Thinking about something over and over is not unexpected, a hunting melody or persistent thought of next trip, that we cannot seem to get out of our mind is also not very uncommon. But, what if we are incapable to distract ourselves, and these thoughts are unpleasant? Mostly we manage to distract our mind from these thoughts but, the patients of Obsessive Compulsive Disorder are unable to do so. They are made anxious by their own thoughts, yet they cannot dismiss them readily from their mind. Moreover they must have had past experiences of embarrassments that suggest them that some thoughts are so hazardous and they must be avoided at all cost. As a result, to avoid these thoughts they perform specific action to insure their “safety” and reduce their “anxiety”. Such kind of thought sufferers engages themselves in complex repetitive rituals that gradually grow to fill most of their day. Because these rituals help to reduce their anxiety, hence, the tendency to perform them grows stronger. Slowly, the person becomes the patient of Obsessive -Compulsive Disorder (Robert A. Baron, 2006).

**Historical perspective of Obsessive Compulsive Disorder (OCD)**

Obsessions and Compulsions have probably been around since time immortal. Although, this phenomenon was described by John Climacus in 6th century (colm, 1982), but, not much could be easily found on the subject of Obsessions and Compulsions, till the European renaissance (14th to 16th century). This was the time when the superstitious notion, that mental illness is caused by devil, was abandoned. To address obsessive and compulsive acts which were also considered as mental illness, a new word was coined: “scrupulosity”. The term scrupulosity was popularized by the two leading scholars of 15th century, John Garson (Chancellor of the university of Paris) and Jhon Nider (Dean of the university of Vienna) and also by Archbishop Antonius of Florence (Eduardo, 1961). To give his view about this
illness, philosopher John Lock in 1678, wrote an essay on Scrupulosity (lord king, 1884). The new label ‘scrupulosity’ helped to emphasize the role of “fear” in creating Obsessions and Compulsions. In the 16th century, the focus was shifted toward the treatment of OCD. For the treatment of OCD, the sufferers mostly sought help from the clergy, they were, priests, bishops, preachers, pastors. By their day to day dealing with such patients clergy, became quite familiar with OCD and several books were written on this topic by english clergymen. These books emphasized that fear (Anxiety) underlies obsession and compulsions (Samuel, 1716). Somewhere in Between the 17th and 18th century, there was a shift towards medical understanding of obsessions and compulsions. Physicians took over the field of OCD with different treatment techniques. Earlier in 20th century, history of Obsession and Compulsion was dominated by two personalities, the French psychiatrist Pierre Jenet (Roger, 1984), and the Austrian psychiatrist Sigmund Freud (Sigmund Freud,1917). Jenet elaborated on existing medical ideas about understanding and treating OCD, but, Freud brought a change in the perspective of understanding OCD, a paradigm shift. Freud interpreted Obsession and Compulsion symbolically and called the illness “Zwangsneurose”. In England this term was translated as “obsession” and in America it was called “compulsion”, the term Obsessive Compulsive disorder was eventually adopted as a compromise (Sandor, 1996).Continuous efforts made in this context made us capable of understanding OCD and treating it in a better way.

**Obsession and compulsion**

In psychiatric literature, obsession was first introduced by Esquirol in 1838 (Rachman and Hadgson, 1980) and explained by Karl Westphal, in 1878. It was explained as “ideas, that in and otherwise intact and without being caused by an emotional or affect
like state, against the will of the person…. Come into the foreground of the consciousness” (Westphal, 1878).

Diagnostic statistical manual-IV (APA, 1994) describe obsession as

“…persistent ideas, thoughts, impulses or images that are experienced as intrusive and inappropriate and that cause marked anxiety or distress. The intrusive and inappropriate quality of the obsessions has been referred to as “Ego- dystonic”. This refers to the individual’s sense that the content of the obsession is alien, not within his or her control, and not the kind of thought that he or she would expect to have. However, the individual is able to recognize that the obsession are the product of his or her mind and are not imposed from without (as an thought insertion)….”

In DSM-IV (1994) compulsion is described as a recurring behavior (example hand washing, ordering, checking) or mental act (example praying, counting, repeating words silently) whose goal is to prevent or decrease anxiety or distress and not to provide enjoyment or gratification. In most cases, the person feels driven by obsession to carry out the compulsion to reduce the distress or to prevent some dreadful event or situation. In some cases, individuals perform stereotyped acts according to idiosyncratically elaborated rules without any purpose. Compulsions are either clearly excessive or are not connected in a realistic way with what they are designed to neutralize or prevent. In the point of view of relationship between obsession and compulsion it is found that Obsession and compulsion can occur in the absence of each other, although in maximum patients they are commonly found together. Obsession may arise with or without a trigger, and can be external or internal. Obsession usually leads to discomfort, anxiety and distress. It leads to an urge to engage in certain compulsive behavior and rituals. A compulsive behaviour can also be either overt or covert. Carrying out compulsive behaviors normally leads to a reduction of discomfort and anxiety although there can be exceptions (Beech, 1971). Sometimes an urge of performing compulsive behaviour can arise without a preceding
obsession. It happens when long standing compulsive behaviors over the years, develop a nature like habit.

**Diagnostic criteria for Obsessive-compulsive disorder (OCD)**

The American psychiatric association’s (APA’s) Diagnostic and statistical manual of mental disorders, Fourth Edition- Text Revision, (DSM-IV-TR; APA, 2000) and the world health organization’s (WHO’S) international classification of diseases, Tenth Edition (WHO, 1992) given criteria to diagnose OCD. ICD-10 criteria for diagnosis of OCD are given below.

**According to the ICD-10, (F42) Diagnostic guidelines:**

For a definite diagnosis obsessiona l symptoms or compulsive acts or both must be present on most days for at least two successive weeks and be a source of distress or interference with activities. The obsessiona l symptoms should have the following characteristics: 1) They must be recognized as the individual’s own thoughts or impulses; 2) There must be at least one thought or act that is still resisted unsuccessfully, even though others may be present which the sufferer no longer resists; 3) The thought of carrying out of the act must not in itself be pleasurable (Simple relief of tension or anxiety is not regarded as pleasure in this sense; 4)The thoughts, images or impulses must be unpleasantly repetitive.

There are several Comorbid and related conditions which is important to consider in differential diagnosis of OCD. As depression, schizophrenia, phobia, Eating disorder, Post-traumatic stress disorder, Gilles de la tourette syndrome, Body dysmorphic disorder, Brain damage and Obsessive-compulsive personality disorder also manifest symptom like that of OCD. Several Studies reported a clear relationship between Obsessive-compulsive disorder and depression (Rachman & hadgson, 1980)). This can have numerous forms. First, some people may develop obsessions when they
become depressed; in such cases the obsessions are essentially secondary to the depression, and usually clear up when the depression lifts. Second, many Obsessive-compulsive patients tend to have a past history of depression. Third, some of these patients become depressed consequently to the onset of their disorder, and may have several episodes of depression. When a patient is depressed, the symptoms of Obsessive-compulsive disorder have a propensity to get worse. Researches have also revealed that patients who are very depressed might not respond well to the standard cognitive-behavioral treatment of the Obsessive-compulsive disorder. In such cases, the depression needs to be treated before improvement can be expected in the Obsessive-compulsive symptoms (De silva & Ranchman, 2004).

In schizophrenia, sometime few stereotyped behavior may appear like compulsive behavior. In the early stages of schizophrenia, obsession and compulsion may appear occasionally, but these are short lived. Few schizophrenic patients’ complain of thoughts which are superficially similar to obsession, but these are usually the thoughts which, according to the patient, have been put into his minds by external force, human or otherwise. This feature distinguishes them from obsessional thoughts, which the patient recognizes as their own. There is one more similarity between obsessive thought and schizophrenia that is delusion because of this similarity, sometimes OCD is diagnosed as schizophrenia. A schizophrenic delusion is an strongly held belief-that is, the client has no insight that it is false, whereas an obsession is experienced as ego-dystonic - that is, not in keeping with one’s own beliefs and thoughts- and as seen as unwanted. In other words, Obsessive-compulsive clients have insight. Admittedly, there are exceptions, but they are very small in number. The DSM-IV of the American psychiatric association (APA, 1994) refers to those ‘with poor insight’.
Obsessive-compulsive disorders are sometime confused with phobic disorder too. Phobias are characterized by anxiety, similarly most Obsessive-compulsive patients experience a lot of anxiety. In both disorders, there is similarity of avoidance behavior. Undoubtedly, some Obsessive-compulsive clients have some phobic characteristics, particularly those who are concerned about contamination. However, the two disorders are different in some important ways, the ritualistic behavior of the Obsessive-compulsive client is not present in the phobic (Enright & Beech, 1997). A further important difference is that, individuals with phobic disorder, if successfully avoid the object or situation they are afraid of, feel safe and be unaffected by the problem in his day-to-day life. In contrast, Obsessive-compulsive clients cannot get away from their problems as easily; even if they keep away from things that trigger their obsessions or compulsive urges, they do not feel liberated.

Anorexia an eating disorder sufferers are commonly described as ‘obsessed with thinness’. This disorder has been described by some researchers as a form of Obsessive-compulsive disorder. The single-minded determination to lose weight and the persistent preoccupation with food, weight, body size and shape that these clients displays have been given as proof for this. In Bulimia nervosa the client has recurrent episodes of bing eating, followed by self-induced vomiting and/or laxative abuse. The strong urge to engage in bing eating is described as a compulsive quality, although the nature of the behavior is by no means senseless. As with anorexic, some bulimics also have associated Obsessive-compulsive problems, some features of which may become closely related to the eating disorder.

Post-traumatic stress disorder refers to a psychiatric disorder that some people develop after exposure to a traumatic event. The main feature is the persistent re-experiencing of the shocking event. The recurrent intrusive thoughts and images that
occur in this disorder are very much like some of the obsessions experienced by patients with obsessive-compulsive disorder. It is also common for sufferers to have intrusive thoughts other than memories of the event (e.g. ‘why did it have happen to me?’). Some also reported cognitive compulsions, such as compulsively saying ‘No it was not my fault’, or compulsively going over the incident. In a small number of clients with this disorder, overt compulsive rituals are found. There are few cases in which a trauma victim has developed obsessions and/or compulsions to a degree that one can describe him or her as suffering from Obsessive-compulsive disorder (De Silva & Marks, 2001). It is also clear that a small number of Obsessive-compulsive clients may have a history of traumatic experiences. However, these two disorders are different entities, and the majority of clients with Obsessive-compulsive disorder do not have a history of trauma.

Gilles de la Tourette syndrome is also a disorder which is characterized by multiple tics, including vocal tics, which may take the form of Swear words or obscenities. Some researchers have highlighted the similarities between the Tourette syndrome and some aspects of Obsessive-compulsive disorder (e.g. Steingard & Dillon-Stout, 1992). However the Tics and Tourette syndrome are different from true Compulsions—unlike later, these are purposeless, involuntary, and cannot be simply delayed, reshaped or substituted. Another difference is that the treatment methods that are doing well with Obsessive- compulsive disorder are of little use with client having Tourette syndrome. It has been reported that some client with this syndrome also have Obsessive-compulsive symptoms, particularly younger clients (Como, 1995).

Body dysmorphic disorder which used to be called ‘dysmorphophobia’ is characterized by excessive concern and preoccupation with imagined defects in body appearance. The repetitive thought may resemble Obsessions and the person usually
engages in extensive checking behavior, especially in the mirror. Reassurance seeking is also common. In some cases the convection that there is a physical abnormality leads to social avoidance. Despite the repetitive thoughts and checking, body dysmorphic disorder is quite distinct from Obsessive-compulsive disorder. It is not considered to be an anxiety disorder at all. On the other hand, a significant minority of clients with body dysmorphic disorder has comorbid Obsessive-compulsive disorder (Veale, 2003).

The manifestation of Obsessive-compulsive type symptoms in certain organic conditions (for example encephalitis lethargic) has been recognized for many decades.Symptom similar to obsessions and compulsions can result from brain damage caused by injury or neurological disease: the patient may engage in repetitive act or express repetitive ideas. But, symptoms of these patients are usually accompanied by other signs of brain injury, such as deficit in memory and learning ability. In addition, repetitive acts and ideas of these patients are different from obsessions and compulsions.

Person with obsessional personality features to a degree that badly affects their life and functioning are sometimes clinically described as suffering from an Obsessive-compulsive personality disorder, (DSM IV; APA, 1994). In these clients, the main features are long standing personality traits, such as excessive rigidity and perfectionism, and undue preoccupation with details, indecisiveness, and so on, and not the episodes of mental illness. These features are well established by early adulthood. Sometimes a client may display features of this disorder as well as Obsessive-compulsive disorder. In such cases a duel diagnosis is given.
Major feature of OCD

To understand the OCD it is important to know its feature. Some major features of OCD include avoidance, fear of disaster, resistance, reassurance seeking, disruption and Ruminations. Many obsessive-compulsive clients have avoidance, which can be almost like phobic avoidance in some cases (Jakes, 1996; Rachman & Hodgson, 1980). The avoidance behavior of an OCD patient concerns stimuli, and sometimes behaviors, that can potentially trigger the obsession or Compulsion. For example those who are suffering with contamination/washing/cleaning type problems make every effort to avoid what they believe to be dirty or contaminating. Patients of OCD also reports fear of disastrous consequences, if they neglect their compulsive behavior. They carry out this behaviour because they think that this behavior wards off some danger. Resistance to the obsession and compulsion has been measured traditionally as a central feature in obsessive-compulsive disorder. It is considered to be its cardinal feature. Although obsession and compulsions are mostly resisted, studies suggest that this is not entirely correct in some clients there is no strong resistance. Obsessional thoughts lead a patient, asking for reassurance. Many obsessive-compulsive clients seek reassurance, usually from their family members or close one. A client who is suffering with feeling of contamination may seek assurance from family member that he has cleaned hand properly. When reassurance is given, the client feels a short-lived relief from discomfort.

When obsessive-compulsive patient engage in performing their compulsion, they feel a need to carry it out accurately, until they are satisfied. If the behavior is disrupted in between by another unwanted thought or external event, the ritual is considered invalidated and client may feel need to be re-started. This reflects the unique feature of disruption in OCD, which can be extremely time consuming for a complicated
compulsive rituals (De silva & Rachman, 2004). Somewhat a difficult phenomenon rumination sometimes found in clients of obsessive-compulsive disorder. This reflects as an attempt to think through a question or topic, such as ‘Is there a life after death?’ and this thinking is uncertain, prolonged and frustrating. The client does this compulsively. Such compulsion is often triggered by the appearance of the relevant obsessional thought (De silva, 2003).

**Symptom dimensions in obsessive-compulsive disorder**

Physicians of the 17th and 18th century, described many types of obsession and compulsion, including “compulsive washing” (William Hammond, 1883), “compulsive checking” (J.E.D. Esquirol, 1838), “obsessive fear of syphilis” (Danial Turner, 1724), “Harm obsession” discussed by’ John Woodward in 1716 (Peter, 1963) and Felix Platter in 1602 (O. Diethelm et al., 1965), and “responsibility obsessions” by Henri Le Grand Du Savile in 1875 (Dan J. Stein, 1997). Fewer “Religious obsessions and compulsions” were also reported in earlier centuries. Since its introduction in first version of DSM in 1952 Obsessive-compulsive disorder has been regarded as a unitary disorder, its clinical features are nevertheless, overtly heterogeneous. Any particular individual may have one- thought more typically several- of variety of symptoms which are presented in varying degree and combinations. Earlier efforts to deal with the symptom unevenness in Obsessive-compulsive disorder proposed a nosology of mutually exclusive subtypes, specifically washers and checkers. The more current view is that the clinical features of Obsessive-compulsive disorder are better described as somewhat correlated symptom dimension. This framework has been identified primarily through the use of “factor analytic procedure” and recognition of the great variability across patients in symptom severity (Mataix-cols et al., 1999). Although studies have not completely agreed on the precise factor structure
of Obsessive-compulsive disorder symptoms. Claridge, et.al. (2003) described either four or five primary dimensions which seem to emerge in OCD. These dimensions are described here.

1. **Symmetry and ordering**- These are the most common symptoms of Obsessive-compulsive disorder. It typically involves obsessions about exactness, repetitive counting and repeating activities. Such obsession is mostly related to concerns about security and accuracy.

2. **Hoarding**- Hoarding is related to the obsession about saving and to compulsions to collect, in excess. It is found to be related with particular items such as old newspapers, cans of food or plastic bags or useless rubbish things like old bits of papers.

3. **Contamination and cleaning**- This subtype includes obsessional concerns with bodily secretions, germs and dirt, environmental contaminations and worries about illness. Related compulsions are excessive hand washing, grooming and household cleaning.

4. **Aggressive obsessions and checking**- This type include a variety of fears, such as excessive worry about harming oneself or others, doing something awkward, acting on unwanted impulses, and obsessions of violent images. Related compulsions typically involve checking door locks, stoves and other appliances; and carrying out acts which reassure that one hasn’t harmed others. In few severe cases, the checking rituals can be performed for hours each day, and to such an extent that the individual suffering with this is hardly able to leave the house.

5. **Sexual/ religious obsessions**- It manifest as the experiencing recurrent thought of prohibited or perverse thoughts and impulses which often concern things
like incest and homosexuality or concerns about blasphemy. When it occurs in isolation of other symptom of compulsion, this is usually called ‘pure obsessional disorder’.

Jaisoorya et al. (2003) conducted a study in India and found following common obsessive-compulsive symptoms in their study sample-

Table 1.

*Obsessive-compulsive symptom percentage of an Indian sample*

<table>
<thead>
<tr>
<th>Obsessions</th>
<th>%</th>
<th>Compulsions</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear of contamination</td>
<td>61</td>
<td>Cleaning &amp; washing</td>
<td>50</td>
</tr>
<tr>
<td>Aggressive thoughts, images &amp; impulses</td>
<td>43</td>
<td>Ordering</td>
<td>41</td>
</tr>
<tr>
<td>Need for symmetry</td>
<td>35</td>
<td>Repeating</td>
<td>38</td>
</tr>
<tr>
<td>Sexual</td>
<td>31</td>
<td>Checking</td>
<td>18</td>
</tr>
<tr>
<td>Religion</td>
<td>30</td>
<td>Hoarding</td>
<td>7</td>
</tr>
<tr>
<td>Pathological doubt</td>
<td>21</td>
<td>Miscellaneous</td>
<td>41</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cause of obsession compulsion a Psychological perspective**

**Behavioral factors and learning theory:** A renowned behavioral model of the acquisition and maintenance of obsessive-compulsive symptoms illustrated from the two stage learning theory of Mowrer (1939). According to this theory in OCD the stage 1 anxiety is classically conditioned to a specific environmental event (classical conditioning). To reduce anxiety the person then engages in compulsive rituals (escape/ avoidance responses). If anxiety is reduced successfully, compulsive behavior is more likely to occur in future (stage 2 or operant conditioning). Higher order conditioning also takes place in OCD when words, images, or thoughts are
associated with the initial stimulus, and the associated anxiety is diffused. The inability to extinguish obsessive thought occurs because patient develops, escape and avoidance behaviors, which leads to anxiety (Rachman & Hadgson, 1980). Behaviour therapy technique Exposure and response prevention (ERP) flows directly from this hypothesis (Salkovskis & kirk, 1989).

**Cognitive behavioral Viewpoint of Obsessive-compulsive disorder:** The basic cognitive model of OCD proposes that patient with this disorder evaluate intrusive thoughts in a unique way. Rather than being able to dismiss them, individuals with OCD appraise intrusive thoughts as highly important as well as threatening, and thus make efforts to control their occurrence. The mere act of appraising one's thoughts is a metacognitive strategy. It refers to beliefs about thinking and strategies used to regulate and control thinking. This term Metacognition was initially elaborated upon by Flavell (1979). Cognitive–behavioural models propose that individuals with OCD hold a number of typical dysfunctional assumptions or beliefs that give rise to their obsessional anxiety. Some of these are metacognitive in nature. Such as, thought–action fusion, over importance of thoughts and need for control over thoughts. Thought–action fusion refers to the “fusing” of one's thoughts causally with definite real-world outcomes. The term was first introduced by Rachman and colleagues in 1996 (Rachman, 1998; Shafran, Thordarson, & Rachman, 1996). Whereas “Thought–action fusion—likelihood” specifically refers to the certainty, that having a particular thought makes it more possible that the imagined outcome will occur. Person suffering with OCD also displays “over importance of thoughts”, which refers to the process of not being able to dismiss naturally occurring intrusive thoughts and instead of that assign importance and meaning to them. Freeston, Ladouceur, Letarte, and Rheaume (1994) first explained this in their study, that 84% of patients with
obsessional ruminations endorsed the meta-belief that “Thinking about something means it's true.”

The concept of “Need for control over thoughts” was first highlighted by Clark and Purdon (Clark, 1989; Clark & Purdon, 1993; Purdon & Clark, 1999). It refers to the meta-belief that some thoughts can and should be controlled. This belief encourages excessive thought control efforts (e.g., thought suppression) that are hardly ever successful. A typical consequence of this effort is that, individuals with OCD start making further negative appraisals of their thoughts as a result of the failure to control them. Evidence for the role of meta-cognition in OCD has been explored in a number of studies. In their Study Solem, Myers, Fisher, Vogel, and Wells (2010), found that all three metacognitive domains were significantly correlated with obsessive–compulsive symptoms. In another study Thought–action fusion beliefs, beliefs about the uncontrollability and danger of thoughts have been found to correlate significantly with obsessive–compulsive symptomatology (e.g., Emmelkamp et al., 1999; Rachman et al., 1995; Sica et al., 2007). Inclusion of metacognitive elements in the cognitive–behavioural treatment of OCD is not new. It was also initially presented in early theoretical models of OCD. Several famous model explaining Obsession and Compulsion have their roots in Beck's schema theory of emotional disorders (Beck, 1976). Salkovskis' model specifies that ‘it is not the intrusive thought itself that is the problem in OCD, but the problem fabricates in the way the thought is appraised’ (Salkovskis, 1985). Similarly, Rachman's (1997) model places the emphasis on the catastrophic nature of the appraisal. Figure 1 is explaining the Salkovskis' cognitive model of developing OCD.
Figure 1: Cognitive model of OCD
Psychanalytical causes of Obsessive-Compulsive disorder:

Dynamic aspects of OCD were first described by Sigmund Freud, he suggested that obsessive symptoms are outcome of unconscious impulses which may be aggressive or sexual in nature. These impulses cause extreme anxiety which is avoided by the defense mechanisms; OCD develops when these defenses fail to control anxiety. Today remarkable progress has been made in psychodynamic viewpoint. Researchers pointed out four primary defense mechanisms. These were isolation, undoing, reaction formation and displacement (Nemiah, 1975; Sturgis, 1993).

Isolation of affect: Isolation is an attempt to separate the feeling or affect from the thought, fantasy or impulse that are associated with them. By this defense mechanism Ego isolates the affect from the idea caused by anxiety, but, this idea still remains in the consciousness of the individual. However, affect becomes free and attached with neutral idea or stimuli. As a result these neutral ideas provoke anxiety and turn into obsession.

Displacement: In displacement the person suffering from OCD, substitute one thought or activity with that of another which is more frightening and threatening.

Reaction formation: This defense mechanism generates an attitude that contradicts the underlying impulse, giving rise to inappropriate behavior patterns; this is commonly found in obsession.

Undoing: Undoing is an attempt to reverse a psychological event, such as a word, thought, or gesture and involves magical thinking. As an act can be undone by its apposite, OCD patient reacts in a way that imagined consequences can be undone by a behavioral apposite act.
Biological causes of OCD

(A) Neurotransmitters

The role of two neurotransmitters “Serotonin” and “Dopamine” are found in developing symptoms and signs of OCD.

Serotonin (5-HT): Biological model of OCD have implicated the role of Serotonin (5-HT) in the development of OCD. Clinical trial of various serotonergic drugs supports the involvement of serotonin neurotransmitter in the Obsessive-Compulsive disorder. Evidence for role of serotonin in OCD stems from the anti obsessional effects of clomipramine (CMI), it has greater 5–HT reuptake blocking effects than other tricyclics, which are less successful. Decrease of OCD symptoms correlates with reduction of platelets’ serotonin level and cerebrospinal fluid (CSF) 5-hydroxyindoleacetic acid (5-HIAA) during clomipramine treatment (Flament et al. 1985; Thoren et al. 1980). In few studies oral methyl-clorophenyl-piperazine (MCPP), a selective 5-HT receptor agonist, has been found to rapidly increase obsessional symptoms in OCD patients (Zohar, 1986). Study conducted by Hollander (1987) also states that increased serotonergic activity contributes to OCD.

Dopamine: The therapeutic effect of the co-administration of Dopamine blocker and SSRIs in a sub-set of patients with OCD and Tic disorders has suggested role of Dopamine dysfunction (Mc Dougle et.al., 1090). A study evaluating levels of platelet Sulphotransferase, an enzyme involved in the catabolism of catecholamines (providing a marker of presynaptic dopamine function), reported a decreased level of platelet [3 H] imipramine binding and a parallel increase in the level of sulphotransferase activity in OCD compared with control. This provides further support for the reduced 5-HT activity and increased dopamine transmission in OCD (Marazitti et al., 1992).
(B) Immune factors

In several studies, there is the evidence of certain association between OCD and the autoimmune diseases of the basal ganglia, eg Sydenham’s chorea, this supports the hypothesis of basal ganglia dysfunction in OCD. A strong connection is also reported between OCD/Tourette’s syndrome and the B-cell antibody D8/17 (Swedo et al., 1997).

(C) Brain imaging studies

Computer assisted imaging technologies can be divided in two major methods. First, those examining brain structures, called ‘structural imaging’ which includes, Computed tomography (CT) and magnetic resonance imaging (MRI). Second those measuring metabolic or bio-chemical functions, called ‘Functional imaging techniques’ which includes, single photon emission tomography (SPECT), positron emission tomography (PET) and fast or functional MRI (fMRI). All these methods have been used to study causes of OCD.

i- Structural brain imaging in Obsessive-Compulsive Disorder

As found in studies of structural brain imaging in OCD patients there have been mainly four targeted areas (Sarah et al. 1997). These are; ratio of ventricle volume to whole brain volume or ventricular brain ratio (VBR), lateral ventricle volumes, caudate size, and volume of the retrocallosal parieto-occipital white matter.

(a) Ventricular-brain ratio (VBR): There are two major findings related to the VBR in subjects with OCD, but the result is not consistent. Behar and colleagues (1984) compared CT scan of 16 adolescent OCD patients and 16 matched normal controls and found significantly higher VBR in OCD patients than control. However, Insel et al. (1983) compared CT scan of 10 OCD patients and 10 matched normal
controls and found no difference in VBR. More studies are needed to understand the role of VBR in OCD patients.

(b) Lateral ventricle volumes: Results related to lateral ventricle volumes are also inconsistent. Stein et al. (1993) used CT to evaluate lateral ventricular volumes in 16 OCD patients (divided in two sub-groups 8 with significant neurological soft sign abnormality and 8 with minimal abnormalities) and 8 non psychiatric patient complaining headaches. Study revealed that patient with high soft sign had significantly larger lateral ventricle volume than both comparison groups. Luxenberg and colleagues (1988) compared CT scan of 10 OCD patients with 10 normal control but, they found no differences in the size of lateral and third ventricle between the two groups. But, they reported difference in the size of caudate nucleus which was significantly smaller in OCD patients.

(c) Caudate size: significant reduction is found in bilateral caudate nuclei volumes in OCD patients in evaluating MRI scans, however, there were no significant difference in prefrontal cortex, lateral and third ventricular volumes, or whole brain volume (Robinson et al., 1995).

(d) Volume of the retrocallosal parieto-occipital white matter: Breiter et al. (1994) analyzed volumes of the retrocallosal white and grey matter, which includes the parieto-occipital area, as well as the retrocallosal lateral ventricles. They also measured the length of the anterior-posterior area and the total area of the midsagittal corpus callosum to ensure that any difference in the retrocallosal volume could not be attributed to a change of the parameter landmark. They found significant smaller right-sided retrocallosal volumes, but no significant difference in the size of the corpus callosum in OCD patients compared to controls.
Result of these studies have been variable, as there are many factors like technical differences, sample size and lack of homogeneous population, etc. But, these findings indicates that OCD patients may have abnormal caudate volume, abnormal ventricular volumes and frontal abnormalities.

ii. **Functional brain imaging in Obsessive-compulsive disorder**

Functional neuroimaging researches in OCD have primarily used, Single photon emission tomography (SPECT) and Positron emission tomography (PET), as high-resolution imaging techniques, which use tracer amounts of bio-chemicals labeled with radiation emitters, which are subsequently localized in different brain areas. SPECT technique is used to measure regional cerebral blood flow (rCBF), highly correlated with cerebral metabolism. PET is used to measure rCBF as well as more direct measurements of basal cerebral glucose or oxygen metabolic rates.

(a) **SPECT studies in OCD:** SPECT studies in OCD has certain limitations as they often give conflicting results. The available data of various studies suggest that OCD patients may have abnormalities in the frontal lobe, in particular the orbital frontal cortex, and the basal ganglia, specifically the caudate nuclei, which normalize after pharmacological treatment (Machlin et al., 1991; Rubin and colleagues, 1992; Edmonstone et al., 1994; Lucey and colleagues, 1995; Hoehn-Saric et al., 1991; and Zohar et al., 1989). Abnormalities in the caudate and the orbital frontal cortex are consistent with the theory of a cortical-striatal-thalamic-cortical loop disturbance in Obsessive compulsive patient.

(b) **PET studies in OCD:** PET technology is used in various studies to assess functional abnormalities in OCD. Baxter et al. (1987) found that OCD patient had significantly increased metabolic rates in the whole cerebral hemisphere, caudate nuclei and orbital gyri. Nordahl et al., (1989) compared PET of OCD and normal
control and found increase metabolic rate in orbital gyri but not in the caudate. Swedo et al. (1989) used PET to compare 18 adults with childhood onset OCD with 18 controls and found that OCD strongly suggested increased metabolism in the right orbital region. The available data of PET studies suggest that ODC patient may have abnormalities in the orbitofrontal-caudate system, which may intervene the expression of some of the symptoms of OCD. These findings compliment the findings of SPECT studies and also support a cortical-striatal-thalamic-cortical loop theory in the pathology of obsessive-compulsive disorder.

**D** The neuroanatomy of OCD: Advancement in the brain imaging studies in OCD provided important information of brain area, which mediates cognitions and behaviors associated with OCD. Current data support the potential involvement of the orbitofrontal white matter, the cingulated gyrus, the caudate and the globus pallidus, which in part make up the cortical-strital-thalamic-cortical loop, in the pathophysiology of OCD. Baxter (1990) has suggested that the main dysfunction is in the striatum, which cause the cortex, particularly the orbitofrontal and cingulate cortex, to do over job in order to compensate. According to this standpoint the striatum, which screens out sensations, thoughts and impulses related to aggression, danger, hygiene and sex during everyday routine activities, is not doing its job. The cortex would then compensate with conscious efforts towards distractions (repetitive rituals). Neuroimaging studies have supported this model. Structural studies show abnormalities in the striatum, particularly the caudate and functional studies have shown that, both the orbitfrontal cortex and the caudate of subjects with OCD have distinct metabolic pattern.

**E** Genetics: A significantly higher concordance rate was found for OCD in monozygotic than for dizygotic twins (Rasmussen et al., 1986). In the first-degree
relatives of patients with childhood onset, 35% were also found afflicted with the disorder (Lanane et al, 1990). Further researches are needed to find out role of genetics in OCD.

(F) Other Biological data: Sleep electroencephalography and neuroendocrine studies have found abnormalities similar to those found in the patients of depression. Insel et al. (1982a) found decreased rapid eye movement latency in OCD patient. Insel et al. (1982b) conducted ‘dexamethasone suppression test’ and found decreased growth hormone secretion with clonidine infusions.

Epidemiology of OCD

The prevalence of obsessive-compulsive disorder among children and adolescents is found in the range of 1% to 3% (Flament et al., 1998; Vallen et al., 1994). According to the US National Comorbidity Survey Replication (NCS-R) about 20% of all affected persons in the USA suffer from manifestations of the disorder at the age of 10yrs or even earlier (Kessler et al., 2005).

According to ‘Obsessive-compulsive disorder: age-standardized incidence and prevalence rate estimates’ for WHO epidemiological subregions (2000) in India ‘Age-std. incidence/100,000’ of OCD for male = 36 and female = 74 and ‘Age-std. prevalence/100,000’ of OCD is male = 313, female = 475 (Ayuso-Mateos & Jose Luis, 2013). There are considerable researches from India on various aspects of OCD. Y. C. Janardhan Reddy et al., (2010) attempted to review all the relevant Indian data on OCD. According to their overview of Indian researches on obsessive compulsive disorder, there are only one epidemiological study conducted by Khanna et al., (1993). 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 (Degonda et al, 1993; Karno et al, 1988). When demographical characteristic of this
disorder is observed in India, it is found that males have outnumbered female subjects (Reddy, PS et al. 2001; Raddy, YC et al., 2000; 2003; Jaisoorya, TS et al. 2003).

Assessment of OCD

There are two kinds of scales available for assessing the symptoms of obsessive-compulsive disorder, namely, rater administered scale and self administered scale.

Self-rated scales

There are a variety of self rating scales for Obsessive-compulsive disorder. Muadsley Obsessive Compulsive Inventory (MOCI) (Rachman and Hodgson, 1980), and the Leyton Obsessional Inventory (LOI) (Cooper, 1970) are the most used ones.

Rater-administered scales

- **Comprehensive Psychopathological Rating Scale (CPRS) (Asberg et al., 1978):**
  The Comprehensive Psychopathological Rating Scale consists of a number of subscales for psychiatric symptoms; the OCD subscale has eight items: rituals, inner tension, compulsive thoughts, concentration difficulties, worry over trifles, sadness, lassitude and indecision. It is evident that the scale is non-specific and measures depression and related symptoms also.

- **NIMH Global Obsessive-Compulsive Scale (GOCS) (Rachman and Hodgson, 1980):**
  The National Institute of Mental Health (NIMH)-Global Obsessive-Compulsive Scale (GOCS), is a rater administered point scale (1-15 points). It contains five categories (1-3, normal; 4-6 subclinical; 7-9, clinical OCD; 10-12, severe OCD; 13-15, very severe OCD) for assessing severity of OCD.
Yale-Brown Obsessive Compulsive Scale (Y-BOCS) (Goodman et al., 1989):
The most widely used instrument for assessing OCD is the Yale-Brown Obsessive Compulsive Scale (Y-BOCS), it is the best scale available to assess severity of OCD. It is administered by clinician or trained person. It has a comprehensive checklist of OC symptoms and a severity scale.

**Symptom checklist:** The Y-BOCS Symptom Checklist includes above 60 different types of obsessions and compulsions divided into 15 larger categories according to the behavioral expression (eg, washing or cleaning) or thematic content (eg, aggression or contamination) of the symptoms.

**Severity scale:** The severity scale has 10 items, five for each, obsession and compulsion. Obsession and compulsion is separately assessed for severity on five dimensions: time spent interference, distress, resistance and control. Each is rated on a 0-4 scale. The maximum total score is 40. Total score above 15 is indicative of clinical OCD. Each item of severity scale has its own relevance to measure the severity of Obsession and compulsion. Relevance of each item in assessing OCD is given below.

**Time spent on obsession:** As De Silva and Rachman, (1992) found that obsession experienced by the OCD patients are more intense, more vivid and longer-lasting. An OCD patient spends many hours of a day, in which intrusions occur in his mind repetitively. Therefore, measuring the time spent on obsession is relevant to assess the severity of symptoms.

**Interference from obsessions:** As Rachman and Hadgson (1980) pointed out that “Normal obsession” reported by non-clinical respondents can be dismissed, blocked or diverted with a little difficulty. As obsessive thought definitely interferes with the
patient’s social or work functioning. Reduction in obsession symptom severity can be evident from reduction in interference.

**Distress from obsession:** OCD is *ego dystonic*, it means that the disorder is incompatible with the sufferer's self-concept. Because ego dystonic disorders go against a person's self-concept, they tend to cause much distress (Aardema et al, 2007; Aardema & o’connor, 2003). Salkovskis (1985) suggested that the distress and adhesiveness of obsession arise from the person’s over interpretation or total misinterpretation of the significance of the relevant thought. Few studies have found that obsession and compulsions are also closely associated with depression (Ricciardi & McNally, 1995). In this context it is very relevant to assess the distress from obsession to know the severity of Obsession symptoms.

**Resistance to obsession:** This item does not directly measure the intensity of the intrusive thought, rather it rates the manifestation of health, i.e., the effort the patient makes to counteract the obsessions by means other than avoidance or the compulsions. Thus, more the patient tries to resist, lesser impaired is his/her functioning.

**Control over Obsession:** Studies pointed out that “Normal obsession” reported by non-clinical respondents can be dismissed, blocked or diverted with little difficulty. But, the OCD patient is unable to control his/her obsession easily (Rachman and Hadgson, 1980). Therefore assessing control over obsession is an important part of assessing severity of obsessive symptoms.

**Time spent on compulsion:** Compulsion is a ‘safety-seeking behaviour’ or action taken in a fearfull situation with the aim of preventing catastrophes and reducing harms (Salkovskis, 1985). The classical manifestations of a compulsive behaviour is repetitive, excessive and stereotyped behaviour in which patient spends a lot of time
of a day in performing his/her compulsions. Studies on the patients of obsessional slowness also explains that in this group, the patient carries out every day’s self-care activities in a stereotype order, for example 6 hours to wash and dress (Rachman, 1974; Rachman and Hodgson, 1980). Assessment of time spent in compulsion is important to understand the severity of compulsive symptoms.

**Interference from compulsions:** A slight to substantial impairment in social or work functioning is reported by the OCD patients due to interference produced by compulsive activity. Therefore, it is relevant to assess interference from compulsion to assess the severity of the symptoms in OCD.

**Distress from compulsions:** Compulsions may act as a mean of avoiding discomfort, as in examples of obsessional slowness (Veale, 1993). But, performing compulsion further leads to Distress from compulsions. And if the patient is prevented by any means from performing the compulsive act, he/she feels further more distressed. Because of this ‘distress from compulsion’ is important to assess while assessing symptom severity of OCD.

**Resistance to compulsions:** This item does not directly measure the severity of the compulsions; rather it rates the manifestation of health, i.e, the effort the patient makes to counteract the compulsions. Thus, more the patient tries to resist, the less impaired is his/her this aspect of functioning.

**Control over compulsions:** In contrast to the preceding item on resistance, the ability of control over compulsions is more closely related to the severity of the compulsions. It is measured through how strong is the drive in OCD patient to perform the compulsive behavior? And how much control a patient has over his/her compulsions? Measuring it also measures the severity of OCD symptoms.
‘Y-BOCS’ has been considered as a gold standard for measuring OCD. Some other known scales are the ‘Brown Assessment of Beliefs Scale’ (BABS) (Eisen et al, 1998) and ‘Overvalued Ideas Scale’ (OVIS), which measures insight (Neziroglu et al., 1999).

**Treatment of Obsessive-compulsive disorder**

**Pharmacotherapy:**

The tricyclic SRI Clomipramine, and the four selective serotonin-reuptake inhibitors Fluoxetine, Fluvoxamine, Sertraline, and Paroxetine, are currently approved by U.S. Food and Drug Administration (FDA) for the treatment of OCD in adults. And, three, Clomipramine, Fluvoxamine, and Sertraline, are approved for treatment of OCD in children and adolescents.

**Tricyclics:**

Tricyclics are named due to their chemical structure -- three rings. Drugs in this class lessen the intensity of anxiety in all the anxiety disorders. Typical drugs in this class include Imipramine (Tofranil), Nortriptyline (Aventil, Pamelon), and Clomipramine (Anafranil). Several studies have been conducted to compare the efficacy of tricyclic antidepressants in OCD, among all of them Clomipramine (CMI) is studied extensively.

- **Clomipramine (CMI)**

CMI is very similar in structure to Imipramine. It is serotonergic uptake inhibitor as well as a noradrenergic uptake inhibitor. The uncontrolled case series showing successful treatment with clomipramine appeared in the 1960s (Fernandez and Lopez-Ibor, 1967; Reynge de Voxrie, 1968). In 1980 studies with double blind, placebo controlled trials confirmed the efficacy of CMI in OCD. By 1990, a collection of double-blind, placebo-controlled trials demonstrated conclusively that clomipramine
is effective in OCD, both in the presence of comorbid depression (Marks et al., 1980; Thoren et al., 1980; Insel et al., 1983; Flament et al., 1985; Mavissakalian et al., 1985; Jenike et al., 1989), as well as in its absence (Marks et al., 1988; de Veaughe-Geiss et al., 1989; Katz et al., 1990).

In treating OCD long term pharmacotherapy is required for most of the patients, therefore side effects which are likely to affect compliance play a major role in the level of success achieved in many cases. Side effects of CMI are constipation, dry mouth and urinary retention. Its other side effects include anorgasmia, drowsiness, and orthostatic hypotension, lowering of seizure threshold and weight gain. CMI is also found potential lethal in overdose (10 times of daily recommended dose can be lethal) due to these effects tricyclics are not first line agents for the treatment of OCD.

**Selective serotonin reuptake inhibitors (SSRIs):**

SSRI acts by enhancing serotonergic neurotransmission through potent and selective inhibition of neuronal reuptake of serotonin in the brain, which reduced the symptom of OCD. At the present time, the majority of the SSRIs have been approved by the United States Food and Drug Administration (FDA) for the treatment of OCD. Fluoxetine and Fluvoxamine were approved by the FDA in 1994, Paroxetine in 1996, and Sertraline in 1997.

- **Fluvoxamine**

It was one of the first SSRI antidepressants to be launched and was the first SSRI, a non-TCA drug approved by the U.S. Food and Drug Administration (FDA) specifically for the treatment of OCD. Till the end of 1995, more than 10 million patients worldwide had been treated with Fluvoxamine. (Fluvoxamine Product Monograph. 1999). Therefore, Fluvoxamine was the first SSRI to be extensively studied in OCD. Fluvoxamine treatment is associated with significant improvement...
on measure of obsessive compulsive symptoms, anxiety and depression. Several double-blind controlled studies have shown Fluvoxamine to be effective in treatment of OCD (Perse et al, 1987; Goodman et al., 1989; Jenike et al., 1990; Perse and colleagues, 1989). A multisite study reports Fluvoxamine (100 to 300 mg per day) to be superior to placebo. In this study, 43% of patients receiving Fluvoxamine treatment responded after 6 weeks compared to 12% receiving placebo (defining response as much or very much improved on the improvement item of the Clinical Global Impression Scale). Jenike et al (1998) in their study of efficacy of Fluvoxamine in patients with OCD reported the mean maximum dose as 294 mgs /day. Side effects were reported mild and consisted mainly of insomnia, nausea, fatigue and headache which were not serious.

- **Sertraline**

Several studies supported the effectiveness of Sertraline in treating OCD. Chouinard and associates (1990) found in their studies that, Sertraline (up to 200 mg per day) to be more effective than placebo on all outcome measures in an eight-week trial. Side effects of Sertraline include insomnia, gastritis, headache and anorexia. Sertraline has recently been available in India to treat OCD.

- **Paroxetine**

Paroxetine has also proven to be effective in OCD. In a large trial of 348 OCD patients, Hollander et al. (2003) tested Paroxetine in fixed doses (20, 40, 60 mg) with placebo. It is found that Y-BOCS score reductions were 16%, 25%, 29% and 13% in the acute phase of the study. Both higher doses (40mg, 60mg) were significantly different from placebo by 6 weeks and from the 20mg dose by 3 weeks. Paroxetine was found well tolerated at all doses for treatment of OCD.
• **Citalopram**

The multinational placebo-controlled study by Montgomery et al. (2001) showed efficacy for fixed doses of 20 mg \((n=102)\), 40 mg \((n=98)\) and 60 mg Citalopram \((n=100)\) compared to placebo \((n=101)\). A significant reduction in baseline Y-BOCS score was seen from week 3 for the 60-mg group, and from weeks 7–12 for other doses. Its side effects are; mainly nausea, headache, fatigue, and insomnia.

• **Fluoxetine**

Since its introduction in the market Fluoxetine has extensively been used in treating OCD. As mentioned above it acts by enhancing serotonergic neurotransmission through potent and selective inhibition of neuronal reuptake of serotonin. Early open trials suggested efficacy of Fluoxetine in OCD (jenike et al.1989; Liebowitz MR et al. 1989). In the multicenter study, which led to FDA approval, three doses of Fluoxetine \((20 \text{ mg per day}, 40 \text{ mg per day}, \text{ and } 60 \text{ mg per day})\) for 13 weeks were studied, all doses were found significantly more effective than placebo in improving OCD (Tollefson et al, 1994). In India this is available in capsule as Flutee- 20, 40 or 60 mg. Some of the common CNS side effects of Fluoxetine are headache, nervousness, insomnia, drowsiness, anxiety, tremor and dizziness. Its gastrointestinal side effects are nausea, dry mouth and anorexia. Other side effects are excessive sweating, weight loss and very rarely suicidal ideation and violent behaviour. OCD patients are relatively resistant to the side effects of Fluoxetine.

Although pharmacotherapy is found very helpful in treatment of OCD, some OCD patient shows little therapeutic response to medications (Stein et al., 1997). It is also found that therapeutic effects obtained from drug treatment do not persist beyond the drug use (Cottraux et al., 1993). Therefore, Expert Consensus guideline recommended treatment with adjoining psychotherapy (march et al, 1997).
Behavior therapy

In the first application of learning theory approach to the treatment of obsessional problem, in 1966, Meyer reported the successful treatment of two cases of chronic obsessional disorder. This trial is followed by a series of successful case reports. Mayer’s work heralded the application of psychological models to obsession-compulsion and development of effective behavioral treatment technique for OCD (Rachman, 2009). Behavior theory of OCD hypothesizes that normal intrusive thoughts, images and impulses become associated through classical conditioning, with anxiety that has subsequently failed to extinguish. It happens because OCD sufferers grow escape and avoidance behaviors (such as obsessional checking and washing) that have the effect of preventing extinction of the anxiety (Rachman & Hodgson, 1980). Meyer also supported this, according to him while treating the OCD it is necessary to tackle avoidance behavior directly by ensuring that rituals should not take place within or between the treatment sessions. Similarly, a technique of behaviour therapy called as, “Exposure and Response Prevention” (EX/RP) also emphasizes on a well-established scientific principle that fear is overcome by braveness, to face the situations or objects that cause fear. It relies on two important principles of learning: habituation and extinction. Habituation is the natural tendency of the nervous system to “numb out” from repeated prolonged contact with an anxiety-provoking object or stimulus. For example, fear of dirt and contamination will fade gradually if one is repeatedly exposed to stimuli believed to be dirty (e.g., doorknobs, toilets, sinks etc) and is prevented from washing ritual. Extinction is based on the principle that our behavior is governed by the consequences of behavior. As it assumes that an object believed to be dirty or contaminated evokes anxiety in obsessive-compulsive disorder patient; the patient performs the compulsive act
immediately to reduce his/her anxiety, as well as, he/she begins to avoid coming into contact with objects or situations that cause anxiety. Because of this extensive avoidance and compulsive behaviors, the patient does not get opportunity to disconfirm his/her fears and fails to get habituated with the object or condition that aroused anxiety. This leads to continuation of obsession and compulsion. EX/RP is considered the most effective treatment for OCD (Huppert & Roth, 2003; National Collaborating Centre for Mental Health, 2005). In the treatment sessions, for treating OCD, the patient is exposed to stimuli that aggravate the obsessional thought and he/she is prevented from compulsive responses (Salkovskis and Kirk, 1989b). However, this claim has been doubted by some researchers criticizing the quality of the studies (Donald F. Klein, 2000).

**Relaxation**

The concept of mind is important in the treatment of illness. It is an integral to the healing approaches of traditional Chinese medicine and Ayurvedic medicine, dating back more than 2,000 years. Hippocrates also noted the moral and spiritual aspects of healing and believed that treatment could occur only with consideration of attitude, environmental influences, and natural remedies. Today Relaxation training has increasingly been popular as a method of anxiety and stress reduction. National Health Interview Survey (2007) which is conducted to know about complementary and alternative medicine (CAM), used by Americans reported that approximately 38% of adults use these practices. Survey found that as a method of anxiety and stress reduction 12.7% of adults had used deep-breathing exercises, 9.4% had practiced meditation, and 6.1% had practiced yoga. Progressive muscles’ relaxation and guided imagery were also among the top 10 CAM therapies for adults; deep breathing and yoga ranked high among children (Barnes et al, 2008). It found in several studies that
OCD severely impairs the patient’s quality of life (Niederauer et al., 2007; Albert et al., 2010). A serious outcome of poor quality of life is high level of stress and anxiety which adversely affects the patient’s day to day adjustment. Therefore, a relaxation exercise, which is easy to practice in patients daily activity schedule, is considered helpful in reducing anxiety and stress in OCD patients. The technique of “Relaxation response” (RR) is found suitable to incorporate in the therapy program.

Relaxation response

As a culture free form of meditation Benson (1976) developed the relaxation response which is a westernized version of meditation. In such kind of deep breathing exercises, a person consciously slowly breathes and focuses on taking regular and deep breaths. Because relaxation is the opposite of stress, the theory is that voluntarily creating the relaxation response through regular use of relaxation techniques could counteract the negative effects of stress. To avoid cultural influence Benson replaced mantra with the number ‘one’. Repetition of number helps the client to discharge any distractive thought which occurs during relaxation.

In explaining the methods of relaxation response, Palmer et al (1995) modified the original text for giving relaxation as following: “Find a comfortable place and sit comfortably and quietly, now close your eyes. Relax your muscles, starting at your face and progress down to your toes. Now concentrate on your breathing. Breathe naturally through your nose. In your mind say the number ‘one’ as you breathe out. One negative or distracting thought may occur, let them just pass over your mind and return to repeating the number ‘one’. Do not try to force relaxation. Just let it take its own time. Continue this exercise for further 10 to 20 minutes. When you are finished with this keep your eyes closed for a couple of minute and sit quietly.”
Several studies find relaxations response (RR) effective in decrease stress and anxiety levels, (Galvin et al., 2006; Park et al., 2013), and supported that relaxation response could be employed as therapeutic intervention (Benson et al., 1975). Few researchers investigated the psychological and biological effects of RR and found that, RR-eliciting practice can decrease psychological distress levels. But, only after years of RR practice, psychological distress reduction coincided with biological change (Chang et Al., 2011). Studies also supported the effectiveness of a short-term 8-week or 8 session Relaxation response program in stress reduction (Chang et al., 2011; Park et al., 2013).

**Cognitive behavior therapy**

During application of behaviour therapy, Rachman and his colleagues (1980) observed that, the presence of the therapist or any other trustworthy person blocked obsessional anxiety. The link between obsession and reassurance seeking, also seem confusing and hard to explain by behaviour theory. Although, anxiety reduction was clearly the most common outcome of obsessional rituals, there were also the patients in whom anxiety increased consistently. Both the strength and limitations of behavior approach and therapy suggested the need for an alternative approach to the conceptualization and therapy of OCD. With retaining the best features of behavioural theory and therapy “Cognitive-behavior therapy” was developed as an alternative. Currently there are two models of cognitive-behavior therapy in OCD-

**A. The medical model of CBT**

Medical model is based on the hypothesis that OCD is a medical brain disorder associated with neurochemical and neuroanatomical dysfunction (Schwartz, 1998; Schwartz & Beyette, 1997).
Therapy proceeds through four steps:

1. Relabel obsessions as symptoms of medical illness,
2. Reattribute obsessions as false brain messages, reduce personal responsibility, encourage patient to act as an impartial spectator,
3. Refocus on working around the illness and
4. Revalue symptom vs. patient as a whole.

B. The classical Model of Cognitive Behaviour Therapy

More than 20 different therapies have been labeled as “cognitive” or “cognitive behavioural”. All of the cognitive behavioral approaches are based on a structured psycho-educational model. The classic model of CBT deals with correction of mistaken beliefs and cognitive distortions by cognitive restructuring (Salkovskis, 1998). In this model the main focus is on belief modification through actively challenging and confronting distorted thinking and belief that drives and maintains the obsession and compulsion. CBT techniques which was developed by Albert Ellis, Aron Beck, Salkovskis’ and others, encourages the person to identify dysfunctional ideas and beliefs and substitute them with more accurate and realistic ideas. The common cognitive distortions found in OCD include overestimation of risk, inflated personal responsibility, thought action fusion, perfectionism and need to control thoughts and beliefs about religion, morality and superstitions. Bruce Hyman et al. (2005) given the following list of the key cognitive errors found in people with OCD-

- Black-and-white, or All-or-nothing thinking
- Magical thinking
- Overestimating risk and danger
- Perfectionism
- Hypermorality
• Overresponsibility for other
• Thought/Action fusion (similar to magical thinking)
• Overimportance of thought
• The exclusivity error
• The “Nobility gambit” (also known as the martyr complex or sacrificial lamb)
• “what if” thinking
• Intolerance of uncertainty

In their study Akbarikia et al. (2012) also evaluated the correlation of maladjusted schema and locus of control with OCD, with the emphasis on cognitive approach to OCD. They found that schema and powerful other types of locus of control, were significantly related to both, the severity of total OCD symptoms and also to other sub-scales of OCD. Change in these “OCD generated beliefs” are vital for recovery in OCD patient. As it is found that CBT is able to make important changes in thoughts, emotions, behaviors and physiology in OCD patients, Expert Consensus Guidelines-R recommended initial treatment either with cognitive behavior therapy (CBT) alone or in conjunction with an SRI (march et al, 1997).

**Therapeutic context of CBT in OCD**

According to Salkovski (2007)

“Cognitive behavior theory regards intrusive thoughts, impulses, images and doubts as an integral part of normal everyday experience. When people develop a tendency to misinterpret their own mental activity as indicating personal “responsibility”, they will experience the pattern of uneasiness and neutralizing characteristics of obsessional problems. In those people where this tendency becomes relatively permanent, a full blown obsessional disorder will develop”.

The broad aim of the cognitive-behavior therapy is to allow the obsessional patient to identify the present beliefs about the problem. To achieve this goal Cognitive behaviour therapy is conducted as a part of a process of guided discovery. It involves
the interweaving of discussion and behavioral experiment and helping the person to consider and evaluate an alternative view to their situation, sometimes referred to as theory A/ theory B. Discussion helps the patient and therapist to achieve a better understanding of the trouble, considering related evidences of past and present, for the patient’s key beliefs and interpretations. Ultimate goal of this discussion is to plan behavioural experiments. Behavioural experiment, help the patient by giving chance to disconfirm their feared consequences. An empathetic approach is found helpful in term of restoring or boosting patient’s self-esteem, and in helping to engage them in active exploration and modification of their thoughts. By this way good cognitive behavior therapy tailor a program to treat the OCD.

Several studies analyze the effectiveness of CBT in treatment of OCD. In some of the most interesting researches after successful treatment by cognitive-behavior therapy, clients with OCD even show biological changes in brain chemicals (Schwartz et.al., 1996). Furthermore this change was found similar to the changes seen after treatment by psychotropic medication (Baxter et.al., 1992).

Van Balkom (1998) designed a study to investigate the differential efficacy of ‘cognitive therapy’ and ‘exposure in vivo with response prevention’ for OCD versus the sequential combination with Fluvoxamine. Outcome was assessed by Anxiety Discomfort Scale, the Yale-Brown Obsessive Compulsive Scale, and the Padua Inventory-Revised. It was found that the sequential combination of Fluvoxamine with ‘cognitive therapy’ and with ‘exposure in vivo with response prevention’ is not superior to either cognitive therapy or exposure in vivo alone.

Simpson et al., (1999) conducted an open trial of cognitive-behavioral therapy (CBT) using exposure and ritual prevention as an adjunct to serotonin reuptake inhibitors (SRIs) in obsessive-compulsive disorder (OCD). They suggested that CBT using
exposure and ritual prevention can lead to a significant reduction in OCD symptoms in patients who remain symptomatic despite an adequate trial of an SRI.

Van et al., (2005) conducted a study which is the first to examine the long-term effectiveness of cognitive therapy (CT) and to compare long-term effectiveness of CT alone, exposure in vivo with response prevention (ERP) alone, and CBT (either CT or ERP) in combination with fluvoxamine in the treatment of OCD. Result demonstrates that at 5-year follow-up (1) prevalence of OCD had declined in all 3 treatment conditions, (2) the clinical benefits of all 3 treatment conditions were maintained, (3) OCD complaints were more severe for treatment dropouts than for treatment completers, and (4) about half of the patients initially treated with Fluvoxamine continued antidepressant use.

Tundo et al. (2007) also examined the effectiveness of CBT on a sample of nonselected, pharmacologically treatment-resistant OCD patients. The therapy was given in a naturalistic setting and manualized guidelines were adapted to each patient. Pharmacologic treatment underwent no changes during the trial period. Outcome measures included the ‘Yale-Brown Obsessive Compulsive Scale’, the ‘Clinical Global Impressions-Severity of Illness scale’, and the ‘Global Assessment of Functioning scale’. Result of their studies supported that, CBT could be suitably added to pharmacological treatments for severe, real-world, medication-resistant OCD patients.

Simpson et al. (2008) conducted another study to examine the effects of augmenting SRIs with exposure and ritual prevention, an established cognitive-behavioral therapy (CBT) for OCD. At the end Exposure and ritual prevention was found superior to stress management training in reducing OCD symptoms. It suggested that
augmentation of SRI pharmacotherapy with exposure and ritual prevention is a strategy for reducing OCD symptoms.

Gail Steketee et al. (2011) tried to identify the predictors of outcome for a comprehensive cognitive therapy (CT) developed for patients with obsessive-compulsive disorder (OCD). For this study 39 participants were assessed on the Yale-Brown Obsessive Compulsive Scale and assigned to CT. They found that longer treatment may be needed for those with more severe OCD symptoms and CT may have positive effects not only on OCD symptoms but also on comorbid depressive and anxious disorders and associated underlying core beliefs.

Lewin et al. (2011) examine correlation of parent, child, and therapist treatment expectations and their role in the exposure-based CBT treatment of childhood obsessive compulsive disorder (OCD). In results, they found that higher treatment expectations were linked to better treatment responses, lower attrition, better homework compliance, and reduced impairment.

**Family counseling**

Family counseling is a program of providing information and professional guidance to members of a family concerning specific health matters. It is found that due to the stigma, families sometime actively ignore symptoms of mental illness. They try to reassure themselves and the patient, that there is nothing wrong. Such kind of factors, increases the symptom of a mental illness and is also responsible for seeking late treatment. Therefore, it is essential to change the way mental health problem is perceived by the family through a greater awareness of illness among the family members and caregivers by providing them counseling.
Effects of OCD on families

OCD have a significant effect on the family members of the patient, because OCD patient may insist others in the family to follow certain rules of behaviour, and to carry-out some compulsive rituals on his or her behalf. Several researchers have remarked on the often extensive family involvement in patients’ OCD symptoms (Livingston, 1990; Allsopp et al., 1990). Family accommodation is the term used to indicate the process whereby family members of patients with obsessive-compulsive disorder (OCD) assist or participate in the patients' rituals. Many studies have found that approximately 75% of OCD relatives participate, at least minimally, in rituals or avoidance or have modified their behavior to accommodate patients’ symptoms. These accommodation includes providing reassurance (>30%), active participation in rituals and/or avoidance at patient’s request (33-60%), taking over patient duties (>33%), and modifying family activities and routines (>35%). These efforts were usually intended to reduce patient distress and time spent on rituals (Calvocoressi et al., 1995; Calvocoressi et al., 1999; Shafran et al., 1995). Stewart et.al., (2008) conducted a study to identify the frequency and clinical predictors of OCD family accommodation behaviors by using Family Accommodation Scale. They reported family accommodation in 96.9% of cases. They also reported that most common behavior includes providing reassurance and waiting for ritual completion. They suggested that Psychoeducation regarding potential harmful effects of accommodation should be given to the family in management of this illness. Albert et al. (2010) examined several socio-demographic and clinical variables that are associated with family accommodation and found that family accommodation was common in OCD, with the provision of reassurance, participation in rituals and assisting the patient in avoidance. They also suggested need of family-based interventions. Similarly,
Lebowitz et.al. (2012) concluded that accommodation is common in OCD and is strongly and consistently correlated with OCD symptom severity. Significant improvement of OCD symptoms with treatment is associated with reductions in family accommodation. Boeding et.al. (2013) examined accommodation behaviors in romantic partners of adults with OCD. And found that accommodation was associated with the patient's OCD symptoms at pre-treatment, and negatively associated with the partners', but not the patients', self-reported relationship satisfaction. Post-treatment partner accommodation was also associated with poorer response to treatment. All these Studies suggested need of therapies targeting family accommodation to improving treatment outcomes in OCD.

As OCD influence the family member’s life significantly. Steketee G. (1997) reviewed impairment in functioning and family burden associated with OCD. As they reported that several studies support extensive family involvement and accommodation of OCD symptoms, as well as the considerable burden placed on families who reduce their social activities and increase their isolation and distress. In an Indian study Gururaj et al. (2008) examined the family burden, quality of life and disability in OCD patients and compared them with patients with schizophrenia of comparable severity. Schizophrenic patients had higher family burden but were comparable to OCD patients with respect to quality of life and disability. The result showed that OCD patients were associated with significant disability, poor quality of life and high family burden comparable to schizophrenia.

Why family member spouse, parents or children or other relatives help the patient in their rituals? Why don’t they refuse? Many of them initially responds with questioning and refusal, but, at the end they begin to obey for the sake of maintaining peace in the family. To understand its impact on family members and patient himself,
several study investigated the relatives’ stress of living with an OCD patient. Cooper (1993) conducted a survey of 225 family members of adults with OCD and reported that 75% experienced disruption in their lives because of the OCD, including loss of personal relationships, loss of leisure time, and financial problems. Studies also found that greater family participation was significantly related to distress in family members (Amir et al., 2000; Calvocoressi et al., 1995), as well as family members expressed emotion as more rejecting attitudes toward the patient (Calvocoressi et al., 1999).

**Expressed emotion (EE):** Among all the family variables, which are examined as predictors of outcome in mental disorders, expressed emotion (EE) appears to be the most studied one. It assessed mainly via a combination of criticism and emotional over-involvement. It is found in the studies that OCD patients who perceived their relatives as either critical or hostile have more severe OCD symptoms (Van Noppen et al., 2009) and higher perceived EE, significantly higher severity of symptoms and higher familial perceived criticism are associated with poor or absence of insight and more compulsions and depressive symptoms (De Berardis et al., 2008). In the pretreatment period, poor social and familial functioning, and patient-rated negative household interactions (anger, criticism, relatives’ beliefs that the OCD patient was malingering) are also studied and it predicted fewer gains at follow-up. Conversely, positive feelings in the household, predicted more improvement in the patient (Steketee, 1993). As level of EE significantly influences the treatment outcome, it is important to involve family in OCD treatment program and council the family members regarding impacts’ of their behaviour on the patient’s treatment results. OCD significantly hampers the adjustment between the patient and his family members. Several researchers studied the Quality of life of OCD patients and their
family and found that OCD impairs the Quality of life of the patient (Niederauer et al., 2007; Albert et al., 2010) as well as their family members (Albert et al., 2007). Family member have an important role in treatment of OCD, they may affect the treatment out-come by changing their attitude about patients illness and provide assistance to EX/RP at home. Few studies examined the role of family in treatment outcome of OCD. Thornicroft et al. (1991) reported an uncontrolled effort to decrease relative’s involvement in OCD symptoms. This inpatient treatment program emphasized self-treatment and teaching relatives to assist in the therapy program. Behavior therapy included exposure and response-prevention plus strategies for self-control and social skills training. The family component focused on reducing relatives’ involvement in rituals by training them to monitor patient behavior and encourage self-exposure in a noncritical manner. Finding indicated that good success of family involvement for severe inpatient OCD population who scored in the extreme range on disability from OCD symptoms.

Taking help of family member in CBT program is also studied by the researchers. Piacentini et al. (2011) conducted the study to examine the efficacy of exposure-based cognitive-behavioral therapy (CBT) plus a structured family intervention (FCBT) versus psychoeducation plus relaxation training (PRT) for reducing symptom severity, functional impairment, and family accommodation in youths with OCD. They found that FCBT is effective for reducing OCD severity and impairment. Such treatment also reduced parent-reported involvement in symptoms with reduced accommodation preceding, reduced symptom severity and functional impairment. In follow-up they found that treatment gains were maintained till 6 months.

Nauta et.al., (2012) provided an overview of current knowledge about the complex interaction between OCD and family factors by systematic search of the literature,
using PubMed and Psychinfo. They concluded that OCD places a heavy burden on partners and family members, and their response to symptom influence the course of the disease, particularly the effect of cognitive behavioural therapy (CBT). Therefore they advised to integrate family factors into the treatment of OCD. As studies revealed that, family accommodation and Expressed emotion plays a crucial role in the treatment of OCD, therefore, adding up Counseling of significant family member is suggested for the success of psychotherapy in the treatment of OCD patient. (Bruce et al, 2005).

**Rational for the study**

Y. C. Janardhan Reddy et al. (2010) attempted to review all the relevant Indian data on OCD. As they concluded that Indian researches on different aspects of OCD has shown big similarities with researches from the other parts of the world and clinical profile of OCD seems to be alike as it is described in the literature. Comorbid patterns of OCD also appear to be similar across the cultures. Biological researches conducted on OCD in India have paralleled the interests in this area with other parts of the world. There seems to be an agreement that serotonergic hypothesis may not explain all the abnormalities in OCD and complex interactions between various neurotransmitters as well as environmental factors may cause OCD. A large amount of the researches are being conducted all over the world, mostly in Europe to assess the effectiveness of SSRI and CBT in treatment of OCD. On the basis of result given by these studies, Expert Consensus Guidelines® recommended treatment with SSRI and CBT (March et al., 1997). Limited amount of data from India on treatment aspects of OCD indicates toward the need to conduct the study to analyze effectiveness of SSRI, CBT and family counseling in treatment of OCD on Indian patients. Therefore this study is conducted with following objectives-
Objective

- To assess the effectiveness of Fluoxetine in treatment of OCD.
- To assess that effectiveness of combination of Fluoxetine and CBT in treatment of OCD.
- To assess the effectiveness of combination of Fluoxetine, CBT and counseling of family member in treatment of OCD.
- Comparison of effectiveness of above mentioned three ‘treatment combinations’ in treatment of OCD symptoms.

Research questions

1. Is there significant difference in pre-post mean score of symptom severity of obsessive compulsive disorder patients treated with Fluoxetine only?
2. Is there significant difference in pre-post mean score of symptom severity of OCD patients treated with combination of Fluoxetine and Cognitive Behavior therapy?
3. Is there significant difference in pre-post mean score of symptom severity of OCD patients treated with the combination of Fluoxetine, Cognitive Behavior therapy and counseling of significant family members only?
4. Is there any significant difference between the post treatment mean scores of symptom severity of OCD patients treated by Fluoxetine only, patients treated with combination of Fluoxetine and Cognitive behavior therapy only and patients treated with combination of Fluoxetine, Cognitive behavior therapy and counseling of family members only?
Hypotheses

1. There would be significant reduction in post mean score from pre mean score of symptom severity of obsessive-compulsive disorder patients treated with Fluoxetine.

2. There would be significant difference in (pre-post) mean scores of symptom severity of OCD patients treated with combination of Fluoxetine and Cognitive Behavior therapy.

3. There would be significant difference in (pre-post) mean scores of symptom severity of OCD patients treated with the combination of Fluoxetine, Cognitive Behavior therapy and counseling of significant family members.

4. There would be significant difference between the post treatment mean scores of symptom severity of OCD patients treated by Fluoxetine only, patients treated with combination of Fluoxetine and Cognitive behavior therapy only and patients treated with combination of Fluoxetine, Cognitive behavior therapy and counseling of significant family members only.