsive Disorder patients had significant deficits in all the cognitive domains. They found a positive correlation between severity of illness and attention deficits but there was no correlation between duration of illness and cognitive dysfunction. Also in a study by Tarafder et al. examined neuropsychological disposition and executive functions in 20 Obsessive Compulsive Disorder patients and 20 matched normal healthy controls. The results shows that Subcortical-cerebellar-spinal domain to be associated with cognitive style and executive functions, affirming the neurobiological basis of the disorder.

**Rao N P, Janardhan Reddy Y C, Kumar K J, Thennarasu K, Chandrasekhar C R (2008)** examined neuropsychological deficits in 30 recovered Obsessive Compulsive Disorder patients in comparison with 30 matched healthy controls. They were assessed on tasks for attention, executive function, memory and intelligence. They observed that patients had significant deficits in tests of set shifting ability, alternation, response inhibition and non verbal memory. There was no correlation between illness related variables neuropsychological deficits. The study findings suggest neuropsychological deficits are possibly state independent.

**Zutshi A, Kamath P, Janardhan Reddy Y C (2007)** examined differences between bipolar Obsessive Compulsive Disorder and non-bipolar Obsessive Compulsive Disorder. Bipolar Obsessive Compulsive Disorder was associated with episodic course, a higher family loading for mood disorders, and higher rates of comorbid depression, social phobia and generalized anxiety disorder. In majority of the patients, Obsessive Compulsive Disorder predated bipolar disorder and Obsessive Compulsive Disorder worsened during depression and improved during mania. Authors concluded that
Obsessive Compulsive Disorder in those with bipolar disorder may be pathophysiologically related to bipolar disorder.

Kamath P, Janardhan Reddy Y C, Thennarasu K (2007) examined suicidal behavior in 100 consecutive DSM-IV Obsessive Compulsive Disorder patients; 59% had 'worst ever' (lifetime) suicidal ideation and 28% had current suicidal ideation. History of suicidal attempt was reported in 27% of the subjects. The results shows that Major depression, unmarried status and hopelessness were the major risk factors for suicidal behavior.

Math S B, Thoduguli J, Janardhan Reddy Y C, Manoj P N, Zutshi A, Rajkumar R P, et al. (2007) in another follow-up study explored if the long term outcome of 'predominantly obsessive' subjects differs from that of 'mixed' Obsessive Compulsive Disorder. They studied the five to six-year course and outcome of 54 patients with 'predominantly obsessions' and 54 with 'mixed' subtype of Obsessive Compulsive Disorder. The results were that the course of the illness was similar in both and a majority (72%) did not have clinical Obsessive Compulsive Disorder at follow up.

Geller D A (2006) reported, from a number of epidemiological studies, most using school surveys, a prevalence rate of pediatric Obsessive Compulsive Disorder varying between 2% and 4% with a mean age of onset between 7.5 and 12.5 years. Flament found in an adolescent epidemiologic study, a lifetime prevalence of 1.9%. They have suggested that Obsessive Compulsive Disorder follows a bimodal distribution of incidence in childhood and adulthood. Regarding gender distribution, Geller, in the same article, reports a 3:2 boys:girls ratio in children; older adolescents follow the adult pattern of equal distribution or slight female preponderance.

Abramowitz J S (2006) in his review for the psychological treatment of obsessive-compulsive disorder with exposure and response prevention methods is one of the great success stories within the field of mental health. He found that within the span of about 20 years, the prognosis for individuals with Obsessive Compulsive Disorder has changed from poor to very good as a result of the development of ERP. He also commented that the success not with standing, the procedures are far from perfect
because a substantial minority of patients still either refuse treatment, drop out prematurely, or fail to benefit, he started working on it with a review of the development of ERP from early animal research on avoidance learning conducted during the 1950s, after which he discussed the mechanisms of ERP, the bulk of the article reviews the treatment-outcome literature on ERP for Obsessive Compulsive Disorder and includes comparisons with cognitive therapy—the "new kid on the block" with respect to psychological treatments for Obsessive Compulsive Disorder.

Geller D A (2006) although Obsessive Compulsive Disorder in children can be encountered in its pure form in childhood, it is frequently a comorbid illness and based on his own studies, reported that 39% of children and 62% of adolescents with Obsessive Compulsive Disorder have symptoms of major depression at some point during the course of their illness. Tourette's disorder occurs, in association with Obsessive Compulsive Disorder, in 25% of children and 9% of adolescents. Disruptive disorders are usually not reported in the adult Obsessive Compulsive Disorder population; they are prevalent in youth (51% in children and 36% in adolescents for attention deficit-hyperactivity disorder (ADHD), 51% and 47% for oppositional disorder). Co morbid non Obsessive Compulsive Disorder anxiety disorders are prevalent in children and adolescents (31%) with an over-representation, in children and adolescents, of separation anxiety disorder (56% and 35%). Co morbid Obsessive Compulsive Disorder occurs in 5% of patients with pervasive developmental disorders; it is important for this group of patients to distinguish between repetitive and rigid behavior as a core symptom of pervasive developmental disorder and true obsessive-compulsive manifestations. It was also found that accompanying substance abuse occurred in 2% of adolescents-the same prevalence as eating disorders.

Geller D A (2006) review states that the estimated familial risk for adults with an Obsessive Compulsive Disorder-suffering relative is 11% to 12%; however, recent studies on family members of affected children show a 25% relative risk. Thus, the age of onset is considered the most important factor relative to genetic penetrance. Lenane et al found that, in parents of children with severe Obsessive Compulsive Disorder, 25% of the fathers and 9% of the mothers had the illness themselves. According to a
recent review by Walitza et al, so far, only a glutamate transporter gene has been associated with early onset Obsessive Compulsive Disorder through linkage studies. Other areas under investigation for genetic studies include the serotononergic and dopaminergic systems. Van Grootheest et al studied a large number of twin pairs at age 12, 14, and 16; only at age 14 and 16 were the prevalence higher in girls; genetic factors contributed at all age groups to obsessive-compulsive symptom liability, with no sex differences. Environmental factors shared by children in the same family contribute to symptom score only at age 12. The same group studied mono and dizygotic twin pairs from 8083 families through parental reports on the Obsessive Compulsive Scale of the Child Behavior Checklist, and concluded that obsessive-compulsive behavior is moderately stable in childhood due to genetic, shared, and nonshared environmental factors. Using the same scale, Hudziack et al studied 4246 twin pairs and found genetic factors accounting for 55% of the results, with 45% due to environmental influences.

**Gupta A, Bahadur I, Gupta K R, Bhugra D (2006)** examined level of comorbid depression in patients with Obsessive Compulsive Disorder, psychotic depression and chronic medical illness. All three groups had moderate to high levels of depression, with Obsessive Compulsive Disorder group intermediary between psychotic depression and physical illness. However, it was found that the Obsessive Compulsive Disorder group had more life events than depression or physical illness.

**Chakrabarty K, Bhattacharyya S, Christopher R, Khanna S (2005)** investigated glutamatergic dysfunction linked to immune pathogenesis in 21 Obsessive Compulsive Disorder patients and 18 healthy controls by collecting CSF. They estimated glutamate levels and found that Obsessive Compulsive Disorder patients had higher glutamate levels. Age, gender, duration of illness, severity of illness did not have any effect on glutamate levels. Neuropsychological studies have provided important clues in understanding the neurobiological basis of Obsessive Compulsive Disorder. Studies have examined patients in symptomatic phase, recovered phase and also in unaffected first degree relatives and concluded that neuropsychological deficits are potential endophenotype markers.
Harbishettar V, Kumar P, Janardhan Reddy Y C, Thennarasu K (2005) systematically assessed OC symptoms and Obsessive Compulsive Disorder in 69 Parkinson's disease patients and matched medically ill controls. There was no difference between the groups with respect to OC symptoms, Obsessive Compulsive Disorder both clinical and subclinical and tics. Also, there was no relationship between severity of Parkinson's disease and OC symptoms. Authors speculated that different circuitry may be involved in the pathophysiology of Obsessive Compulsive Disorder and Parkinson's disease although basal ganglia involvement may be common to both the disorders.

Reddy Y C, D'Souza S M, Shetti C, Kandavel T, Deshpande S, Badamath S, et al. (2005) observed that there is limited literature on the long-term course and outcome of Obsessive Compulsive Disorder. In an 11-13 year follow-up study of +75 subjects with Obsessive Compulsive Disorder, they reported a favorable outcome in majority of the subjects: 43% had no Obsessive Compulsive Disorder, 33% had subclinical Obsessive Compulsive Disorder and only 24% had clinical Obsessive Compulsive Disorder. Median time to reach 'no Obsessive Compulsive Disorder' and 'subclinical' status was 42 months and 84 months respectively. Interestingly, 37% were in true remission ('no Obsessive Compulsive Disorder' and not on any treatment) for a median period of 132 months. Those who had 'mixed' Obsessive Compulsive Disorder and Axis I comorbidity had poorer outcome. Age of onset and duration of illness had no effect on outcome. Optimistic outcome reported in this study is somewhat different from the findings of studies from other parts of the world which have reported lower rates of remission. Previous studies included samples that were severe and chronically ill with high rates of comorbidity. The subjects in the study by Reddy et al. were largely self-referred, moderately ill, and did not have history of treatment resistance. Hence, they suggested that findings of this study, therefore, could be generalized for patients routinely seen in the outpatient consultation at clinics and secondary-care hospitals in India.

Bhattacharyya S, Prasanna CLN, Khanna S, Janardhan Redy Y C, Sheshadri S (2005) examined familiarity of washers and checkers by interviewing first-degree
relatives of 25 checkers, 30 washers and 40 psychiatrically normal control probands. The morbid risk of Obsessive Compulsive Disorder was significantly higher among relatives of checker probands (19.4%) than in the relatives of washer (8.7%) or control probands (5.4%), while the morbid risk for relatives of washer and control probands was not significantly different. In all they found, 67% of the checker relatives with Obsessive Compulsive Disorder were checkers, while 54% of the washer relatives with Obsessive Compulsive Disorder were washers. The study provided preliminary evidence of familiality of the checker subtype of Obsessive Compulsive Disorder.

Shetti C N, Reddy Y C, Kandavel T, Kashyap K, Singisetty S, Hiremath A S, et al. (2005) examined the differences between SSRI responders and non responders. They assessed 67 SRI responders and 55 non responders. They observed that base line severity of illness, comorbid major depression, sexual obsessions, washing and miscellaneous compulsions, early age at onset, 'mixed' Obsessive Compulsive Disorder and poor insight were associated with poor response to SRIs. A serotonergic hypothesis of Obsessive Compulsive Disorder was suggested originally by the observed differential efficacy of SRIs in alleviating Obsessive Compulsive Disorder symptoms. Since then, numerous studies of peripheral receptor binding in the blood or concentrations of serotonin metabolites in cerebrospinal fluid have been performed but have yielded inconsistent results. Pharmacological challenge studies provide another indirect approach. By administering serotonergic agents and measuring endocrine and behavioral responses, investigators have attempted to study the central serotonergic functioning in Obsessive Compulsive Disorder. It is observed that Obsessive Compulsive Disorder patients become significantly more anxious and dysphoric after administration of meta-chlorophenyl-piperazine (mCPP), a 5-HT receptor agonist. In addition, obsessive-compulsive symptoms worsen. However, there appears to be blunted cortisol and prolactin response in response to mCPP. In an attempt to replicate these findings, mCPP was administered orally in a randomized double-blind design to 34 Obsessive Compulsive Disorder patients who were either drug-naive or drug-free for a minimum of four weeks. The cortisol and prolactin responses were contrasted with those of 18 drug-free healthy subjects. The Obsessive Compulsive Disorder patients showed significantly blunted cortisol and prolactin responses to mCPP.
challenge as compared to normal subjects. However, mCPP did not produce any significant exacerbation of obsessive-compulsive symptoms in the patients. These findings are suggestive of a serotonin (5-HT) receptor hyporesponsivity in the HPA axis. Even though previous studies indicate a hyperresponsivity of the 5-HT receptor system as shown by significant symptom worsening following serotonergic challenge, the Indian study failed to replicate those results. It was postulated that the 5-HT receptor hyporesponsivity in the HPA axis may be a biological "trait marker" of Obsessive Compulsive Disorder, and may not be directly involved in the mediation of symptomatology of the disorder. It was inferred that there could be discrepancy among studies regarding the behavioural responses to mCPP challenge may in part be due to differences in the basic environmental conditions across various studies. In a previous study by the same group, an endocrinological blunting in the absence of a behavioural increase in obsessive-compulsive symptoms was documented after oral administration of mCPP; however, when exposure was incorporated into the paradigm, with oral mCPP, exacerbation of obsessive-compulsive symptoms was noted. A normal endocrinological response after treatment with clomipramine was also independently documented. It is a matter of conjecture whether stimulation of noradrenergic system by the α2 adrenergic antagonistic action of mCPP, or behavioral exposure conditions during the challenge procedure are also partly responsible for the symptom exacerbation as noted in previous studies. In summary, it could be said that pharmacological challenge studies and other studies that have explored serotonergic hypothesis in Obsessive Compulsive Disorder, have very limited evidence to support a primary serotonergic dysfunction in Obsessive Compulsive Disorder. However, they have suggested that a modulation of serotonergic system clearly plays a role in effective pharmacotherapy of at least a significant proportion of Obsessive Compulsive Disorder patients.

Alonso, P, M Menchón, J, Mataix-Col, D, Pifarré, J, Urretavizcaya, M, Crespo, J. M, et al (2004) studied parental characteristics wherein he had conducted study on 40 Obsessive Compulsive Disorder children and 40 matched controls. They examined parental rearing style and its relation to symptom dimensions; Obsessive Compulsive Disorder patients perceived higher levels of rejection from their fathers but no
differences were found with respect of perceived overprotection. Low parental emotional warmth was associated with hoarding behavior. Liakopoulou et al reported on 31 Obsessive Compulsive Disorder patients aged 8 to 15 years old and their parents; parental psychopathology (anxiety disorders, depression, Obsessive Compulsive Disorder) was more prevalent than average, and fathers presented more severe obsessive-compulsive symptoms than mothers.

**Eddy K T, Dutra L, Bradley R, Westen D (2004)** examined data from 15 clinical trials (a meta analysis). Treatments included EX/RP, CT, and active and passive control conditions. Overall, approximately two thirds of the patients who completed treatment improved, but only a third met recovery criteria. Among the intent-to-treat sample, which included dropouts, about one-half of patients improved and only a quarter recovered. Findings were stronger for EX/RP than CT, and individual therapy was more effective than group therapy.

**Stewart S E, Geller D A, Jenike M, et al. (2004)** reported the following results of a meta-analysis on outcome in 16 samples of children with Obsessive Compulsive Disorder: 41% persisted into adulthood (60% if sub threshold cases were included) and a majority kept some traits; 39% qualified for remission. Severity of illness, need for hospitalization, early onset, and psychiatric co morbidity were linked to a greater persistence of the illness. They found fluctuation in symptoms occurred in relation to stress factors, either in school, family, or social environment.

**March J, Foa E, Gammon P, et al. (2004)** had studied the Pediatric Obsessive Compulsive Disorder Treatment over 5 years on 3 different sites yielded the following results: remission was induced by Cognitive Behavior Therapy and sertraline in 53.6%, Cognitive Behavior Therapy in 39.3%, sertraline alone in 21.4%, and placebo in 3.6%. It was found that it is important to treat comorbidities, such as ADHD and depression, that impact on treatment.

**Jaisoorya T S, Janardhan Reddy Y C, Srinath S (2003)** studied juvenile Obsessive Compulsive Disorder comparison with adult-onset Obsessive Compulsive Disorder, using multinominal logistic regression analysis. There was positive association of chronic tics, ADHD, major depressive disorder, and Body Dysmorphic Disorder (BDD)
with juvenile Obsessive Compulsive Disorder. The TS showed an almost significant association with juvenile Obsessive Compulsive Disorder. The BDD also had a positive association with juvenile-onset adult Obsessive Compulsive Disorder. In addition regression analysis (juvenile-onset adult Obsessive Compulsive Disorder vs. adult-onset Obsessive Compulsive Disorder), showed positive association between social phobia, chronic tics and MDD and juvenile-onset adult Obsessive Compulsive Disorder. These findings suggest that there are age-specific correlates of the disorder across the life cycle. Further, the findings suggest that Obsessive Compulsive Disorder in juveniles is perhaps a developmental subtype of Obsessive Compulsive Disorder with specific correlates such as high rate of ADHD and tic disorders. Follow-up studies of Obsessive Compulsive Disorder in children and adolescents have reported low rates of remission. Similarly, studies of adult Obsessive Compulsive Disorder have reported worse course in those with early onset of illness. However, studies on long-term course and outcome of Obsessive Compulsive Disorder in juveniles are few and many have small sample sizes. They discuss here a two to nine year follow-up study of 58 children and adolescents with DSM-III-R Obsessive Compulsive Disorder from India. The subjects were largely 'self-referred' (93%) and 'drug-naive' (90%) at the time of consultation. None had received any form of psychotherapeutic intervention and none were treatment refractory at the time of first consultation. Most were treated with medications and only a few of them with a combination of medicines and exposure and response prevention. At the time of follow-up, only 29% were still receiving medication. The median duration without any treatment at the time of follow-up was 49 months. At follow-up, 62% of the subjects were in full remission or had 'no Obsessive Compulsive Disorder' (Total Y-BOCS score=0 to 3), 17% had subclinical Obsessive Compulsive Disorder (Y-BOCS score, 4-15) and only 21% had clinical Obsessive Compulsive Disorder (Y-BOCS>15). It was found that the median time to achieve full remission was 24 months and subjects were symptom free for a mean of 41 months prior to follow-up assessment. However, the most significant finding is that 28 subjects (48%) were in true remission (full remission and not on any treatment) and were not receiving treatment for a mean period of 58 months. The result also shows that duration of follow-up and age-at-onset emerged as significant predictors of full remission. The
odds of younger subjects having full remission or no Obsessive Compulsive Disorder outcome were 1.5 times that of older subjects. Those who had ‘no Obsessive Compulsive Disorder’ at follow-up had earlier age-at-onset of illness.

Guruswamy R, Relan P, Khanna S (2002) in the family studies suggested that methodologically sound studies in the last decade have reported higher morbid risk for Obsessive Compulsive Disorder among first-degree relatives of Obsessive Compulsive Disorder probands but Indian studies have reported either no increase in morbid risk or much less than what was previously reported. The rate of Obsessive Compulsive Disorder in 135 first-degree relatives of 33 adult Obsessive Compulsive Disorder probands was comparable to the rate in 148 adults from the general population. In the family study of juvenile Obsessive Compulsive Disorder, they examined first-degree relatives of 35 juvenile Obsessive Compulsive Disorder probands and 34 matched normal controls, the morbid risk for Obsessive Compulsive Disorder among relatives of Obsessive Compulsive Disorder probands was 5%, while none of the relatives of controls had Obsessive Compulsive Disorder. In addition, none of the relatives had Tourette syndrome and only one relative of Obsessive Compulsive Disorder proband had chronic tics. The study concluded that most juvenile cases of Obsessive Compulsive Disorder were nonfamilial and unrelated to tic disorders, while only a few were familial.

Rachman S, Hodgson R J, Turner, Beidel, Stanley, Newth & Rachman, et al (2001) found that Obsessions are thoughts that give rise to immediate resistance. They also found that active resistance is a defining feature of obsessions in the Diagnostic and Statistical Manual of Mental Disorders and is an important criterion for distinguishing obsessions from other kinds of persistent, negative, unwanted thoughts such as worry and depressive rumination. They searched Phenomenological reports of Obsessive Compulsive Disorder emphasizing that in many cases of Obsessive Compulsive Disorder the significant complaint is that the subjective level of control over obsession thoughts is inadequate, as assessed by thought frequency, intensity and duration. That is the usual powers of exclusion and removal are weakened. Hence they suggested that successful treatment is characterized by restoration of an appropriate
degree of self-regulation. At the same time, they also found that the person is often highly motivated not to reveal the content of their obsessions to anyone in order to avoid feeling ashamed, humiliated, rejected or feared.

Cottraux J, Note I, Yao SN, et al (2001) conducted a study involving 62 French patients who received 20 sessions of CT or EX/RP for Obsessive Compulsive Disorder. Treatment included 4 weeks of intensive treatment (16 hours) and 12 weeks of maintenance (4 hours). EX/RP and CT produced equal improvements in Obsessive Compulsive Disorder symptoms after 4 weeks, although EX/RP patients showed greater improvement on a measure of intrusive thoughts and CT patients were more improved in anxiety and depression. They found that by week 52, most of the differences had disappeared, but the EX/RP group had lower Obsessive Compulsive Disorder symptoms and the CT group had lower depression. Notably, here too CT included some in vivo exposure in the form of behavioral experiments to test unrealistic fears and cognitive schemas; no processing of cognitive techniques were included in EX/RP. In another dismantling study of CT and exposure for Obsessive Compulsive Disorder, patients with Obsessive Compulsive Disorder were randomly assigned to receive exposure plus relaxation, exposure plus cognitive therapy, or waitlist. The Cognitive Behavior Therapy portion of the treatment consisted of 2-hour sessions held twice a week for 6 weeks using EX/RP along with either CT or relaxation; this was followed by 10 more sessions of in-vivo and/or imaginal exposure. They found that the two Cognitive Behavior Therapy treatments were equally effective, and patients showed significant improvement post-treatment and through 12-month follow-up.

Reddy Y C, Srinath S, Prakash H M, Girimaji S C, Sheshadri S P, Khanna S, et al (2000) while studying comorbidity they suggested that psychiatric comorbidity is common in adults with Obsessive Compulsive Disorder. Similarly, studies of juvenile Obsessive Compulsive Disorder have found high rates of comorbid major depression (10%-73%), anxiety disorders (26%-76%), and tic disorders (17%-59%). Three Indian studies have systematically examined the comorbidity in juveniles with Obsessive Compulsive Disorder. Rates of comorbid major depression, dysthymia, and bipolar disorder have ranged from 14-23%, 0-2%, and 0-2% respectively. Among anxiety
disorders, rates of panic disorder, social phobia, specific phobias, overanxious disorder and separation anxiety disorder ranged from 0-6%, 0-13%, 5-7%, 0-7%, and 5-7% respectively. Of considerable interest is the co-morbid relationship between tic disorders, disruptive behavior disorders and juvenile Obsessive Compulsive Disorder. Rates of TS have varied from 11-15% and that of other tic disorders from 17-59%. In the three Indian studies, rates of TS and chronic tics are in the range of 8-11% and 2-23% respectively. In the follow-up study by Leonard et al. TS was present in 15% of the sample and any tics in 59% of the sample. The rate of TS in the Indian juvenile Obsessive Compulsive Disorder samples is somewhat comparable to the rates in previous studies, but the overall rate of tic disorders and, in particular, chronic tics are somewhat lower. In a recent study, the clinical profile of Obsessive Compulsive Disorder+ tics patients was examined in juvenile Obsessive Compulsive Disorder, juvenile-onset adult Obsessive Compulsive Disorder and adult-onset Obsessive Compulsive Disorder subjects. Miscellaneous compulsions such as touching, tapping, rubbing, blinking, staring etc (73% vs. 45% vs. 32%) and pathological doubts (40% vs. 13% vs. 9%) and ADHD (26% vs. 3% vs. 0) were over represented in the juvenile Obsessive Compulsive Disorder group compared to the other two groups. The miscellaneous compulsions of the type reported in this study were also reported in previous studies of Obsessive Compulsive Disorder patients with tics but the obsessions are not similar to the ones reported in other studies that found mainly excess of aggressive, sexual, and symmetry obsessions. Further, the results shows that the elevated rate of ADHD in juvenile Obsessive Compulsive Disorder with tics support the previous observations that ADHD, tics and Obsessive Compulsive Disorder commonly co-occur in juvenile Obsessive Compulsive Disorder and are possibly interrelated sharing a common pathophysiology.

Van Oppen P, de Haan E, Van Balkom AJLM, et al (1995) conducted study of Cognitive therapy compared to in-vivo exposure with ritual prevention a treatment study comparing CT with EX/RP. They have taken seventy-one Dutch Obsessive Compulsive Disorder patients, were randomly assigned to either CT or in-vivo exposure. Sixteen 45-minute sessions were administered. In the CT condition,
treatment focused on “overestimation of danger and inflated personal responsibility,” and after session 6, behavioral experiments were included to test the basis of unrealistic beliefs. The exposure condition consisted of EX/RP working up a hierarchy of feared and avoided situations, with no discussion of feared consequences until after session 6. Patients in both groups improved significantly. No differences between the two treatments emerged. It should be noted that the behavioral experiments in the CT condition introduced in-vivo exposure and ritual prevention. On the other hand, the processing component of EX/RP was omitted. Thus, it was difficult for them to interpret the results of the study.

**Dr. March (1995)** studied Cognitive-Behavioral Psychotherapy for Children and Adolescents with Obsessive compulsive disorder. He gave a review and recommendations for treatment and critically reviewed the published literature on cognitive-behavioral psychotherapy for obsessive-compulsive disorder in children and adolescents. He explored the psychiatric and psychological literature and systematically searched for “studies” applying cognitive-behavioral principles to children and adolescents with Obsessive compulsive disorder. He identified around thirty-two investigations; most of them were single case reports. He found that despite manifold differences in terminology and theoretical framework, all but one showed some benefit for cognitive-behavioral interventions. He suggested graded exposure and response prevention form the core of treatment; anxiety management training and Obsessive compulsive disorder specific family interventions may play an adjunctive role. He faced recurrent problems such as Poor compliance, inadequately documented and inconsistently applied treatment, and lack of exportability. He concluded that abundant clinical and emerging empirical evidence suggest that cognitive-behavioral psychotherapy, alone or in combination with pharmacotherapy, is an effective treatment for Obsessive compulsive disorder in children and adolescents. He suggested future research in this area will need to focus on comparisons of cognitive-behavioral psychotherapy to other treatments, on component analysis, and on the application of exportable protocol-driven treatments to divergent patient populations.
Leonard H L, Swedo S E, Lenane M C, Rettew D C, Hamburger S D, Bartko J J, et al (1993) studied that comorbid ADHD is considered by some to be a developmental marker of juvenile Obsessive Compulsive Disorder, the rate of ADHD was 26% and the rate of ADHD was as high as 57%. In the three Indian studies, rates of ADHD ranged from 3 to 18%. The rates of ADHD in Indian samples are considerably lower than the rates reported in previous studies. The samples in the previous studies were recruited from a specialized pediatric Obsessive Compulsive Disorder program, whereas the Indian samples were largely "self-referred" and this difference in the ascertainment method might possibly explain the variation in the rates across the samples. However, at least in one study, the 18% rate of ADHD was higher than the 5-10% rate reported in community samples. The elevated rate of ADHD in juvenile Obsessive Compulsive Disorder in this study is consistent with the findings of previous studies although the rate of ADHD is much lower than the 51-57% in children and 36-39% in adolescents reported in the studies by Geller and others.

Leonard H L, Swedo S E, Lenane M C, Rettew D C, Hamburger S D, Bartko J J, et al (1993) showed the high rate of 'true remitters' is in sharp contrast to the 6% rate in the study. The rate of clinical Obsessive Compulsive Disorder (21%) at follow-up is low compared to the high rates of clinical Obsessive Compulsive Disorder (35%-68%) reported in previous studies. They reported that favorable prognosis in this study could be due to several reasons. First, the sample was largely 'self-referred', 'drug-naive', moderately ill, with relatively low rate of comorbidity (55%). In the classic study by them, the subjects were severely and chronically ill with history of treatment resistance in 75% of them and 100% comorbidity. Second, a low rate of tic disorders (16%) and ADHD (3%) could have contributed to better prognosis.

Khanna S, Reddy P L, Subhash M N, Sridhar Ram Rao B S, Channabasavanna S M. (1992) found that there was a blunted growth hormone, cortisol and ACTH response to clonidine in Obsessive Compulsive Disorder. They have done qualitative analysis wherein they found that three possible responses of growth hormone: Accentuation (.10 ng/ml), normal (5-10 ng/ml) and attenuation (.10 ng/ml). Most patients with an accentuated response were patients with compulsions, pure obsessions were
significantly more likely to have blunted responses. The study findings suggest noradrenergic dysfunction in Obsessive Compulsive Disorder and also imply noradrenergic heterogeneity in the observation that pure obsessions tend to have a more down regulated noradrenergic system as compared to the compulsives. Based on their work, they concluded that serotonergic hypothesis may not explain all the abnormalities seen in Obsessive Compulsive Disorder and that complex interactions between various neurotransmitters as well as the environmental conditions may be necessary to cause Obsessive Compulsive Disorder. Also soft neurological signs in Thirty-seven drug free non-depressed Obsessive Compulsive Disorder subjects and 20 normal healthy volunteers were screened for SNS. The Obsessive Compulsive Disorder subjects had significantly more total SNS as compared to normals. These findings were most marked in the frontal lobe functions. There was a trend towards significance in temporal lobe functions, while other test findings were not impaired. If individual items were studied the problems were predominantly in complex motor tasks. They found that there was no significant laterality effect.

Khanna S, Gokul B N, Reddy P L, Khanna N, Channabasavanna S M (1990) while studying immunological factors documented increased levels of serum immunoglobulins in Obsessive Compulsive Disorder subjects as compared to normal controls, with specific reference to IgG. The IgG levels were high even after clinical improvement. The authors speculated that the immunological abnormality could be a marker of vulnerability to Obsessive Compulsive Disorder. They also discussed the possibility that the immunological dysfunction could be due to an unidentified infectious agent or an autoimmune process. As an extension of the hypothesis, viral antibodies were measured in the blood and cerebrospinal fluid (CSF) of Obsessive Compulsive Disorder subjects. IgG viral antibodies for herpes simplex virus-1 (HSV-1), varicella zoster, cytomegalovirus, measles and mumps were studied in 76 subjects with Obsessive Compulsive Disorder and compared with 55 normal healthy volunteers. There was a significantly higher titer for HSV-1 antibodies in both serum and CSF. The sera: CSF ratios were suggestive of intrathecal synthesis. The study on viral antibodies in CSF suggests a role for HSV-1 in Obsessive Compulsive Disorder. However, they
suggested caution needs to be exercised in interpreting the finding because of certain methodological issues raised in the paper by the authors.

Khanna S, Srinath S (1988) from India have conducted one of the earliest studies to systematically examine the clinical profile of Obsessive Compulsive Disorder in children in comparison with the Obsessive Compulsive Disorder in adults. In this sample, obsessions were less frequent compared to compulsions. Obsessions of harm, religion, and impersonal images were commonly reported. Washing, praying, touching, counting and spitting were the common compulsions. Recent studies from India have examined the phenomenology of Obsessive Compulsive Disorder in children using the children's version of the Yale-Brown Obsessive-Compulsive Scale (CY-BOCS), the instrument that is widely used all over the world. In a study of 58 children and adolescents, all aged 16 years and below, contamination obsessions were the commonest (62%), followed by obsessions related to aggression (57%), symmetry (34%), sex (22%), religion (22%), somatic (12%), and hoarding (7%). Regarding compulsions, cleaning and washing was the commonest (69%) followed by repeating (52%), checking (47%), ordering (29%), counting (15%), and hoarding (7%). The miscellaneous obsessions and compulsions were present in 65% and 47% of the subjects respectively. The phenomenology of Obsessive Compulsive Disorder in these studies is similar to that reported in a group of 70 young patients at the National Institute of Mental Health (NIMH) in USA. In one study, the phenomenology in juvenile Obsessive Compulsive Disorder was compared with that of adult-onset Obsessive Compulsive Disorder and juvenile-onset adult Obsessive Compulsive Disorder, in view of the previously reported findings that juvenile Obsessive Compulsive Disorder could be phenotypically different from adult Obsessive Compulsive Disorder and juvenile-onset adult Obsessive Compulsive Disorder. Obsessions related to contamination and compulsions related to checking and miscellaneous types were common in juvenile Obsessive Compulsive Disorder. In addition, the mean Y-BOCS score was greater in the juvenile Obsessive Compulsive Disorder and juvenile-onset adult Obsessive Compulsive Disorder subjects compared to the adult-onset Obsessive Compulsive Disorder subjects suggesting greater severity of Obsessive Compulsive Disorder in the juvenile groups. The variations in the clinical
manifestations support developmental variability in the expression of Obsessive Compulsive Disorder. However, they are not consistent with specific variations reported in previous studies. For example, Obsessive Compulsive Disorder in juveniles was associated with a higher frequency of aggression/catastrophic obsessions, hoarding and saving compulsions. They found that Sexual obsessions were selectively more prevalent in adolescents compared with children or adults. According to them it is also possible that sexual and aggressive obsessions were underrepresented in this sample due to the fact that the subjects kept them secret because of embarrassment and possible guilt associated in revealing them. However, they suggested that there could also be a true cross cultural variation in the phenotypic manifestation of Obsessive Compulsive Disorder.

Khanna S (1988) in the electrophysiological studies suggested that most electrophysiological studies in Obsessive Compulsive Disorder have either tried to localize the site of the disorder at a structural or functional substrate, or have been based on the associated increased autonomic arousal. Khanna concluded that in most cases there was no obvious EEG abnormality in Obsessive Compulsive Disorder; when it was present it was likely to be a non-specific disturbance in the temporal and frontotemporal regions. In Obsessive Compulsive Disorder there was a decreased power in the nondominant frontomedial and posterior temporal regions in the computerized EEG analysis. There were no significant differences in the coherence observed from these sites. The study suggested nondominant frontomedial hypofunctioning to be associated with Obsessive Compulsive Disorder. In a study of resting middle latency auditory and visual evoked potentials in 50 Obsessive Compulsive Disorder subjects and 40 normal controls, there were no significant differences between the two groups for amplitude and latency or left-right ratios. The study did not support any laterality deficit in Obsessive Compulsive Disorder and was inconsistent with the hypothesis of left frontal lobe dysfunction in Obsessive Compulsive Disorder. A more prolonged post imperative negativity and a higher amplitude of the late component of the Contingent Negative Variation (CNV) has been repeatedly recorded. Obsessive Compulsive Disorder patients exhibited higher amplitude of the 'late' component of the CNV. The role of the mesencephalic reticular
formation with modulation by the frontal granular cortex in the genesis of these potentials has been stressed. Bereitschaft potential has been found absent or to have a decreased onset latency in 44 subjects with Obsessive Compulsive Disorder. A deficit of the complex motor programming circuit similar to those observed in Gilles de la Tourette syndrome has been put forth on the basis of this observation. Based on the evidence from electrophysiological, neuropsychological, scan, lesion, and psychosurgical studies, he also proposed an integrated model of possible frontal dysfunction in Obsessive Compulsive Disorder with associated dysfunction in other areas of the brain such as cingulum and basal ganglia.

Gojer J, Khanna S, Channabasavanna S M (1987) compared 53 cases of Obsessive Compulsive Disorder with an equal number of subjects with depression and anxiety neurosis. And results were that there were more similarities in the Obsessive Compulsive Disorder and anxiety neurosis group than the depressive group.

Foa E B, Goldstein A J. (1978) studied a series of Obsessive Compulsive Disorder patients, using a quasi-experimental design. They followed the following procedure - Patients' Obsessive Compulsive Disorder symptom severity was assessed before and after 2 weeks, in which the therapists collected information about their Obsessive Compulsive Disorder, history, and type of symptoms, but no treatment was conducted. Patients were then treated with EX/RP and their symptom severity was assessed again. This treatment differed in several ways from previous studies. First, for the majority of patients, treatment was conducted as outpatients rather than as inpatients. Second, exposure and ritual prevention involved 10 rather than 15 daily sessions. Third, influenced by reports about the efficacy of imaginal exposure with phobias. Foa and Goldstein included imaginal exposure in addition to in-vivo exposure in the EX/RP treatment. During imaginal exposure, therapists described the patients' feared “disasters” that might result from not performing the rituals and asked them to immerse themselves in imagining the scenario described. The treatment program proved quite effective. During the information-gathering stage, no improvement was evident. In contrast, they concluded that during the 2-week EX/RP, a marked and highly significant improvement was found. At follow-up, 66% of patients were very much
improved and 20% partially improved. Only three patients did not benefit from the treatment program, which was attributed to overvalued ideation, ie, poor insight.

**Rachman et al (1971)** conducted a controlled treatment study of 10 in patients with chronic Obsessive Compulsive Disorder. All patients received 15 sessions of relaxation control treatment prior to EX/RP. The patients were then assigned randomly to intensive treatment of 15 daily sessions of either modeling in vivo or flooding in vivo. They concluded significantly more improvement in Obsessive Compulsive Disorder symptoms in EX/RP compared with the relaxation treatment, and the patients maintained their gains at 3 months' follow-up. At a 2-year follow-up with the 10 original and 10 additional patients, three quarters of the 20 patients were much improved.

**Dutta Ray(1964)** in his earliest study of phenomenology of obsessive-compulsive disorder in adults followed by a series of articles by Akhtar *et al.* on phenomenology and socio-cultural determinants of symptoms in Obsessive Compulsive Disorder, Chakraborty and Banerji, in a study compared 200 "obsessionals" with 200 controls reported a high rate of family history of obsessional illness (26%) and premorbid obsessional personality (26%). Two other studies also reported high rates of obsessive personality.