CHAPTER 2
REVIEW OF RELEVANT LITERATURE
Among children, Obsessive Compulsive Symptoms frequently lead to difficulties in cognitive processes, academic achievement, social problems and distress in home and family environment and if such symptoms persist may lead to impairment in adulthood. Recurrent obsessions (i.e., intrusive thoughts) and/or compulsions (i.e., ritualistic behaviors and avoidance) are two components of childhood OCD which are often identified as contributing to these problems. Like adults, young people with OCD have good insight into the unnecessary nature of their rituals and obsessions, and often feel foolish and vulnerable about revealing their symptoms (Shafran et al., 2003). In this section, a review of some prior and recent relevant research findings has been reported. It needs to be stated that though many studies are available relating to Obsessive Compulsive symptoms with Cognitive processes and Neuropsychological functioning but there is a paucity of research on the relationship between obsessive compulsive symptoms and academic achievement. Therefore this review includes, apart from the relationship between the variables mentioned above, other relevant studies regarding the relationship between the General Anxiety symptoms and academic achievement and Intelligence and Academic achievement.

In the present review, the research reports published in the last 17 years (from 1995 onwards) have been presented. A chronological order from the most recent to the earlier ones has been roughly maintained within each sub-theme.

The relevant literature has been categorized under the following headings:

1. Studies on Obsessive Compulsive symptoms, Cognitive Processes and Neuropsychological functioning.

2. Studies on prevalence of Obsessive compulsive symptoms, Gender, and Age.

3. Studies on Obsessive Compulsive symptoms, and Academic achievement.

4. Studies on General Anxiety symptoms and Academic achievement.

5. Studies on Intelligence and Academic achievement.
2.1 Studies On Obsessive Compulsive Symptoms, Cognitive Processes And Neuropsychological Functioning:

The consequences of obsessive compulsive symptoms can affect many cognitive processes, neuropsychological functioning of school-aged children, adolescents and adults. The relevant studies in this area are presented below-

2.1.1 Studies On Obsessive Compulsive Symptoms And Cognitive Processes

Shin et al. (2012) conducted a study to examine the switching strategy underlines phonemic verbal fluency impairment in obsessive-compulsive disorder. In this study they sought to test the hypothesis that phonemic fluency impairment in OCD resulted from switching problems rather than lack of fluency per se. In addition, they aimed to evaluate whether certain symptoms dimensions were associated with impaired phonemic fluency to better understand OCD heterogeneity. The study included 85 patients with OCD (45 drug-naïve and 40 drug-free) and 71 healthy controls matched for gender, age, education, and intelligence. The controlled oral word association (COWA) test was administered to assess phonemic fluency and switching performance. Patients with OCD generated a smaller number of words and displayed fewer switches than did healthy control subjects, and switching was found to mediate impaired phonemic fluency in OCD. Furthermore, impairment in switching and phonemic fluency was related to the symmetry dimension in patients with OCD. Their findings suggested that phonemic fluency impairment in OCD is mediated by switching deficit that may originate from abnormal processing in the frontal-striatal circuitry involving the orbit frontal cortex. Moreover, different obsessive-compulsive symptom dimensions may be characterized by distinct neurocognitive dysfunctions in OCD.

Harkin, Rutherford and Kessler (2011) studied about the role of impaired executive functioning in sub clinical compulsive checking with ecologically valid stimuli in a working memory task. The task in this study was to memorize four appliances, including their states (on/off), and their locations on the kitchen countertop. Memory accuracy was tested for the test of appliances in experiment 1, and for their locations in experiment 2. Intermediate probes were identical in both experiments were administered during the retention on 66.7% of the trials with 50% resolvable and 50% irresolvable/misleading probes. Experiment 1 revealed the efficacy of the employed stimuli by revealing a general
impairment of high-compared to low checkers, which confirmed the ecological validity of their stimuli. In experiment 2 they observed the expected, more differentiated pattern: High checkers were not generally affected in their WM performance (i.e., no general capacity issue); instead they showed a particular impairment in the misleading distractor-probe condition. Also high checker’s confidence ratings were indicative of a general impairment in meta-cognitive functioning.

Wright (2010) conducted a study to see the cognitive dissonance approach to understanding and treating obsessive-compulsive disorder. To test the assertions of cognitive dissonance perspective, the effects of self-affirmation were experimentally tested using a simulated intrusive thought. The extent to which simulated intrusive thought was perceived to conflict with self-concept consistently predicted the distress that participants experienced. There was also robust evidence that the distress experienced due to the simulated intrusive thought was associated with negative changes in self-concept. Finally, self-affirmation and neutralization showed equivalent results. Both showed some improvement over a no-intervention control group. Performing the two strategies in succession showed greater improvements in distress and threat appraisals than did either intervention alone. Taken together the results reinforce the importance of self-concept in understanding the distress associated with intrusive thoughts (and possibly obsessions), and provide initial support for the effectiveness of self-affirmation as a coping strategy for that distress.

Daddona (2009) conducted a study on an investigation of working memory ability, executive functioning and judgment of learning in obsessive-compulsive disorder. A total of 21 participants were recruited from two clinical sites and the community: eleven diagnosed with OCD and ten diagnosed with another anxiety disorder. The variables of interest included verbal and visual working memory, judgment of learning and executive functioning. Verbal working memory was assessed using Letter-Number sequencing; visual working memory through a computerized task and executive functioning with the Wisconsin Card Sorting Test. Judgment of learning was assessed by asking the participants to estimate the accuracy of their performance. Based on earlier research findings, it was postulated that participants with OCD would exhibit greater difficulty on all neuropsychological tests, compared to participants with other anxiety disorders. In addition it was hypothesized that there would be a positive relationship between obsessive-
compulsive symptom severity and the discrepancy between the participant’s judgment of learning and true accuracy.

**Renolds and Reeves (2008)** studied that whether cognitive models of obsessive compulsive disorder apply to children and adolescents. The aim of that systematic review was to evaluate research that examined the applicability of the cognitive model of OCD to children and adolescents. Eleven studies were identified in a systematic literature search. Seven studies were with non clinical samples, and 10 studies were cross-sectional. Only one study did not support the cognitive models of OCD in children and adolescents and that was with clinical sample and was the only experimental study. Overall, the results strongly supported the applicability of cognitive models of OCD to children and young people.

**Olley, Malhi and Sachdev (2007)** conducted a study to examine the role of memory and executive functioning in obsessive-compulsive disorder. The study was conducted using MEDLINE and drawing on literature known to the authors. The results showed that neuropsychological profile of OCD appears to be one of primary executive dysfunction. Although memory functioning may be affected, these deficits appear secondary to an executive failure of organizational strategies during encoding. On tasks of executive functioning patients with OCD demonstrate increased response latencies, preservations of responses, and difficulties utilizing feedback to adapt to change. Surprisingly it was seen that decision making as cognitive construct as related to OCD had not received greater attention in the neuropsychological literature. On the basis of emerging literature they suggested that it is a potential area of dysfunction and one that warrants further investigation as it may assist in enhancing our understanding of the pathophysiology of OCD.

**Moulding and Kyrios (2007)** conducted a study on the relationship among desire for control, sense of control and obsessive-compulsive symptoms. In this study it was hypothesized that OCD symptoms may be linked with a higher desire to control (DC), but a lower sense of control (SC) over the self and environment, leading to motivation for compulsive symptoms. This hypothesis was investigated in an analogue population, using regression analyses controlling for depression and anxiety. Consistent with predictions, it was found that higher levels of DC and lower levels of SC were associated with higher
levels of OCD-related beliefs and symptoms. While control cognitions were linked with the OCD-related beliefs of perfectionism and the over-estimation of threat, they did not relate to cognitions concerning the importance of need to control thoughts. With respect to specific OCD-symptoms, control cognitions were most strongly related to contaminations obsessions/washing compulsions.

Besiroglu, Agargun, Ozbebit, and Aydin (2006) conducted a study on a discrimination based on autogenous versus reactive obsessions in obsessive-compulsive disorder and related clinical manifestations. The medical records of 177 OCD patients were evaluated retrospectively for gender, age at onset, comorbid diagnoses, and predisposing life events. Obsessions and compulsions were coded according to the Yale-Brown Obsessive-Compulsive Scale. All patients were grouped as the patients with autogenous (n=32), reactive (n=77) and mixed obsessions (n=68). Results suggested that the discrimination between autogenous and reactive obsessions are not only based on their development and maintenance mechanism through different cognitive process but that there also clinical manifestations of this discrimination.

Hansen (2005) conducted a study to investigate the role of cognitive functioning and personality traits in obsessive-compulsive disorder, panic disorder, healthy controls and sub-clinical obsessive-compulsives. In this study 20 OCD patients were compared to 20 patients with panic disorder, 20 subjects with sub-clinical OC symptoms and 20 healthy control subjects on tests of working memory and the Five-Factor Model of personality. To measure different aspects of working memory, participants completed three delayed matching-to-sample (DMS) tasks and two continuous performance working memory tasks (n-back tasks). The DMS tasks assessed the ability to actively maintain different types of information in working memory (irregular objects; geometric objects; spatial locations). The n-back tasks assessed the ability to update and temporally order verbal and spatial stimuli in working memory. The OCD patients were less accurate than the healthy control subjects on the memory trials of the spatial DMS task, the 3-back trials of the spatial n-back task, and the 2-back and 3-back trials of the verbal n-back task. The OCD patients were also less accurate than patients with panic disorder and sub-clinical OC subjects on the verbal 3-back task. The results indicated that OCD patients were impaired on cognitive tasks requiring the maintenance of spatial stimuli and the updating and temporal ordering of verbal and spatial stimuli on working memory. The OCD patients were not impaired on tasks requiring the
maintenance of object information in working memory. To measure normal personality traits, subjects completed the Revised NEO Personality Inventory (NEO PI-R). Compared to healthy controls, OCD patients reported being highly emotional and introverted, less open to new experiences, and lacking confidence in their own abilities. The OCD patients were similar to panic disorder patients on most of the domains and facets of the NEO PI-R; however, they were distinguished by their lower openness to experiencing new activities, and being less diligent and purposeful. Compared to the sub-clinical OC subjects, OCD patients reported being more prone to feelings of depression, more vulnerable to stress, less likely to experience positive emotions, more humble and sincere and less able to carry tasks through to completion. Overall, this thesis provided further evidence that OCD patients are impaired on cognitive tasks requiring the organization and manipulation of information in working memory. However, it is still unclear whether this deficit arises due to capacity constraints being exceeded in working memory systems, or some other executive dysfunction such as executive error monitoring. The present thesis also found that normal personality traits-as measured by the NEO PI-R-were able to distinguish OCD patients from healthy controls, patients with panic disorder and individuals with sub-clinical levels of OC symptoms. The results had implications for sub-clinical OC research and the clinical management of OCD.

Sawamura, Nakashima, Inoue and Kurita (2005) conducted a study to examine the role of short term verbal memory deficits in patients with obsessive-compulsive disorder. In this study they examined verbal memory deficit and the ability of feature detection in Japanese patients with obsessive compulsive disorder. They administered Iddon et al.'s verbal strategy task to 16 patients with obsessive-compulsive disorder and 16 healthy controls. The feature of Iddon et al.'s task was to include a phase that showed subjects the semantic structure of the task and timed each subject's analysis of the organization. Patients with obsessive-compulsive disorder were slower to clarify stimuli words into semantic categories than were healthy controls. They recalled and recognized significantly fewer words than did healthy controls.

Moritz and Muhlenen (2005) conducted a study on inhibition of return in patients with obsessive-compulsive disorder. 30 OCD patients, 14 psychiatric, and 14 healthy controls participated in a visual cueing experiment. The task required detection of a target stimulus at one of two possible locations. Prior to the target, an uninformative cue
appeared at one of these two locations. The stimulus onset Asynchrony (SOA) between the cue and the target was systematically varied. They were especially interested in whether severity OCD symptoms would be negatively correlated with inhibition for previously occupied locations. In accordance with prior research on healthy participants all groups displayed a comparable response pattern: facilitation at the short SOA condition and increasing inhibition of return for the longer SOA conditions. Medication, comorbid depression, and OCD severity did not consistently moderate these effects.

Roth, Baribeau, Milovan, and O’connor (2004) conducted a study to examine the role of speed and accuracy on tests of executive function in obsessive-compulsive disorder. This study suggested that slowness in OCD may be, particularly evident on tests of executive function sub served by frontostriatal circuitry. In this study speed and accuracy of respondents on neuropsychological test, executive functions, and psychomotor speed were investigated in 27 non-depressed, un-medicated adults with OCD and 27 healthy controls. Results suggested that slowness in OCD may be most apparent on executive tests requiring self initiated organizational strategies consistent with frontostriatal abnormality.

Cohen and Calamari (2004) observed a study on the relationship between thought focused attention and obsessive-compulsive symptoms. This study was conducted to evaluate cognitive, self-consciousness in a non-clinical sample. In this study a self report measure of consciousness was administered to a non-clinical sample (N=323) and the relationship to OCD symptoms and intrusive thought appraisals were evaluated. Analysis revealed that consciousness and intrusive thought appraisals were largely independent predictors of OCD symptoms. Meta-cognitive processes such as consciousness appeared distinguishable from intrusive thought appraisals. Consciousness may play an important role in the development or maintenance of OCD.

Mather and Cartwright-Hatton (2004) studied the cognitive predictors of obsessive-compulsive symptoms in adolescents. This study examined the relations among responsibility attitudes, meta-cognitive belief and obsessive-compulsive (OC) symptoms in youth. 160 non-clinical youth (ages 13 to 17 years) were studied. Participants endorsed a range of responsibility and meta-cognitive beliefs, and both responsibility and meta-cognition were positively correlated with obsessive-compulsive (OC) symptoms. However when age, sex, and depression were controlled, only meta-cognition was a predictor of
obsessive-compulsive symptoms. The findings suggested that meta-cognition and responsibility may be important correlates of obsessive compulsive symptoms in youth.

Mataix-cols (2003) conducted a study to see the role of declarative and procedural learning in individuals with sub-clinical obsessive compulsive symptoms. This study suggested that psychometrically sub-clinical obsessive-compulsive (OC) individuals performed worse than non-obsessive-compulsive controls on specific tests of executive functioning. This study compared the performance of 25 sub-clinical obsessive-compulsive and 28 non-obsessive compulsive control subjects on measure of declarative learning, motor procedural learning, spatial problem solving and cognitive procedural learning. The results suggested that the suboptimal acquisition of cognitive skills among sub-clinical obsessive-compulsive control subjects is more likely to be related to inefficient spatial problem solving strategies than to a cognitive procedural learning deficit per se.

Jessica, Wade and Tracey (2002) conducted a study to investigate the relationship between responsibility and attention deficits characteristics of obsessive-compulsive phenomena. The study examined the relative importance of responsibility and attention in predicting non-clinical levels of obsessionality. 300 Australian University students were screened using the Maudsley Obsessional Compulsive Inventory (MOCI) and students who scored in the top and bottom of 10% of the distribution were selected for the participation. Results suggested that measure of attention may be confounded by responsibility attitudes, thus highlighting the importance of controlling for meta-cognitive variables such as responsibility when investigating attention in OCD.

Coles, Mennin, and Heimberg (2001) conducted a study to examine the role of thought-action fusion in distinguishing obsessive features and worries. In this study they proposed that (1) obsessive features and worry could be differentiated and that (2) a measure of the cognitive process thought-action fusion would distinguish between obsessive features and worry, being strongly related to obsessive features after controlling for the effects of worry. These hypotheses were supported in a sample of 173 undergraduate students. Thought-action fusion may be a valuable construct in differentiating between obsessive features and worry.
Studies in India

Some Indian studies are available in the area of cognitive disturbances in obsessive-compulsive symptoms. These studies explored the area of executive functioning, metacognition, memory functioning and cognitive style. These are discussed below-

Tarafder, Billimoria, Roy, and Mukhopadhyay (2012) conducted a study to investigate the domain of executive functioning, and metacognition in OCD along with obsessive personality traits and obsessive symptoms. The sample comprised of 30 patients suffering from OCD who were compared to their normal counterparts (n=30) matched on the basis of age, sex, education and handedness. The Leyton’s Obsessional Inventory was administered to obtain both obsessive symptoms and obsessive personality traits and Metacognition questionnaire and Yale-Brown Obsessive Compulsive Scale were administered to ascertain metacognitive beliefs and symptom severity respectively. The aspect of executive functioning investigated in the study were set-shifting (measured by Wisconsin Card Sorting Test), Planning (measured by Tower of London DX) and processing speed (from Processing Speed Index). The comparative evaluation of the findings indicated that the OCD differed markedly from their control counterparts in terms of Obsessive personality traits, metacognitive beliefs and executive functioning.

Tarafder, Bhattacharya, Paul, Bondyopadhyay and Mukhopadhyay (2006) studied to examine neuropsychological disposition and its impact on the executive functions and cognitive style in patients with obsessive-compulsive disorder. 20 patients (14 males, 6 females) and 20 normal control subjects, matched for all relevant variables including age, sex and education were studied. Neuropsychological disposition was assessed on the Adult Neuropsychological Questionnaire (ANQ), the executive functions were assessed through Wilconsin Card Sorting Test (WCST), and the cognitive style was assessed by employing the Embedded Figure Test (EFT). Results revealed that Subcortical-cerebeller-Spinal domain of ANQ was found to be associated with cognitive style and executive functions. Finally they stated that the impairment in executive functions and poor activation of specific neurological circuitry in OCD patients affirms the neurophysiological basis of the disorder.

In sum, obsessive-compulsive symptoms impair the function of various cognitive processes to lead an adolescent to achieve their desired goals.
2.1.2 Obsessive-Compulsive Symptoms And Neuropsychological Functioning

Bradbury, Cassin and Rector (2011) conducted a study on the role of obsessive beliefs and neurocognitive flexibility in obsessive-compulsive disorder. The current study sought to examine potential neurocognitive differences between obsessive beliefs subgroups. Performance on the Wisconsin Card Sorting Test (WCST) was compared between a Low beliefs OCD subgroup, High beliefs OCD subgroups, and two anxious control groups: Panic Disorder with Agoraphobia (PDA) and Social Phobia (SP). The High beliefs OCD subgroup performed significantly proper on WCST subscales compared to the other diagnostic groups. These findings were not accounted for by severity of OCD or depressive symptoms. The Low beliefs OCD subgroup performed similar to the anxiety disorder control groups. The results suggested a potential interplay between heightened obsessive beliefs and neurocognitive inflexibility.

Maia, Cooney, and Peterson (2008) studied the neural bases of obsessive-compulsive disorder in children and adults. This article analyzed the evidence for a causal role of cortico-basal ganglia-thalamo-cortical loops in producing OCD in children and adults. The article first reviewed the strong evidence for anatomical abnormalities in these loops in patients with OCD. These findings were not sufficient to establish causality, however, because anatomical alterations may themselves be a consequence rather than cause of the symptoms. The article then reviewed three lines of evidence that, despite their own limitations, permit stronger causal inferences: the development of OCD following brain injury, pediatric autoimmune neuropsychiatric disorders associated with streptococcal infection and neurosurgical lesions that attenuate OCD. Converging evidence from these various lines of research supported a causal role for the cortico-basal ganglia-thalamo-cortical loops that involve the OFC and ACC in the pathogenesis of OCD in children and adults.

Chamberlain, Blackwell, Fineberg, Robbins and Sahakian (2005) conducted a study about the neuropsychology of obsessive compulsive disorder: the importance of failures in cognitive and behavioral Inhibition as candidate endophenotypic markers. The neuroimaging findings in OCD are amongst the most robust reported in the psychiatric literature, with structural and functional abnormalities frequently reported in orbitofrontal cortex, anterior cingulated cortex, and caudate nucleus. In spite of this, our relative lack of
understanding of OCD neurochemical processes continues to impede progress in the development of novel pharmacological treatment approaches. Integrating the neurobiological, cognitive, and clinical findings, they proposed that OCD might usefully be conceptualized in terms of lateral orbitofrontal loop dysfunction, and that failure in cognitive and behavioral inhibitory process appear to underlie many of the symptoms and neurocognitive findings. They proposed that neurocognitive indices of inhibitory functions may represent a useful heuristic in the search for endophenotypes in OCD. This had direct implications not only for OCD but also for putative obsessive-compulsive spectrum conditions including attention deficit hyperactivity disorder, Tourette’s syndrome, and trichotillomania (compulsive hair pulling).

Viard et al. (2005) conducted a study regarding the cognitive control in childhood-onset obsessive-compulsive disorder: a functional MRI study. Differences in brain regional activity were examined by event-related functional magnetic regional imaging (FMRI) in group of adolescents or young adults (n=12) with childhood- onset obsessive-compulsive disorder (OCD), relative to healthy subjects. Subjects performed a conflict task involving the presentation of two consecutive and possibly conflicting prime and target numbers. Patient’s image dataset was further analyzed according to resistance or non-resistance to symptoms during the scan. Results revealed that using volume correlation based on a priori hypotheses, an exploratory analysis revealed that, within a prime- target repetition condition, the OCD subjects activated more than healthy subjects a sub region of the anterior cingulate gyrus and the left parietal lobe. Furthermore, compared with ‘resistant’ patients, the ‘non- resistant’ OCD subjects activated a bilateral network including the precuneus, pulvinar and paracentral lobules. Higher regional activations suggested an abnormal amplification process in OCD subjects during the discrimination of repetitive visual stimuli. The regional distribution of functional changes may vary with the patient’s ability to resist obsessions.

Kuelz, Hhagen, and Voderholzer (2004) conducted a study to see the role of neuropsychological performance in obsessive-compulsive disorder. Fifty studies were surveyed with regard to methodological aspects and cognitive impairment in OCD patients. In addition, the impacts of confounding variables such as psychotropic medication, comorbidity or severity of symptoms on neuropsychological functioning as well as effects of treatment were discussed. OCD is often related to memory dysfunction that seems to be
associated with impaired organization of information at the stage of encoding. Several other executive functions are also commonly disturbed, though results are inconsistent. The results of the study suggested that some cognitive deficits seem to be common in OCD.

Greisberg and Mckay (2003) conducted a study to examine the neuropsychology of obsessive-compulsive disorder. The accumulated research points to a deficit in organizational strategies in general, suggesting problems in executive functioning. The available research is inconsistent in identifying memory deficits in OCD. Memory problems are most evident when tests are used that require an implicit organizational strategy. While the majority of the research reviewed involves adult samples, there is emerging evidence that these deficits are present in children as well. Here it is suggested that the interaction between organizational strategy deficits and the effort to recall unstructured information contributes to doubting, an important feature of OCD. Implications of this body of research for behavior therapy are considered.

Aycicegi, Dinn, and Harris (2002) conducted a study to see the role of neuropsychological function in Obsessive-compulsive Personality with Schizotypal Features. They examined the neurocognitive profiles of 12 clinically referred obsessive-compulsive disorder (OCD) patients in Turkey. They administered a neuropsychological test battery consisting of tasks considered sensitive to orbitofrontal dysfunction and tests of executive function. Contrary to the expectations results suggested that OCD subjects did not display performance deficits on orbitofrontal tasks. Unexpectedly only 2 to 12 patients in Turkish sample presented with classical OCD. The remaining 10 subjects displayed obsessive-compulsive personality traits (e.g., striving for symmetry and order, perfectionism, and rigid adherence to rules), schizotypal personality features, and generalized anxiety. They excluded the two primary OCD subjects and conducted a separate analysis of the OCPT/SP groups. They demonstrated performance deficits on measures of executive function relative to control subjects. Findings were consistent with the contention that obsessive-compulsive personality traits and schizotypal personality features are associated with performance deficits on tests of executive function, possibly reflecting dorsolateral-or mesialprefrontal dysfunction. They suggested that obsessive-compulsive personality traits may develop as a compensatory response to working memory and executive function deficit.
Moritz et al. (2001) conducted a study to examine the impact of comorbid depressive symptoms on neuropsychological performance in obsessive-compulsive disorder. In this present study the authors investigated whether OCD patients elevated Hamilton Rating Scale for Depression (HRSD) scores would exhibit deficits in tasks sensitive to the medial dorsolateral frontal cortex as well as other executive tasks. The 36 OCD patients were split along the median according to HRSD scores and compared with matched control subjects. Patients with high HRSD scores performed significantly worse than control subjects and patients with low HRSD scores on the Wisconsin Card Sorting Test, the Trial Making Test (TMT). Moreover, patients with high HRSD scores exhibited deficits on a (creative) verbal fluency tasks suggested that co morbid depressive symptoms may have artificially inflated some executive deficit scores in previous studies.

Coetzer, Stein and Du Toit (2001) conducted a study about the executive function in traumatic brain injury and obsessive-compulsive disorder. 13 individuals with traumatic brain injury, and 13 individuals with obsessive compulsive disorder and 10 normal controls were compared on neuropsychological measures of executive function. Individuals with traumatic brain injury performed significantly poorer than the other two groups on the tests measuring visuo-spatial strategy. Although the traumatic brain injury group made more errors on the test of maze learning and the OCD group less than the control group, this did not reach statistical significance. No support for an overlap in executive dysfunction in traumatic brain injury and OCD was found. It may be that the ‘error prevention system’ in the brain was influenced in a contrasting way by executive dysfunction in these disorders. This difference may reveal itself clinically in impulsivity/perseveration and slowness, respectively.

Studies in India

Some Indian studies are available in the area of neuropsychological functioning in obsessive-compulsive symptoms. These studies are discussed below-

Trivedi et al. (2008) conducted a study to examine neurocognitive dysfunction in patients with Obsessive-Compulsive disorder. 30 OCD patients were compared with 30, age and education matched control subjects on computer based tests measuring executive functions, vigilance and special Working memory. Results indicated that OCD patients performed poorly on all the neuro-cognitive parameters as compared to controls. The
severity of illness had a positive correlation with poorer performance on CPT. There were no significant correlations between duration of illness and any parameter of cognition. These findings suggested that OCD patients performed significantly worse on cognitive measures than controls. This was consistent with their poorer functional outcome. The results further suggested that on the basis of severity OCD patients are qualitatively distinguishable in neuropsychological terms, given their difference in the profiles of cognitive impairment.

Rao, Reddy, Kumar, kandavel, and Chandrashekar (2008) conducted a study to investigate whether neuropsychological deficits are trait markers in OCD. They assessed 30 recovered DSM-IV OCD patients without may concurrent comorbidity or lifetime history of Schizophrenia, bipolar disorder, tics and alcohol/substance abuse and 30 healthy controls individually matched for age, sex, and education. They were assessed on different neuropsychological dimensions: attention, executive function, memory and intelligence. Results indicated that patients in the recovered phase of the illness had significant deficits in tests of self-shifting ability, alternation, response inhibition and nonverbal memory but had intact performance on other tests. Finally they stated that deficits in certain executive functions and nonverbal memory are possibly state independent. Neuropsychological deficits were possibly candidate endophenotype markers for OCD and may help clarify genetic contributions.

In sum, it can be stated that obsessive compulsive symptoms impair neuropsychological functioning in terms of different areas like executive functioning, working memory, vigilance, and other cognitive parameters.

2.2 Studies On Prevalence Of Obsessive Compulsive Symptoms, Gender, And Age:

de Mathis et al. (2011) conducted a study to examine the role of gender differences in obsessive-compulsive disorder. A conventional review was conducted, including all papers that investigated demographic, clinical, and genetic aspects of OCD according to gender. The search was based on data available in Medline and psycINFO databases in the last 20 years. Results indicated that 63 of 487 phenotypical and genetic studies were selected. Most studies indicated that male patients were more likely than females to be single, present early onset of symptoms and chronic course of the disorder, greater social impairment, more sexual-religious and aggressive symptoms, and greater comorbidity with tic and substance
use disorders. Female patients presented more contamination/cleaning symptoms and greater comorbidity with eating and impulse-control disorders. Genetic and family studies suggested that gender may play a role in the disease expression. Finally they stated that gender is a relevant factor that should be taken into account when evaluating the OCD patients.

**Yoldascan, Ozenil, Kutlu, Topal, and Bozkurt (2009)** studied to assess the prevalence of obsessive-compulsive disorder in Turkish university students and assessment of associated factors. This study was performed in the Cukurova University Faculty of Education with a population of 5500 students; the representative sample size for detecting the OCD prevalence was calculated to be 800. After collecting sociodemographic data, they questioned the students for associated factors of OCD. The General Health Questionnaire-12 and Composite International Diagnostic Interview were used for psychiatric evaluation. Logistic regression analysis was performed to evaluate the linkage between OCD and associated factors. The GHQ-12- positive students (241 students) were interviewed using Section K of the CIDI (222 students). OCD was diagnosed in 33 (4.2%) students. The logistic regression analysis of the data showed significant association between OCD and male gender, living on government dormitory, living on student’s house/parental house, having private room in the parental house and verbal abuse in the family. The study demonstrated a higher prevalence of OCD among a group of university students compared to other prevalence studies of OCD in Turkish society. Furthermore, their findings also suggested relationships between OCD and sociodemographic factors, as well as other environmental stress factors.

**Hanna, Himle, Curtis, and Gillespie (2005)** conducted a family study of Obsessive-Compulsive Disorder with Pediatric Probands. They examined the lifetime history of obsessions, compulsions, and OCD in the first and second-degree relatives of 35 pediatric probands with OCD and 17 controls with no psychiatric diagnosis. Data were analyzed with logistic regression by the generalized estimating equation method and with robust Cox regression models. The lifetime prevalence of definite OCD was significantly higher in case than control first degree relatives. Compared to controls, case first degree relatives also had significantly higher lifetime rates of obsessions and compulsions. There was no significant difference between case and control second-degree relatives in lifetime rates of OCD. First-degree relatives of case probands with ordering compulsions had a significantly higher
lifetime rate of definite and sub threshold OCD than relatives of case probands without ordering compulsions. The lifetime prevalence of definite OCD was significantly higher in case first-degree relatives with a history of tics than in case first-degree relatives without a tic history. The results provided further evidence that early-onset OCD is highly familial and suggested that two clinical variables were associated with its familial aggregation.

**Heyman et al. (2001)** conducted a study to examine the **prevalence of obsessive-compulsive disorder in the British nationwide survey of child mental health.** The nationwide (UK) epidemiological study of rates of psychiatric disorder in 5-to 15-year-olds, 10438 children were assessed. 25 children with OCD were identified, with prevalence rising exponentially with increasing age. Compared with normal controls, children with OCD were more likely to be from lower socio-economic class and of lower intelligence. Only three of these children had been seen by specialist children’s services. Although OCD is rare in young children, the rate increased towards the adult rates at puberty. Children with OCD had additional psychosocial disadvantage.

**Bogetto, Venturello, Albert, Mainna, and Ravizza (1999)** conducted a study to examine **gender-related clinical differences in obsessive-compulsive disorder.** 160 outpatients with a principal diagnosis of OCD were admitted. Patients were evaluated with a semi-structured interview covering the following areas: socio-demographic data, Axis-1 diagnosis (DSM-IV), OCD clinical features. They found an earlier age at onset of OC symptoms and disorder in males; an insidious onset and a chronic course of illness were also observed in that group of patients. Females more frequently showed an acute onset of OCD and an episodic course of illness; they also reported more frequently a stressful event in the year preceding OCD onset. They found three gender related features of OCD: males showed an earlier age at onset with a lower impact of precipitant events in triggering the disorder; OCD seemed to occur in a relative high proportion of males who already had phobias and/or tic disorders; and a surfeit of chronic course of the illness in males in comparison with females.

**Geller et al. (1998)** conducted a study to examine the **clinical correlates of obsessive-compulsive disorder (OCD) in children and adolescents.** A systematic review of the extant literature on juvenile OCD was conducted examining age at onset, gender distribution, symptom phenomenology, psychiatric comorbidity, neurological and perinatal...
history, family psychiatric history, cognitive and neuropsychological profiles, and treatment and outcome in juvenile OCD subjects. Results indicated that juvenile OCD was associated with a unique peak of age at onset indicating a bimodal incidence of the disorder, male preponderance, a distinct pattern of comorbidity with attention-deficit/hyperactivity disorder and other developmental disorders as well as frequent associated neurological deficits, an increased familial loading for OCD, and frequent absence of insight. These findings showed that juvenile OCD is associated with a unique set of correlates that appeared to differ from findings reported in studies of adult OCD subjects. Although in need of confirmation, these findings suggested that juvenile OCD may be a developmental subtype of the disorder. Since juvenile OCD is likely to continue into adulthood, these findings stressed the importance of considering age at onset in clinical and research studies of adults with OCD.

Nicolini et al. (1997) studied the role of age of onset, gender and severity in obsessive-compulsive disorder. This study was conducted on the Mexican population. They evaluated the age of onset, gender, severity, and other demographic characteristics in 71 affected patients. In that study, males had a significantly earlier age of onset than females. Also, there was a significant negative correlation between total symptom severity (Y-BOCS) and age of onset. Aggression obsessions were associated with a higher age of onset and symmetry obsessions with a lower age of onset. The compulsion subscale was higher in the presence of contamination and cleaning obsessions; and lower in the presence of aggression obsessions.

Geller, Biederman, Griffin, Jones, and Lefkowitz (1996) conducted a study to examine the full spectrum of psychiatric comorbidity in juvenile obsessive-compulsive disorder (OCD) in a naturalistic manner when no exclusionary criteria are used for sample selection. Findings were compared with those of previously published reports of juvenile OCD. Compared with previous studies, their sample of juveniles with OCD had high rates of comorbidity not only with tic, mood and anxiety disorders but also with disruptive behavior disorders. Their findings indicated that in the naturalistic setting, juvenile OCD is heavily comorbid with both internalizing and externalizing disorders.
In India some interesting studies are available about OCD prevalence, gender and age. These are stated below-

Jaisoorya, Reddy, Srinath, and Thennarasu (2009) conducted a study to investigate the sex differences in OCD with respect to sociodemographics, symptom profile, and comorbidity including spectrum disorders. 231 subjects diagnosed with OCD by DSM-IV, criteria were included in the study. The subjects were evaluated by extensive clinical and semi-structured interviews by expert clinical psychiatrists, and diagnosis was made by consensus, male (n=166) and female (n=65) subjects with OCD were compared with respect to the data obtained. Males with OCD tended to have an earlier onset and had more symmetry/religious obsessions and miscellaneous compulsions. Males also showed a tendency to have Attention deficit hyperactive disorder. Female subjects were more likely to be married, have cleaning compulsions and be associated with trichotillomania. The findings supported the hypothesis that there are sex differences in OCD, but results were only partly comparable with other studies, suggesting that the phenotypic expression of OCD is possibly dependent on a complex interaction among biologic, personal, and cultural factors.

Hemron et al. (2009) conducted a study to examine prevalence of obsessive compulsive symptoms among schizophrenia. A total of 90 hospitalized patients with schizophrenia diagnosed according to DCR of ICD-10 criteria were selected for the study. Padua inventory and Yale-Brown Obsessive-Compulsive scale were applied to find out the prevalence and nature of Obsessive compulsive symptoms. It was found that 10% of schizophrenic patients had obsessive compulsive symptoms. Finally they stated that obsessive compulsive symptoms are prevalent in patients with schizophrenia.

Saha and Gupta (2000) studied phenomenology of OCD with a cross-cultural perspective. 40 patients of OCD (as per ICD-10) were studied using YBOC checklist. The common obsessions noticed were contamination (52%), and aggression (32.5%), washing (57.5%) and checking (42.5%) rituals were the common compulsions.

Prakash, Chandra and Kumar et al. (2000) studied the clinical profile of OCD at NIMHANS, Bangalore, in a sample of 159 patients seen in the OCD clinic. They reported
obsessional doubts (49%), imageries (20%), impulses (15%), and thoughts (65%), as commonly encountering obsessions. The common compulsions were yielding (60%), controlling (14%) and autonomous compulsions (1%).

Khess, Akhtar, Jagawat, Das, and Srivastava (1996) studied about the gender and psychopathology in Obsessive Compulsive Disorder. This study was conducted in 52 patients attending the psychiatric OPD and it was found that 35 (67.30%) patients were male compared to 17 (32.70%) females, which constituted 0.72% and 1.03% of the male and female patients attending the OPD during the study period, respectively. Hence, in spite of the male preponderance in the study sample, it might not reflect the true prevalence of the disorder in the community. The age of onset for males was lower than that for females, but it did not reach statistical significance. The mean duration of illness was found to be significantly longer for females compared to males. The females had higher obsessive, compulsive and total score on Y-BOCS indicating a more severe psychopathology. All female patients had compulsions compared to 25.71% males who had no compulsions. Females had increased frequency of obsessive rumination with obsessions of dirt and contamination along with compulsive washing. An interesting finding was that obsessive imagery with obsessions of sex and religion along with repeating rituals were found exclusively in males. A high celibacy rate was found amongst the males. There was no difference in the family history between the males and females.

In sum, though OCD is rare in young children, the rate increased as the child attained puberty. Some studies indicate that among children, OCD is greater among boys, but in adults, it is more prominent in women. The research about gender difference in OCD prevalence and contents among adolescents remain an area of continued interest, since conclusive indications are not available.

2.3 Obsessive-Compulsive Symptoms, And Academic Achievement

Obsessive-compulsive features contribute to academic failure in children and adolescents. Yet, only limited research of such features and academic performance has been conducted with adolescent students. Therefore, in this section apart from Obsessive-compulsive symptoms some studies relating to General anxiety symptoms and academic achievement have been reported. The relevant studies are presented below-
Rosa et al. (2012) worked about the clinical correlates of social adjustment in patients with obsessive-compulsive disorder. This is a Cross-sectional study involving 815 adults with a primary DSM-IV diagnosis of OCD participating in the Brazilian Research Consortium on Obsessive-Compulsive Spectrum Disorders. Patients were assessed with the Social Adjustment Scale, the Medical Outcomes Study 36-item Short-Form Healthy Survey, the Yale-Brown Obsessive-Compulsive Scale, the Dimensional Yale-Brown Obsessive-Compulsive Scale, and the Structured Clinical Interview for DSM-IV Axis 1 Disorder. Clinical correlates of social adjustment were assessed with generalized linear models with gamma distribution. Results indicated that patients with OCD have poor social functioning in domains related to personal relationships and professional performance. Hoarding symptoms and sexual/religious obsessions seem to have the strongest negative effects on social functioning. Early age at OCD symptom onset seems to be associated with professional and academic underachievement and impairment within the family unit, whereas current psychiatric comorbidity worsens overall social functioning.

Rodriguez-Salgado et al. (2006) conducted a study to examine the perceived quality of life in obsessive-compulsive disorder: related factors. 64 OCD outpatients were assessed with the Mini International Neuropsychiatric Interview for DSM-IV, the Yale-Brown Obsessions and Compulsions scale (Y-BOCS), Hamilton’s depression scale and the SF-36 self-administered global QOL perception scale. Results suggested that there were significant differences between OCD patients and the Spanish general population in all SF-36 subscales except those related to physical health and pain. Gender, age, age of onset of the disorder, years of evolution and marital status of the patients did not significantly affect quality of life perception. Being employed was related to better scores in the subscale of physical role. Patients with medical comorbidity scored lower in the subscales of general health, social functioning and mental health. Patients with comorbid psychiatric disorders had worse scores in the subscales of pain, general health, social functioning and mental health.

Mrdjenovich and Bischof (2003) conducted a study about the relationship between obsessive-compulsive complaints and academic performance in college students. This study examined how obsessive-compulsive complaints, as measured by Maudsley Obsessive-Compulsive Inventory (MOCI), related to academic performance in a college student sample (N=56). Analyses involved correlation, regression, and group comparisons.
Students who indicated a higher level of obsessive-compulsive complaints earned a significantly lower course grade, despite having enrolled in a fewer credit hours. Obsessive-compulsive complaints predicted course grades independent of credit hours. Such complaints were elevated significantly among non-Caucasian respondents. The MOCI may be of utility in predicting academic difficulty.

Piacentini, Bergman, Keller, and McCracken (2003) worked about the functional impairment in children and adolescents with obsessive-compulsive disorder. They surveyed the complaints reported by 151 OCD children and adolescents and their parents. They observed that parents of clinic referred OCD children and adolescents identified the most significant problems as trouble with concentrating on school work (47%), doing homework (46%), and getting ready for bed (42%). The children and adolescents themselves complained more of difficulties relating to concentrating on school work (37%), doing homework (32%), and doing household chores (30%).

Studies in India

Malakar, Basu and Chaudhuri (2009) conducted a study to examine the effect of obsessional thoughts on intelligence-achievement relationship of late adolescents. The aims of the study were to determine (1) whether there is any sex difference in obsessional thoughts (2) whether there is any sex difference in achievement scores and (3) whether there exist any difference in intelligence-achievement relationship between low and high obsessional thought groups. The sample consisted of 103 Bengali girls and 92 Bengali boys selected randomly from class XI (16-18 years). Raven’s Standard Progressive Matrices and Leyton Obsessional Inventory by Cooper and an information schedule were administered. The achievement level of the students was measured from the Madhyamik mark-sheet. The analyses revealed significant differences between high and low obsessional thought groups indicating substantial loss in intelligence-achievement relationship attributable to obsessional thought.

In sum, obsessive compulsive symptoms impair mental health and may prevent an adolescent to reach the level of academic achievement one deserves.
2.4 General Anxiety Symptoms And Academic Achievement

In this section apart from Obsessive-compulsive symptoms some studies relating to General anxiety symptoms and academic achievement have been reported. The relevant studies are presented below-

**Grover, Ginsburg, and Ialongo (2012)** conducted a study to examine the psychosocial outcomes of anxious first grades: A seven year follow-up. This study examined the concurrent and long-term psychosocial outcomes associated with anxiety symptoms among a community sample of predominately low-income African Americans (N=149; 72 females). They classified first grades as high or low anxious using child, parent, and teacher reports. Academic, social and psychological outcomes were assessed in the first and eighth grades. Logistic regressions with concurrent data revealed that high anxious children were significantly more likely to score lower on measures of academic achievement and peer acceptance, but higher on measures of depression and aggression compared to their low anxious peers. Longitudinal analyses revealed that high-anxious first graders, compared to their low anxious peers, scored significantly lower on measures of academic achievement, aggression, and peer acceptance; and higher on measures of anxiety and depression in the eighth grade. Findings suggested that, similar to European American Youth, early-onset anxious symptoms in African American children are associated with both concurrent and long-term academic, social and psychological difficulties.

**Anyadubala (2010)** conducted a study about self-Efficacy, Anxiety, and Performance in the English Language among Middle-School Students in English Language Program in Satri Si Suriyothai School, Bangkok. The researcher tested the research hypotheses using a sample group of 318 respondents out of the population size of 400 students. The results obtained revealed that there was a significant moderate negative relationship between English language anxiety and performance in English language, but no significant relationship between self-efficacy and English language performance, among the middle-school students. There was a significant moderate negative relationship between English language anxiety and self-efficacy. It was discovered that general self-efficacy and English language anxiety represented a significantly more powerful set of predictors than the set of confounding variables. Thus, this study concluded that English language anxiety and
general self-efficacy were significant predictors of English language performance among middle-school students in Satri Si Suriyothai School.

**Bruehl (2009)** studied about the **general anxiety and academic indicators as predictors of test anxiety in adolescents**. The study examined the extent to which academic variables, general anxiety, and selected demographics predicted test anxiety in male and female adolescents. Self-reported rating scales addressing test anxiety, general anxiety, and student’s perceptions of academic skills and academic enabling behaviors were obtained from 104 adolescents in grades seven through nine. In addition, participant’s grade point average and performance on a statewide achievement test were collected. Multiple regression analyses revealed that general anxiety and performance on a statewide achievement test were found to be significant predictors of test anxiety. A hierarchical regression analyses indicated that student’s perceptions of their academic skills also contributed an additional small portion of the variance associated with test anxiety. Although some minor gender differences were identified, the predictive model including general anxiety and statewide achievement scores was applicable to both males and females.

**Eisenberg, Golberstein, and Hunt (2009)** conducted a study about the relationship between **mental Health and Academic Success in College**. They conducted the study in a random longitudinal sample of students. They found that depression is a significant predictor of lower GPA and higher probability of dropping out, controlling for prior academic performance and other variables. The association between depression and academic outcomes is strongest among students with a positive anxiety disorder screen. In within-person estimates using their longitudinal sample, they found again that co-occurring depression and anxiety are associated with lower GPA, and they found that symptoms of eating disorders are also associated with lower GPA. This descriptive study highlighted the policy relevance of generating more definitive causal estimates of the effect of mental health on college success, which will likely require a randomized trial.

**Tapper (2008)** conducted a study about the **depressive symptoms, anxiety, and perceived competence as predictors of goal orientation**. Multiple-regression analyses conducted on data collected from 196 post secondary students revealed performance avoid and mastery orientation were significantly predicted by measures of depressive symptoms and perceived academic competence. Different affect and goal patterns were found for males and females,
with trait anxiety being a strong predictor of performance avoid orientation for females but not males. There were different affect and goal patterns for students in their first semester and second semester. Predictor variables accounted for significant variance for the Spring Semester cohort for mastery, performance approach, and performance avoid orientation, but only for mastery orientation with the full semester cohort.

**Mazzone et al. (2007)** worked on the **role of anxiety symptoms in school performance in a community of children and adolescents.** Sample of elementary (N=131, age 8-10 years), middle (N=267, age 11-13 years), and high school (N=80, age 14-16 years) children were recruited from four public schools in a predominantly middle-class community in Catania, Italy. Children completed the Multidimensional Anxiety Scale for Children (MASC). T-scores were completed for the MASC total scores, and considered to be in the anxious range if 65 or above. Results indicated that of the 478 children, 35(7.3%) had a MASC T-Score in the anxious range. The rate of children in the anxious range was 2.3% in the elementary, 7.9% in middle, and 15.9% in the high school, and 14.1% among with insufficient grades, 9.4% among those with sufficient grades, and 3.9% among those with good or very good grades. In that community sample of children and adolescents attending elementary school through high school, the prevalence of abnormally high self-reported levels of anxiety increased in frequency with age and was negatively associated with school performance.

**Moore (2006)** conducted a study to examine the **variations in Test Anxiety and Locus of Control Orientation in Achieving and Underachieving Gifted and Nongifted Middle School Students.** Two instruments were used in the study, The Test Anxiety Inventory (TAT) and the Children’s Nowicki Strickland Internal-External Control Scale (CNSIE). Participants completed the TAT by indicating their level of agreement with 20 statements that measure test anxiety symptoms before, during, and after a testing session. Responses ranged between Almost never (1) and Almost Always (4). Participants completed the CNSIE by selecting Yes or No to indicate whether or not each of 25 statements describing their feelings about a variety of situations. Although none of the group received extreme scores on either instrument, MANOVA results indicated significant differences between the groups by gender and achievement classification. Underachieving gifted students were more extremely oriented than achieving gifted students. There was also a significant difference in the Locus of Control Orientation between achieving gifted and nongifted students; nongifted students were more externally controlled than achieving gifted students. In
regards to underachievers, males were more externally controlled than females. Regarding
test anxiety, females consistently reported higher levels of anxiety than males. Findings
suggested the need for school interventions to reduce test anxiety among females and to
assist students in developing the thought processes that gave them a sense of Control over
the events in their life, in particular their academic performance.

Mlech, Eaton, and Brennan (2005) conducted a study to examine mental health
disparities across education and sex: a prospective analysis examining how they persist
over the life course. This longitudinal study assessed mental health status and educational
attainment of over 1,000 general population subjects in 1981 and again 13 years later. Those
who did not complete high school were more likely to have symptoms of mental illness at
both points in time compared to those who did complete high school. The authors concluded
that to the extent that mental health disparities in educational attainment represent "the
aftermath of a process that first occurred prior to or in early adulthood, interventions that
effectively prevent this process from taking place could potentially cut off disparities before
they start. Their results indicated that treatment or prevention programs addressed at the
mental health of the individuals before adulthood could, if they were effective, potentially
have a lasting influence on mental health disparities across education over the life course.

Asarnow et al. (2005) conducted a study about depression and role impairment among
adolescents in primary care clinics. The sample included about 3,500 primary care
patients aged 13-21 drawn from six sites including public health, managed care, and
academic health center clinics. The sample included a large number of ethnic minority
youth. Youth self reported questionnaires assessed probable depressive disorder, depressive
symptoms, and common medical problems. Depression was uniquely associated with
clinically meaningful and statistically significant decrements in school and work
productivity and in educational attainment. Both measures of depression were significant
predictors of role impairment and low educational attainment. Moreover, the presence of a
medical condition, which was more common among depressed adolescents, was not
associated with role impairment once depression was controlled, underscoring the strong
links between depression and role impairment in this age group.

Bodas (2003) conducted a study about the moderating role of anxiety in predicting
academic achievement in children. The study investigated whether anxiety contributed to
the prediction of academic achievement above and beyond the influence of IQ. Furthermore, the study explored whether anxiety moderated the already established relationship between IQ and academic achievement. In this study, the WISC-III Verbal IQ, the RCMAS factors of physiological anxiety (i.e., emotionality) and worry/oversensitivity, and the WIAT total and composite achievement scores were examined to investigate these relationships. Results indicated that anxiety failed, for the most part, to moderate these relationships.

Kessler (2003) studied about the impairments caused by social phobia in the general population. In this study he noted that social phobia is a very common disorder that typically begins in childhood or early adolescence and generally persists through adulthood. The condition is strongly associated with reduced educational attainment and highly predictive of failure to enter college after high school.

Woodward and Fergusson (2001) conducted a study about life course outcomes of young people with anxiety disorders in adolescence. This study examined associations between the extent of anxiety disorder in adolescence (14-16 years) and young people's later risks of a range of mental health, educational, and social-role outcomes (16-21 years). Significant linear associations were found between the number of anxiety disorders and a range of adverse outcomes in early adulthood. Even after taking into account the effects of confounding factors, significant association remained between the present of anxiety disorders reported in adolescence and failure to attend college or a training program after high school.

Marmorstein and Iacona (2001) worked to investigate female adolescent twins with both major depression and conduct disorder. They conducted a study of about 90 adolescent girls with major depression and/or conduct disorder and 125 controls in Minnesota. Results suggested that both major depression and conduct disorder are related to significant difficulties in functioning and school adjustment. Each disorder alone is related to an increased number of negative school related events such as suspension and failing grades. A dual diagnosis of major depression and conduct disorder was associated with the highest level of school impairment.

Stein and Kean (2000) studied about disability and Quality of life in social phobia: Epidemiologic Findings. They analyzed data from the Ontario Mental Health Supplement,
a survey of over 8,000 residents in Ontario aged 15-64, to investigate the effects of social phobia on functioning and life satisfaction independently of major depression, a very common co-occurring condition, and other factors such as age, gender, and social class. Social phobia was a very common condition in the community and significantly more common in the young (aged 15-24) and in females. On virtually every index of functional impairment and life satisfaction, people with social phobia fared worse than people without the condition, even after accounting for the impairment associated with major depression. The effects of social phobia on academic achievement were particularly striking. After adjusting for age, gender, and social class, people who had a lifetime occurrence of social phobia were almost twice as likely to fail a grade or not complete high school compared to those who never had the condition. The presence or absence of major depression did not affect this outcome.

Kessler, Foster, Saunders and Stang (1995) conducted a study about Social consequences of psychiatric disorders. The authors looked at the relationships between early onset mood, anxiety, substance, and conduct disorders on failure to complete high school among eighth grade graduates, failure to enter college among high school graduates, and failure to complete college among college entrants. All four types of disorders are significant predictors of failure in all three educational transitions. There is also a clear "dose-response" relationship between the number of prior disorders and dropping out of high school. The authors found that over 14% of high school dropouts, 5% of high school graduates who did not enter college and almost 5% of college entrants who did not complete college had history of mental illness. Based on the results of the survey, it was conservatively estimated that 7.2 million people in the United States prematurely terminated their education because of early-onset psychiatric disorders, with only a small fraction later completing either high school or college. The data further suggested that in 1995, 3.5 million people aged 15-54 would have completed high school and 4.3 million would have graduated from college if they had not suffered from mental disorders.

**Studies in India**

Indian studies about how symptoms of anxiety and the various anxiety disorders affect academic performances are not limited. Some of the studies in this area are stated below-
Mattoo and Nabi (2012) conducted a study about academic anxiety among adolescents. The study was conducted on a sample of 80 respondents selected through random sampling technique. The aim of the study was to assess the academic anxiety among students between 14 and 16 years of age, to compare the academic anxiety among boys and girls and to find the relationship of school environment and academic anxiety among sample. For this purpose Academic Anxiety Scale was used to collect the data. It was found that there was no significant difference in anxiety scores between male and female respondents. The type of school was found to play a very important role as far as anxiety levels were concerned. Overall results depicted that majority of the respondents had high academic anxiety.

Vazalwar (2011) conducted a study to examine the effect of Anxiety on reading comprehension in English. The study was conducted on a sample of 960 standard XI students from 32 senior's secondary schools. The results showed anxiety and reading comprehension in English is correlated negatively in boys and girls respectively and boys and girls both. The normal level of anxiety gives positive effect in reading comprehension.

Ahmad, Khalique, and Khan (2007) studied behavioral and emotional problems of adolescents and relationship with academic achievement. The study was conducted on the adolescents of 10-19 years. Results suggested that the prevalence of combined behavioral and emotional problems was 17.9%. Behavioral problems were more prevalent in adolescents in compared to emotional problems. Both types of problems had an inverse relationship with the academic achievement of students. Students had multiple problems and the load of these problems was more (29 problems/student) in those doing poor in studies. Finally they stated that significant proportion of male adolescents had behavioral and emotional problems that are often hidden and precipitate academic under achievement.

In sum, various symptoms of anxiety and anxiety disorders impair mental and physical health which in turn hampers student’s academic success.

2.5 General Intelligence And Academic Achievement

General Intelligence and academic achievement are two important variables of this study. Intelligence is often identified as a significant predictor of academic achievement although this is an area which has been examined thoroughly in the last few decades. Some recent
studies shed further light on this relationship, mainly in connection with different sets of variables. Some such recent studies are presented below-

Kaufman, Reynolds, Liu, Kaufman and McGrew (2012) studied to examine whether cognitive g and academic achievement g one and the same g? An exploration on the Woodcock-Johnson and Kaufman tests. They examined the degree to which the conventional notion of g associated with IQ tests and general cognitive ability tests (COG-g) relate to the general ability that underlies tests of reading, math, and writing achievement (ACH-g). Two large, nationally representative data sets and two independent individually-administered set of test batteries were analyzed using confirmatory factor analysis procedures: (a) the Kaufman-II sample (N=2520), organized into six age groups between 4-5 and 16-19 years, tested on both the Kaufman assessment battery for Children-2nd ed. (KABC-II) and the Kaufman Test of Educational Achievement 2nd ed. (KTEA-II) comprehensive form; and (b) the WJ III sample (N=4969), organized into four age groups between 5-6 and 14-19 years, tested on both the cognitive and achievement batteries of the Woodcock-Johnson-3rd ed. (WJ III). Second order latent factor models were used to model the test scores. Multi-group confirmatory factor analysis was used to investigate factor loading invariance across the age groups. In general, invariance was tenable, which allowed for valid comparisons of second-order COG-g and ACH-g factor variance/covariances and correlations across age. Although COG-g and ACH-g were not isomorphic, they correlated substantially, with an overall mean correlation coefficient of .83, and with the correlations generally increasing with age (ranging from .77 to .94). The nature of the relation between COG-g and ACH-g was explored and the best measures of COG-g were examined.

King, McInerney and Watkins (2012) studied about how you think about yours intelligence determines how you feel in school: The role of theories of intelligence on academic emotions. This study aimed to examine the potential synergies that may exist between these two strands of research by examining whether implicit theories of intelligence can function as a predictor of academic emotions when situated within Pekrun’s (2006) control-value theory of academic emotions. Filipino secondary school students (N=1147) participated in the study. Hierarchical regression analyses were employed to investigate the predictive effects of implicit theories of intelligence on academic emotions after controlling for the variance accounted for by demographic variables, social environmental factors, and achievement goals which have been identified as important.
antecedents in previous research. Results indicated that holding an entity theory of intelligence positively predicted negative emotions such as anger, anxiety, shame, hopelessness, and boredom. However, it was not significantly related to the positive emotions of enjoyment, hope, and pride.

Brazdau and Mihai (2011) worked to see whether the consciousness quotient is a new predictor of the student's academic performance. Basic hypothesis of this study was to determine the incremental validity brought by the Consciousness Quotient in the prediction of academic performance. The study was based on a 138 participants from the Ecological University of Bucharest, Romania. The “Consciousness Quotient Inventory” (CQI) and General Ability Measure for Adults” (GAMA) are used to evaluate the Consciousness Quotient and the Intelligence Levels. The results confirmed the influence of Consciousness Quotient in the academic performance appraisal.

Vedadi, Kheiri, and Abasalizadeh (2010) studied about the relationship between cultural intelligence and achievement. This was a case study in an Iranian company. In this research, thorough studying a new multidimensional construct of cultural intelligence, which contains both cognitive and behavioral dimensions, they have considered its relation with the achievement need of the managers. 78 middle and high managers of an Iranian company working energy are chosen and the results showed a high correlation between cultural intelligence and its different dimensions including CQ of knowledge, strategy, motivation and behavior with the achievement need motif of the managers who had been studied.

Hare and McGuinness (2009) conducted a study to measuring critical thinking, intelligence, and academic performance in psychology undergraduates. 129 undergraduate psychology students (94 first years and 35 third years) participated by completing two subscales of the California Critical Thinking Skills Test (CCTST) and Raven’s Advanced Progressive Matrices Set 1 (APM-S1); they also provided information on their A-levels and degree marks formed a second factor named ‘Academic knowledge’. Furthermore, third years scored significantly higher than first years on the CCTST evaluation subscale (effect size d=0.56), and there was a moderate effect size difference between their CCTST inference subscale scores (effect size d=0.31) but only small effect size differences between the two groups on academic performance (d=0.16) and APM-S1
scores \( (d=0.04) \). It was provisionally concluded that critical thinking changes over the course of a degree and that these abilities are not well captured by traditional academic assessments.

Lee, Pe, Ang and Stankov (2009) conducted a study to examine whether measures of working memory predict academic proficiency better than measures of intelligence. They used data from three studies to show that the validity of this assertion is highly dependent on the method of analysis. Using the same measures of intelligence, but different measures of working memory and algebraic proficiency, they found working memory provided better explanatory power only when analysis was conducted on the observed variable level. When the same data were analyzed using structural equation models, only measures of intelligence had a direct effect on algebraic proficiency. From a theoretical viewpoint, there findings are consistent with a claim that working memory is a constituent component of (fluid) intelligence.

Naderi, Abdullah, Hamid, Sharir and Kumar (2009) studied about Intelligence, Creativity and Gender as Predictors of Academic Achievement among Undergraduate Students. Participants \( (N=153, 105=\text{male} & 48=\text{female}) \) completed intelligence and creativity tests which were compared with their cumulative grade point average (CGPA). A multiple regression analysis indicated that intelligence, creativity and gender explained 0.045 of the variance in academic achievement, which is not significant, as indicated by the F-value of 2.334. Multiple regression analyses also indicated that intelligence and creativity (gender is controlled) together explained 0.010 of the variance in academic achievement, which was also not significant, as indicated by the F-value of 1.562. Partial correlations between academic achievement and IQ, creativity scores and gender were non significant at .05. Coefficients also showed there is no significance between academic achievement and IQ and gender at .05, except for creativity \( (t=2.008, p=0.046) \). Findings showed predicting lower independent variables of that study (scores of intelligence, creativity and gender) on academic achievement (CGPA).

Laidra, Pullmann, and Allik (2007) worked on the role of personality and intelligence as predictors of academic achievement: A cross-sectional study from elementary to secondary school. General intelligence and personality traits from the five factor model were studied as predictors of academic achievement in a large sample of Estonian school
children from elementary to secondary school. A total of 3686 students (1746 boys and 1872 girls) from all over Estonia attending grades 2, 3, 4, 6, 8, 10, and 12 participated in this study. Intelligence as measured by the Raven’s Standard Progressive Matrices, was found to be the best predictor of student’s grade point average (GPA) in all grades. Among personality traits (measured by self-reports on the Estonian Big Five Questionnaire for children in Grades 2 to 4 and by the NEO Five Factor Inventory in Grade 6 to 12), Openness, Agreeableness, and conscientiousness correlated positively and Neuroticism correlated negatively with GPA in almost every grade. When all measured variables were entered together into a regression model, intelligence was still the strongest predictor of GPA, being followed by Agreeableness in Grade 2 to 4 and Conscientiousness in Grade 6 to 12. Interactions between predictor variables and age accounted for only a small percentage of variance in GPA, suggesting that academic achievement relies basically on the same mechanisms through the school years.

Yuan, Steedle, Shavelson, Alonzo and Oppezzo (2006) worked about the relationship among working memory, fluid intelligence, and science learning. Comparison between contemporary Working Memory models revealed: (1) consensus that the content of WM includes not only task-relevant information, but also task-irrelevant information; (2) consensus that WM consists of phonological and visuospatial components; (3) consensus that short-term memory storage is a function of WM; (4) disagreement as to whether an independent executive control is a necessary WM component; and (5) disagreement as to whether the control function is active or passive. Methods for measuring WM differed across studies with a preponderance of various dual-tasks; little psychometric work had been done on these measures. Correlational studies supported a close relationship between WM and measures of fluid intelligence and science achievement, but they found no experimental studies on the impact of WM training on science achievement. Finally they suggested how WM research findings may be applied to improve fluid intelligence and science achievement.

Nyborg (2005) examined whether there exists sex related differences in general intelligence g, brain size, and social status. IQ researchers sum standardized subtest scores to calculate intelligence in general, and found that males outscored females by about 3.8 points, whereas factor analysts derived the g factor scores from interest-correlations and found no consistent sex differences in general intelligence. This study by Nyborg tested four
hypotheses: (1) Inadequate analyses explain why researchers get inconsistent results (2) the proper method will identify a male g lead, (3) the larger male brain “explains” the male g lead. (4) the higher male g average and wider distribution transform into an exponentially increased male-female ratio at the high end of the g distribution, and this largely explained male dominance in society. All four hypotheses obtained supported and explained in part why relatively few males dominate the upper strata in all known societies. The confirmation of hypothesis 3 suggested that the brain size-intelligence-dominance link may partly be biological.

Dayioglu and Asik (2004) conducted a study to examine whether there exists gender difference in academic performance in a large public university in Turkey based on three indicators; university entrance scores, performance in the English preparatory school and in the program the student is majoring in. The paper found that a smaller number of female students managed to enter the university and when they did so, they entered with lower scores. However, once they were admitted to the university, they excelled in their studies and outperformed their male counterparts.

Colom, Espinosa, Abad, and Gazda (2000) conducted a research on cognitive sex differences in whether, on average, females and males differ in g. Cognitive batteries were applied in the present study to independent sample totaling 10,475 adults, subjects (4,256 females and 6,219 males). The scores were factor analysed by sex to obtain separate g factor. The congruence coefficient suggested a near identity of these factors. Then, three methods were used to know if the standardized sex differences are explained by g: (1) the method of correlated vectors; (2) the sex loading in g was computed including the point-biserial correlation between sex and each of the subjects in the full matrix of subtest inter-correlations for factor analysis; and (3) the correlation between sex and g factor scores. The results suggested a negligible sex difference in g. This study included the largest sample on which a sex difference in g has ever been tested. The findings were consistent with those using quite different test batteries and subject samples.
Studies in India

Studies are available in relationship between General intelligence and academic achievement. Some of the studies are stated below-

Fatima, Ghayas, and Adil (2012) conducted a study to examine impact of achievement goals, sociability, and gender on academic achievement of university students. The sample drawn through stratified random sampling consisted of 300 undergraduates from different department of university of Sargodha including boys (152) and girls (148). Regression analysis showed that only performance-approach goals significantly predicted academic achievement. Independent sample t-test demonstrated that girls are significantly high on academic achievement and performance-approach goals whereas boys were significantly more sociable.

Devi, Gupta, and Shekher (2011) studied to investigate the gender related differences and differences across academic streams on achievement motivation among college students. The purposive sampling method was used to select 80 undergraduate (40 males and 40 females) students of various colleges from Jammu region with age range of 18-23 years. As per research design of the study all 80 subjects were selected on the basis of gender (male and female) and academic stream (arts and science) using Achievement Motivation Scale. Data were analyzed using ‘t’-test. Significant difference was found between the achievement motivation of sciences and arts stream students as well as among male and female college students. The present findings reflected the role of gender and academic streams in achievement motivation of college students.

Rangaiah and Singh (2009) studied to examine cognitive styles among children and adults in tribal and urban contexts. Story pictorial embedded figure test (SPEFT) was employed to assess the cognitive styles. The sample consisted of 70 adults and 30 children in each group. Results showed that the urban sample were psychologically more differentiated compared to tribes; urban sample had taken more response scores and lesser time to complete the test than tribal sample. Tribal children found to be quicker than tribal adults in completing the test. Urban children were less differentiated psychologically compared to the adults in urban context; urban children were found to be psychologically more differentiated as compared to tribal children.
Haider (2007) conducted a study to examine academic achievement and intelligence of orthopaedically challenged women in relation to parental education and income. The sample consisted of 25 (N=25) orthopaedically challenged women gathered by situational sampling technique from different schools. Findings indicated significant relationship between academic achievement and intelligence of the orthopaedically challenged women which is a quite established fact. The findings also indicated mother's education to be a significant correlate for the academic achievement of the orthopaedically challenged women.

Kumar and Lai (2006) conducted a study to examine the role of Self efficacy and gender differences among the adolescents as revealed by Intelligence test. A random sample of 200 students (100 boys and 100 girls) studying in I, II, and III year of under-graduation was selected from different colleges of the city of Chandigarh. Self efficacy scale developed by Jerusalem and Schwarrer was used to classify subjects. General Mental Ability Test developed by Jalota was used to have the dependent variable scores. Analysis of variance was applied and F-ratio revealed the significant effect of self-efficacy. Significant gender differences were also found, where female scored higher than their male counter parts. No interaction was found in self efficacy and gender.

In sum, it can be stated that general intelligence has a direct effect on academic proficiency even in the face of physical disabilities and cultural disadvantages.

2.6. Summary Of The Findings

From the above discussion, it is apparent that, obsessive-compulsive symptoms result in a number of functional impairment in the children as well as adolescents such as cognitive processes like memory and attention, executive functioning and academic achievement. Obsessions (intrusive thoughts) and compulsions (ritualized behaviors) are key indicators of the sufferings of adolescent students. Moreover, obsessive-compulsive symptoms impair the function of intelligence and different cognitive processes which are essential for an adolescent to attain the level of academic achievement one deserves.

However, the review also points out some deficiencies in the available research. These are:

1. Although there are indications that OCD and related symptoms impair cognitive functions, they have rarely been studied in connection with academic achievement.
2. The degree of intelligence achievement relationship as impaired by OCD and related symptoms are rarely studied.

3. The findings on gender and age related prevalence of OCD and related symptoms are still inconclusive, despite having considerable number of studies.

4. Most of the studies are related with clinical OCD, and very few are concerned with sub-clinical symptoms quite prevalent in the general population.

The methodology of the present study was framed keeping these in mind.