Introduction
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Human behavior is what people do and how they do it. The mental and physical responses by which such actions are expressed depend on environmental input to our sense organs. The various stimuli are coordinated and controlled by immensely complicated network of nerve impulses and by hormonal messengers. Our activities are therefore based on aspects of anatomy and physiology that we know can be affected by genes encoded proteins. It should therefore be expressed that genetic variations can lead to behavioral variations. The Psychogenetic study deals with the behavior of human beings that develops in response to interaction between inherited limitations and environmental factors. There are many causes of behavioral adaptations. In some instances for example, in certain forms of brain damage, organic cause is uncovered, in other cases undesirable present or past relationship and a combination of these factors along with a stressful environment such as death of a loved one may be implicated. A wide range of biological conditions such as endocrine imbalances, malnutrition, injuries and effective genes that interfere with normal development and function of human body, are potential causes of abnormal human behavior. A number of chromosomal anomalies interfere directly with normal development of brain; others are more subtle defects but can still render a person susceptible to the most severe type of the mental disorders. These susceptible influences are usually transmitted in the genetic code itself.

The great majority of people show normal behavior with slight deviation in it in certain specific conditions. Among the unselected life records there would be found small groups of individuals that deviated from the normal in an unfavourable or
pathological direction, included in this abnormal group would be individuals marked by limited intelligence, emotional instability, personality disorganization and character defects who for the most part lead wretched personal lives and were social misfits or liabilities.

These abnormal deviants who constitute about ten percent of the general population usually classified into four main categories i.e. antisocial personalities, mentally defective people, sufferers of psychoses, and psychoneuroses.

The etiology of most of these disorders reflects the genetic background; some are chromosomal anomalies i.e. Down syndrome, Fragile X, XYY syndrome etc. Some are due to defects in the genes, phenylketonuria (PKU), Leschnyhans syndrome, dyslexia etc.

These were those prominent well studied genetic disorders with many physical and physiological defects; however there are many cases of mental retardation seen in human population which show their onset at certain age without any physical defects. Most among these are abnormal behavioural traits or psychological traits like psychosis, psychoneurosis etc.

**Psychoses:** Psychoses are severe mental disorders that tend to shatter the integration of the personality and disrupt the individual’s social relationship.

The behavior of the psychotic patient is too bizarre, unreasonable and inappropriate. It is necessary to supervise them closely, or hospitalize them. Psychotic patients because of their peculiar and unpredictable actions constitute a potential threat to the welfare of others.

Psychotic individuals are unbalanced mentally that they are not legally responsible for their actions. In psychoses, normal inhibitions and cultural restraints
are severe and the patient indulges his whims and phantasies unchecked by rules of logic, common sense, or social pressure, unpleasant delusions and hallucinations are just as real. In their emotional reactions they show the same disregard for reality without any apparent cause, they become violently excited, depressed or irritable. There is no logical relation between motivating situation and emotional response, sad news from home may evoke laughter, good news tears, or either may have no effect, usually the patient is confused, bewildered and disoriented, speech is incoherent and thought processes are retarded and ineffective. There is inability to grasp new material, and memory disturbances are common. The final outcome may be a permanent impairment of total personality. The psychotic lives in the world of reality but in his own private world. Customs and happenings of the real world have no meaning or significance for him, his behavior is impervious to outcome influences and attempts to hold his attention or to modify his thoughts by persuasion, reason or force are futile.

Some of the examples of psychoses include schizophrenia and bipolar disorder etc. which have been subjects of psychogenetic studies and are mainly studied through adoption, family histories and twin studies.

Twin and adoption studies indicate that genetic factors are involved in Schizophrenia. A large number of genomic studies have also been performed to locate schizophrenia gene. A number of chromosomal regions have been implicated; no schizophrenia gene has been conclusively identified. However, linkage to several chromosome regions has been replicated in multiple proportions and specific genes in these regions are being studied.
Some techniques like linkage disequilibrium, candidate gene analysis have been identified. Promising associations between schizophrenia and several brain expressed genes whose product interact with glutamate receptor which include dysbindin (chromosome 6p), neureglin (chromosome 8p) and G72 (Chromosome 13q) were reported by Harold and Benjamin, 1995.

**Psychoneuroses:** Psychoneuroses also known as neuroses are minor mental disorders characterized by inner struggles and discordant social relationships. Psychoneurotics are the individuals who “go to pieces” and easily confronted with a difficult or trying situation and exhibit a variety of mental and physical symptoms that persists for several weeks and months.

Psychoneurotic symptoms are anxiety, feeling of inner tension, restlessness, idea of inadequacy depressed spirits to concentrate or make decisions, memory disturbance, heightened irritability, morbid doubts, headaches, upset stomach, irrational fears, insomnia, obsessions, compulsions and inability to enjoy social relations.

Physical symptoms which are essentially bodily concomitants of strong emotions and conflicts include loss of voluntary control over certain motor or sensory functions, shortness of breath, persistent tension, fatigue, headache, gastrointestinal disturbance, palpitation, cardiac irregularities, temperature imbalances, multiple aches, pains and loss of sensory and motor functions.

Psychoneuroses are relatively mild personality disorders that distress and inconvenience the patient but neither these disrupt his social adjustments nor interfere with his everyday activities to the point of necessitating supervision or compulsory commitment to a mental hospital. His personality remains intact and his grasp of
reality is not distorted. Psychoneurotic patients know what they are doing; they also have a clear understanding of their difficulties, can distinguish right from wrong and are legally responsible for their actions. Their behavior though frequently annoying is rarely offensive or a source of dangers to others, under great emotional stress, normal individuals frequently exhibit typical psychoneurotic symptoms but with two important modifications, namely their reactions are appropriate to the stimulating situation and are of short duration.

A normal person who experiences a sense of emotional shock may be speechless or paralyzed for a few minutes, he may faint, feel weak or complains of irregular heart action or nausea soon, he regains control on himself and his symptoms disappear following a similar or milder emotional shock. On the other hand a psychoneurotic may suffer for months from loss of voice, paralyses, general exhaustion, cardiac instability etc. A normal individual may be best with temporary anxiety and a feeling of inferiority, but a psychotic may retain this attitude in exaggerated forms. Many normal individuals have a fear of germs and take reasonable precautions to avoid infection but unlike certain psychoneurotics they do not wash their hands a hundred times a day, wear gloves in handling money or sterilize their cooking utensils before each meal.

The psychoneurotic disorders produce mild to moderate illness and are very most widespread amongst the mental disorders. So these are studied mostly by psychologists and psychiatrists but less researches are conducted on them by geneticists as there are no concrete genetic or cytogenetic evidences reported for these disorders and also due to the fact that most of those are not following the classical
mendelian inheritance. Therefore these are categorized under the complex genetic disorders, perhaps inherited through polygenes or polyalleles.

These complexes psychogenetic, disorders may involve the combined effect of mutations in multiple alleles/ genes but they are also reported to be influenced by a number of environmental stresses that generally control their penetrance and expressivity within a population.

**Classification of psychoneurotic disorders**

In 1952 the American psychiatric association committee on Nomenclature and statistics, published the first edition of DSM (DSM-I) i.e. Diagnostic and statistical manual). While DSM II was published in 1968. Since then four editions has already been published.

The psychoneurotic disorder underwent significant diagnostic revision with the publication of DSM III (American psychiatric association 1980; Frances et al. 1993, Zal 1988). As most recent family and twin studies of psychoneurotic have employed DSM III/DSM IIIR criteria (1987) changes in classification systems reflects the evolution and refinement of definitions and diagnostic criteria for these disorders. This is an ongoing process and other psychiatric nomenclature such as the International classification on diseases (ICD-9; ICD-10) applies a different classification system (Torgersen, 1986). The fourth edition of Diagnostic and statistical manual of mental disorder (DSM-IV) published in 1994. [The latest criterion is DSM-V (but unpublished)]. The IV edition correlates with the 10th revision of World Health Organization’s (WHO’s) International Classification of disease and related health problem (ICD-10) developed in 1992.
**Basic features of DSM-IV**

DSM-IV attempts to describe what the manifestations of mental disorder are, specified diagnostic criteria are provided for each mental disorder. These criteria include a list of features that must be present for diagnosis to be made thus increasing the validity and reliability of the diagnostic process among clinicians.

DSM-IV also systematically describes each disorder in terms of its associated features: specific age, culture, and gender related features; prevalence incidence and risk, course complications, predisposing factors, familial pattern and differential diagnosis.

DSM-IV provides explicit rules to be used when information is insufficient (diagnosis to be deferred or provisional) or the patients clinical presentation and history do not met the full criteria of a prototypical category (an atypical, residual or not otherwise specified [NOS] type with in the general category. DSM-IV is a multi axial system of evaluation that evaluates the patients along several variables and contain five axes. Out of these, Axis I and Axis II deal with the entire classification of mental disorders-17 major classification and more than 300 specific disorders.

**Anxiety**

Psychoneurotic anxiety disorders are the most prevailing type of disorders. The term anxiety is usually defined as a diffuse vague, very unpleasant feeling of fear and apprehension. Freud (1895) understood anxiety as a manifestation of a physiologically induced tension state. Freud concluded that anxiety is a symptom of unresolved unconscious conflicts between the impulse of libidinal or aggressive gratification and the ego’s recognition of the external danger that could result from that gratification.
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Mobilized by signal anxiety and acting according the pleasure principle, the ego uses various defenses to avoid the anxiety produced by both intra psychic conflict and potential external danger. The experience of anxiety is the result of a failure of the ego to use effective defenses, signal anxiety occurs outside awareness. Felt anxiety is consciously experience and can reach traumatic proportions. Freud description of traumatic anxiety closely correlates with the current definition of a panic attack.

According to psychoanalytic theory, anxiety arises from a conflict between instinctual drive and internal inhibition. Real external danger evokes fear, which is distinct from anxiety.

The cognitive theory of anxiety, represented by the work of Beck (1976) suggests that anxiety is a response to perceived danger consistent distortions in information processing lead to misperceiving danger and experiencing anxiety. Pathological anxiety is related selective information processing of a threat. Anxious patients also perceive their resources as inadequate to cope with threat.

The most prevalent neurobiological model comes from the knowledge concerning the operation of Benzodiazepines, a group of drugs that are effective in treating anxiety. Hence abnormalities in brain have been suggested as possible biological mechanisms of anxiety. A receptor in the brain has been discovered that is linked to an inhibitory neurotransmitter called gamma amino butyric acid (GABA) which is stimulated by neural excitation anxiety. The benozodiazepines reduce anxiety by enhancing release of GABA, similarly drugs that block or inhibit the GABA system leads to an increase in anxiety (Insell, 1986).
Most anxiety disorders run in families. Structured diagnostic interviews conducted in family members of patients with GAD have confirmed that about 20 percent of the relative suffers from GAD.

Anxiety disorders are classified into five different types by DSM-IV (1994). The difference is in the cause that lead to anxiety marked by symptoms which are more or less common to all the types of disorders.

(I) GAD

(II) Phobia

(III) PTSD

(IV) OCD

(V) Panic disorder

The present study deals with the gender wise age of onset and possible mode of inheritance of two of these anxiety disorders i.e. OCD (obsessive compulsive disorder) and panic disorder (PD).

**Obsessive compulsive disorder**

Obsessive compulsive disorder is an anxiety disorder in which mind is flooded with persistent and uncontrollable thoughts or the individual is compelled to repeat certain acts again and again causing significant distress and interference with everyday functioning.

Obsessions are intrusive and recurring thoughts impulses and images that come unbidden to the mind and appears irrational uncontrollable to the individuals experiencing them, obsession have five distinguishable forms as:

- Obsessive doubts,
- Obsessive thinking,
Obsessive impulses,
Obsessive fears,
Obsessive image.

**Compulsion:** A compulsion is a repetitive behaviour that the person feels driven to perform in order to reduce distress or prevent some calamity from occurring.

Compulsions have two distinguishable forms as

Yielding compulsion and

Controlling compulsion

**DSM-IV Diagnostic criteria for obsessive compulsive disorder**

(A) Either obsessions or compulsions

Obsessions are defined by (1), (2), (3) and (4)

(1). recurrent and persistent thoughts, impulses, or images that are experienced at some time during the disturbance as intrusive and inappropriate and that cause marked anxiety or distress.

(2). the thoughts, impulses or images are not simply excessive worries about real life problems.

(3). the person attempts to ignore or suppress such thoughts, impulses, or images or to neutralize them with some other thought or action.

(4). the person recognizes that the obsessional thoughts, impulses, or images are a product of his or her own mind (not imposed from without as in thought insertion)

Compulsions are defined by (1) and (2)

(1). Repetitive behaviours (e.g. hand washing, ordering and checking) or mental acts (e.g. Praying, counting, repeating words silently) that the person feels
driven to perform in response to an obsession or according to rule that must be applied rigidly.

(2). The behaviours or mental acts are aimed at preventing or reducing distress or preventing some dreaded event or situations; however, these behaviours or mental acts either are not connected in a realistic way with what they are designed to neutralize or prevent, or are clearly excessive.

At some point during the course of the disorder the person has recognized that the obsessions or compulsions are excessive or unreasonable (This does not apply to children).

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Note: This does not apply to children

(C) The obsessions or compulsions cause marked distress; are time consuming (take more than an hour a day); or significantly interfere with the person’s normal routine, occupational (or academic) functioning, or usual social activities or relationships.

(D) If another axis 1 disorder is present, the content of the obsessions or compulsions is not restricted to it (eg. preoccupation with food in the presence of an eating disorder; hair pulling in the presence of trichotillomania; concern with appearance in the presence of body dysmorphic disorder; preoccupation with drugs in the presence of a substance use disorder; preoccupation with having a serious illness in the presence of hypochondriasis; preoccupation with sexual urges or fantasies in the presence of a paraphilia; or guilty ruminations in the presence of major depressive disorder.
The disturbance is not due to the direct effects of a substance (e.g. a drug of abuse, a medication) or a general medical condition

**Panic disorder:** It is a sudden and often inexplicable attack characterized by labored breathing, heart palpitation, chest pain, feeling of choking and smothering, nausea, dizziness, sweating, trembling and intense apprehension, terror and feeling of impending doom, depersonalization and derealization, feeling of being outside one's body and of the world not being real or even feeling of dying.

Some times panic attacks are associated with certain situation like car driving then they are called cued panic attacks and when they occur unexpectedly, in sleeping and relaxation they are called uncued panic attacks.

It typically begins in early adulthood and its onset is associated with stressful life experiences (Pollard and Corn 1989).

**DSM-IV criteria for panic attack**

Panic attack is a discrete period of intense fear or discomfort in which four (or more) of the following symptoms developed abruptly and reached a peak within 10 minutes.

- Palpitation, pounding heart or accelerated heart rate.
- Sweating.
- Trembling or shaking.
- Sensation of shortness of breath or smothering.
- Feeling of choking.
- Chest pain or discomfort.
- Nausea or abdominal distress.
- Feeling dizzy, unsteady, lightheaded, or faint.
Derealization (feeling of unreality) or depersonalization (being detached from oneself.

Fear of losing control or going crazy.

Fear of dying

Paresthesian (numbers or tingling sensations)

Chill or hot flushes

**DSM-IV Diagnostic criteria for panic disorder with Agoraphobia**

(A) Both (1) and (2)

(1) recurrent unexpected panic attacks.

(2) at least one of the attacks has been followed by 1 month (or more) of the following.

(a) persistent concern about having additional attacks

(b) worry about the implications of the attack or its consequences (e.g. losing control, a heart attack, “going crazy”).

(c) a significant change in behaviour related to the attacks.

(B) The presence of agoraphobia.

(C) The panic attacks are not due to the direct physiological effects of a substance (e.g. A drug of abuse, a medication or a general medical condition (e.g. Hyperthyroidism).

(D) The panic attacks are not better accounted for by another mental disorder such as social phobia (e.g. On exposure to a feared social situations specific phobia (e.g. On exposure to a specific phobia situation) Obsessive Compulsive disorder (e.g. On exposure to dirt in some one with obsession about contamination), post traumatic stress disorder (e.g. In response to stimuli associated with a severe stressor), or
separation anxiety disorder (e.g. in response to being away from home or close relatives)

**DSM-IV Diagnostic criteria for panic disorders without Agoraphobia**

(A) Both (1) and (2)

(1) recurrent unexpected panic attacks.
(2) at least one of the attack has been followed by at least 1 month (or more) of the following.
(a) persistent concern about having additional attacks.
(b) worry about implication of the attack and its consequences (e.g. losing control, having a heart attack, “going crazy”)
(c) a significant change in behaviour related to the attacks.

(B) The absence of agoraphobia (A completed syndrome is a cluster of fears centering on public places i.e. fears of shopping encountering crowds and traveling etc.).

(C) The panic attacks are not due to direct physiological effects of substance (e.g. a drug of abuse, a medication or a general medical condition (e.g. hyperthyroidism).

(D) The panic attacks are not better accounted for by another mental disorder such as social phobia (e.g. On exposure to a feared social situations specific phobia (e.g. On exposure to a specific phobia situation) Obsessive Compulsive disorder (e.g. On exposure to dirt in some one with obsession about contamination), post traumatic stress disorder (e.g. In response to stimuli associated with a severe stressor ), or separation anxiety disorder (e.g. in response to being away from home or close relatives).

The present study is based on the pedigree analysis for 3 to 4 generations and twin analysis. Various statistical methods are used i.e. chi-square, heritability,
concordance to prove the significance of data. The prevalence of the disorders in both the sexes is also studied. Another important aspect of the present work involves the study of comorbidity among anxiety disorders.

OCD and Panic disorder are common psychiatric illness affecting a considerable fraction of population. Their complications include Agoraphobia, depressions, Generalized anxiety, Tic and Tourette disorder etc. which cause the personal pain and humiliations in the patient and a restricted life style after months or years of continuous attacks and the restricted life style caused by the typical avoidance behaviour. The sufferers of these disorders may become highly demoralized and depressed. There are missed days of work due to panic attacks and there may be unemployment due to partial or complete disability. There is increased risk of alcoholism and tragically one out of every fine untreated sufferer attempts to end his or her life. Coryell et al. 1982; Weismann et al., 1989)

Biological research is a reasonable strategy for understanding the causes of such diseases and because these disorders are also the sources of social morbidity, the causes of these could benefit individuals with these illnesses through more accurate diagnostic and effective treatment. Therefore in the present study attempts were made to find out the possible causes of these disorders (genetic and non genetic) with the help of pedigree analysis and twin studies in Northern Indian population.