Basics of Mental Health and Clinical Psychiatry
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Lecture 14
Schizophrenia

Hello everyone. Let us start lecture number 14. The topic is schizophrenia.

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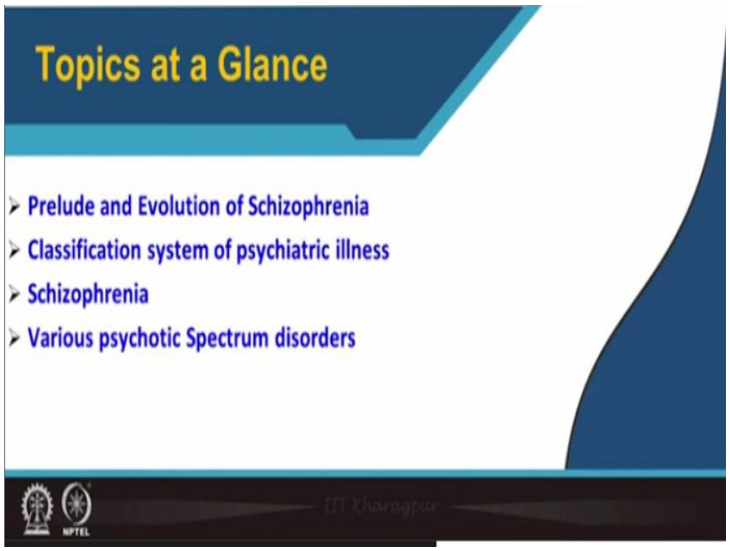

Let us look at the topic that we will be discussing. Prelude and evolution of schizophrenia. Classification system of psychiatric illness, schizophrenia, various psychotic spectrum disorders.

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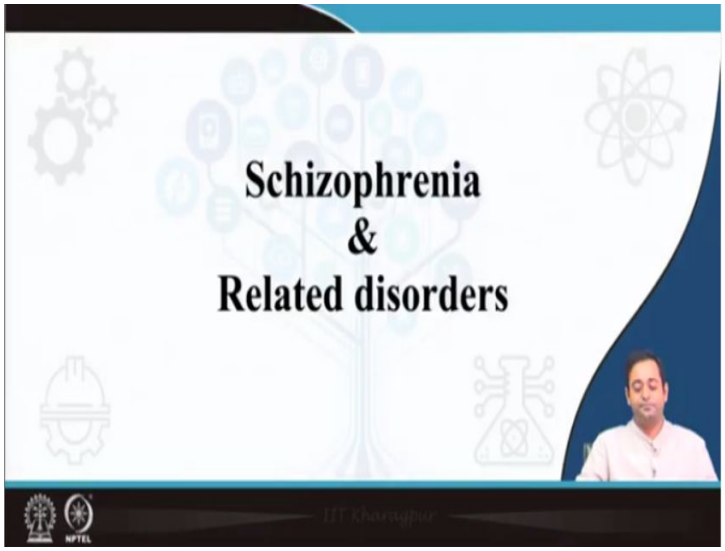

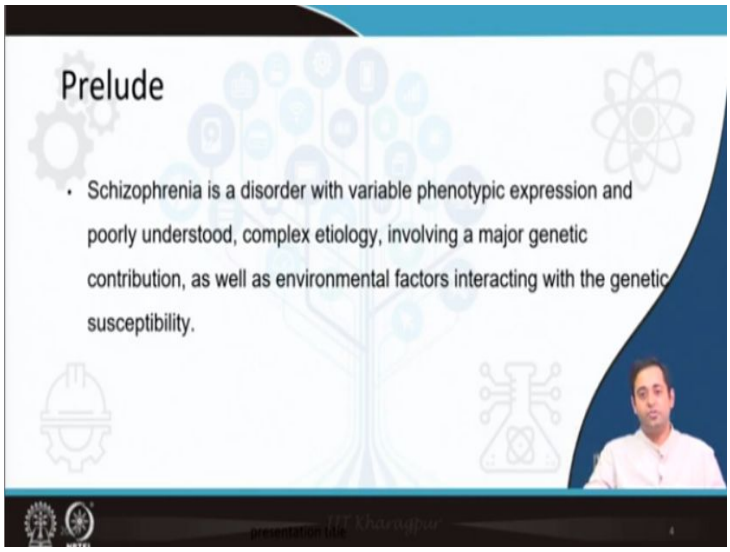

What is schizophrenia? Schizophrenia, as we all know is a disorder with variable phenotypic expression and poorly understood complex etiology. It has multi multifactorial etiology, involving a major genetic contribution as well as environmental factors interacting with the genetic susceptibility.

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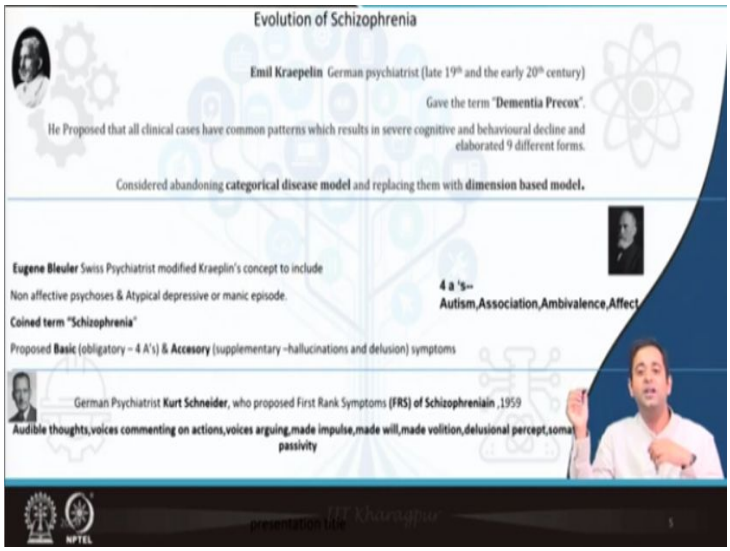

Now, there are various psychiatrists which have actively contributed in this evolution of schizophrenia. Let us try to look at them. Now we will, we will first start with Emil Krypton. Now, he was a German psychiatrist who in, in the late nineteenth and twentieth century gave the term Dementia Precox. And this Dementia Precox actually came from Dementia Precox which, was actually given by Benedict Morel. He was a French psychiatrist.

So, this Emil Krypton proposed that all clinical cases have common patterns which results in severe cognitive and behavioural decline, and they elaborated into nine different clinical subtypes. He was the first person who actually, considered abandoning the categorical subtypes and replacing them with the dimensional disease model.

So, categorical subtypes means they are ways, various subtypes, which has become obsolete right now that catatonic schizophrenia script, simple schizophrenia, hyper phrenic schizophrenia, paranoid schizophrenia. So, he actually wanted to replace them with the dimensional model. Dimensional model actually has the illness which is on a continuum basis. There is no separate distinction between the, this, severe subtypes of schizophrenia.

So, what was Bleuler telling? He was a (psych) Swiss psychiatrist. He actually modified the concept of Kraepelin to include non-effective psychosis and a typical depressive or manic episodes. Now we will talk about this bipolar concept, manic and depressive episodes later on. He gave the concept of the, he called the term schizophrenia and, propose the basic and accessory symptoms.

Now, as we better known as the basic symptoms, as we are better known as four a's, which is very commonly known, four a, the first a is autism, association second, third is ambivalence and the last is affect. Now the third person was Scott Schneider. He was a German psychiatrist. He gave the pro, like he proposed the first rank symptoms of schizophrenia.

The first rank symptoms were audible thoughts, voices commenting on actions, voices arguing, made impulse, made will, made, volition, delusional percept and somatic passivity. Let us talk about this in very brief. Somatic passivity is when the patient is actually experiencing thisma feeling that somebody is controlling my body.

So, your body is so here and you have been passively controlled, active, and passive. So, active is, when you are actively doing it, I am holding this pen. I am actively holding this, this pen, and passively means somebody else is doing it. There is an external, a agency or force, which is actually behind this, lifting the pen. So, I am being passively controlled. So, there is somatic passivity.

What is delusional percept. Delusion percept is, there is two membernance. Two things which is happening with the delusion percept. First is you have a perception, a normal perception, and then you have a delusional misinterpretation of the normal perception. So, there, there might be something that, I might be having a normal perception of this, driving in a (tra), I

am driving my car and I am on onto some traffic signal. So, there is a red light in the traffic signal. So, suddenly I see that red light. I see, this red light is because of something which is going to have effect on me. Somebody is going to come and kill me. Now suddenly this light is red switched on, so I will be getting persecuted or I will be getting harmed, or I will be getting killed. So, they will have self referential ideation. That is dilution percept, two memberednence.

Made will, made volition, made impulse. So, this is a made phenomena where you have impulse, this impulse are not me because of me, it is the external agency, external force which is actually making this impulse. Made volition means what if I am trying to get up from here, if I am going, if I am trying to walk. So, this evolution is not because of me, I am not doing it. There is some external agency, external force, which is actually making me to do this.

Likewise, you have audit audible thoughts. Audible thought means eco. I was, referring, that, if you have first person auditor hallucination, that means your thoughts are being echoed. These are audible thoughts and voices commenting on action means you have second person auditor hallucination. There is somebody and he is talking, he is commenting on your actions. Suppose you are lifting this pen. So, there will be voices in my ear that see this person is lifting his pen. So, I am being referred as a second person and the person who is being commenting on my action is the first person.

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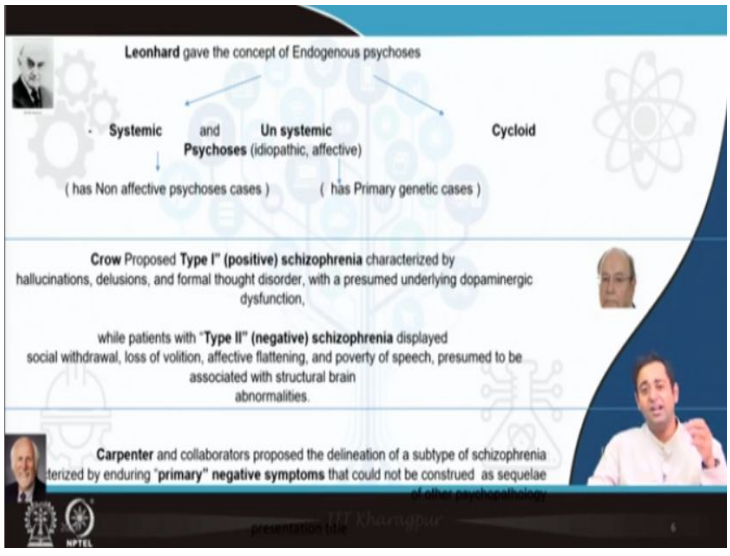

There was just another person Leonhard. Leonhard gave the concept of endogenous psychosis. So, he divided this endogenous psychosis into systemic, unsystemic and cycloid

psychosis. Now, systemic was actually having the non-effective psychosis cases and unsystemic had the primary genetic cases. Crow proposed positive and negative schizophrenia.

Positive schizophrenia means you have all those positive kind of feelings, means delusions, hallucinations, formal thought disorder. So, and the second is negative. That is type two. Type two is when the patient is having negative symptoms. When you are actually not involved, you are not actually conversating with your friends, your families, you have a self-absorbed nature.

You are not having good quality speech. The content of speech is very, very low. So, these are negative symptoms. Third is what the Carpenter gave the concept of primarily negative symptoms. So, there is no positive symptoms at all and there is predominant of negative symptoms.

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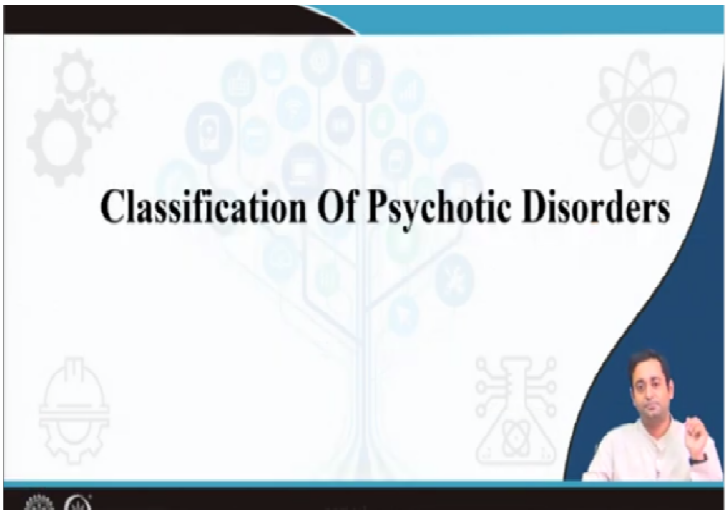

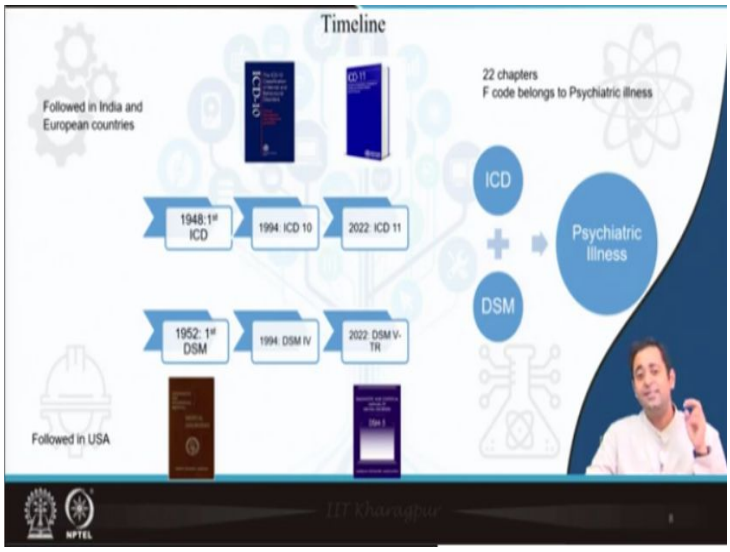

Let us look at the classification of psychotic disorders. Now this classification is basically done by this classification system is given by two, two bodies. One is ICD, that is International Classification of Diseases, and the third is, second is Diagnostic and Statistical Manual of Mental Disorders.

So, DSM was given by American Psychiatric Association and ICD was given by WHO world Health Organization. ICD is basically for India and European countries, and DSM is in American continent. There are 22 chapters in ICD and the F code in ICD belongs to the mental and behavioural disorders.

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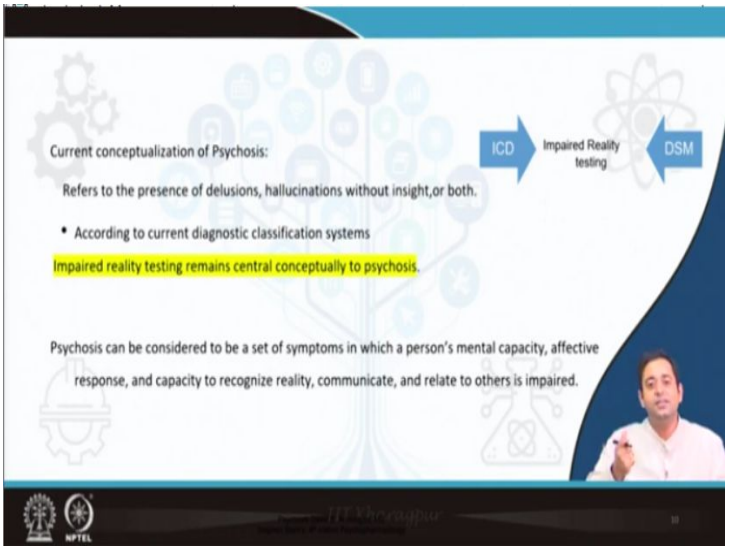

Now, what is psychosis? We are actually talking about what is the basic reason for having, how can we tell that, this patient is psychotic. Now there has to be an impaired reality testing. Impaired reality testing remains a central conceptual to psychosis, and this is actually being proposed by both the bodies, ICD and DSM. They actually give this impaired reality testing as a predominant reason to tell that this person might have a psychotic illness.

Now, what is a psychosis? It can be considered to be a set of symptoms in which a person's mental capacity, effective response and capacity to relate and recognize the reality communicate with others is actually impaired.

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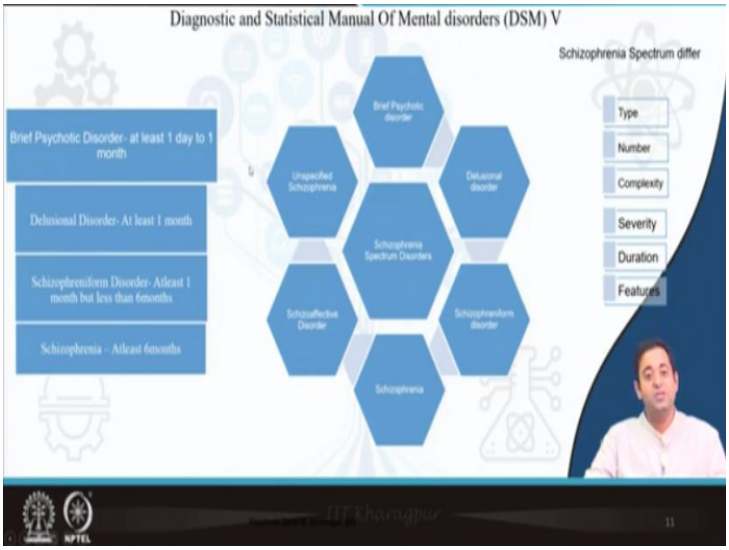

There are various, different types of ice, psychiatric disorders and the both the classificatory systems they have their own way of describing them. So, in DSM, these all psychotic

spectrum disorders are, they are deferred in terms of type, their number, their complexity, severity, duration, and feature. Brief cycle disorders is the duration is one day to one month. Delusional disorders, at least one month. Schizophrenia form is 1 to 6 month and in schizophrenia it is at least 6 months.

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So, there is a slight difference in ICD, the ATPD what we tell in ICD is actually acute transient psychotic disorders. It is same as root psychotic disorder in DSM. So, there you have 1 day to 1 month, but here in ICD you have 1 48 hours to 1 month. P persistent delusion disorder is 3 months. In DSM you have at least 1 month. So, the duration criteria is different for both the bodies. There in DSM you have 6 months schizophrenia. But here in in ICD you have 1 thought more than 1. Schizotypal is at least 2 years. So, in ICD schizotypal is recognized as a personality disorder.

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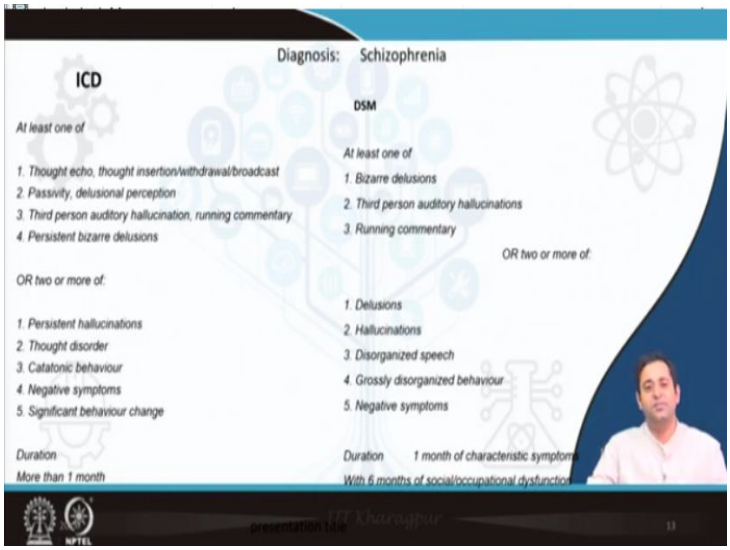

Now there are various diagnostic criteria given by both the bodies ICD and DSM.

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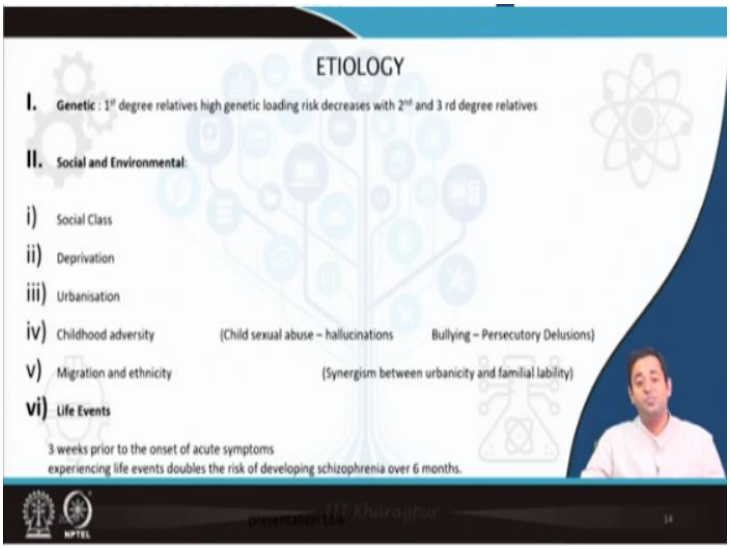

Let us come to etiology. Now there are multifactorial reasons. There are multifactorial reasons for the development of schizophrenia. It is not that a single gene is responsible for schizophrenia. There are pool of genes and this pool of genes actually is responsible in a collective fashion. So, it is not just one gene, which we actually, have this notion, this is the gene which is responsive for skills schizophrenia.

So, till now the studies have been done and they are of a proposition that there is no single gene which is causing (skill) schizophrenia. What are the social and environmental factors? Social class, deprivation, urbanization, childhood adversity. In childhood adversity, the child

sexual abuse in early ages. If child is getting undergoing sexual abuse later on when the schizophrenia develops, there can be more of hallucinations rather than delusions. And if the child is getting bullied, there are evidences, there are literature available which tells that if the child is getting bullied early on, there can be development of persecuted delusions rather than hallucinations.

There is a contribution of migration and ethnicity also. Next year's life events three weeks prior to the onset of acute symptoms. Now this three weeks prior to the onset of acute symptoms holds a very important significance in experiencing life events which doubles the risk of risk schizophrenia over 6 months.

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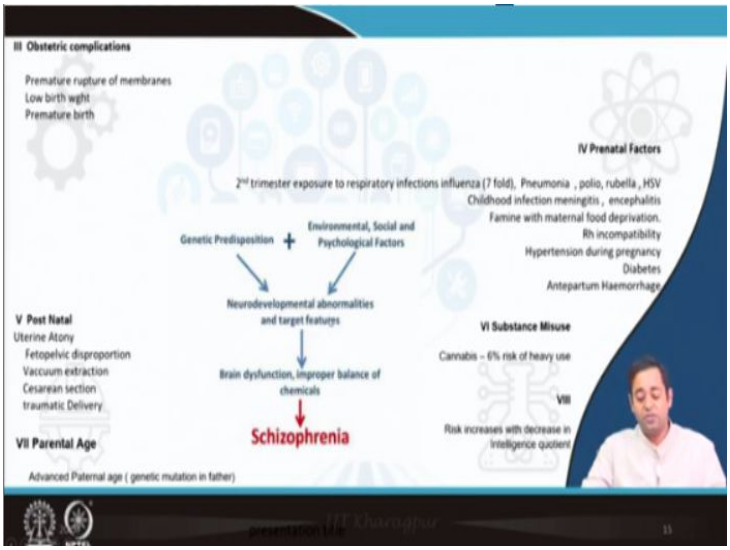

There are various other reasons, obstetric reasons, while the child is getting born there is they can be premature rupture of membranes, low birth weight, premature birth, postnatal causes various obstetric reasons. Feto, fetal pelvic proportion, dis disproportion, traumatic delivery, cesarean sections. All these contribute to development of schizophrenia. Parental age is a very important thing. Advanced paternal age, which has a genetic mutation which, which has this important contribution in development of schizophrenia.

Next you have prenatal factors. In prenatal factors, it is the respiratory infection, specifically influenza infection which holds sevenfold more times the other respiratory infection which causes schizophrenia. Pneumonia, polio, rubella HSB as we all are contributory factors. RH incompatibility, hypertension during pre pregnancy, diabetes, antepartum haemorrhage. These all contribute.

Substance misuse among all the substances. Smoking that is tobacco and cannabis, they add to the development of schizophrenia. And lastly, risk increases with the decrease in the intelligent quotient. So, as you see, there is genetic predisposition, environmental, social and psychological factors. They act in synchrony to develop schizophrenia. And how are this developing? It is a neurodevelopmental abnormalities and target features which actively contributes to brain dysfunction, improper balance of chemical.

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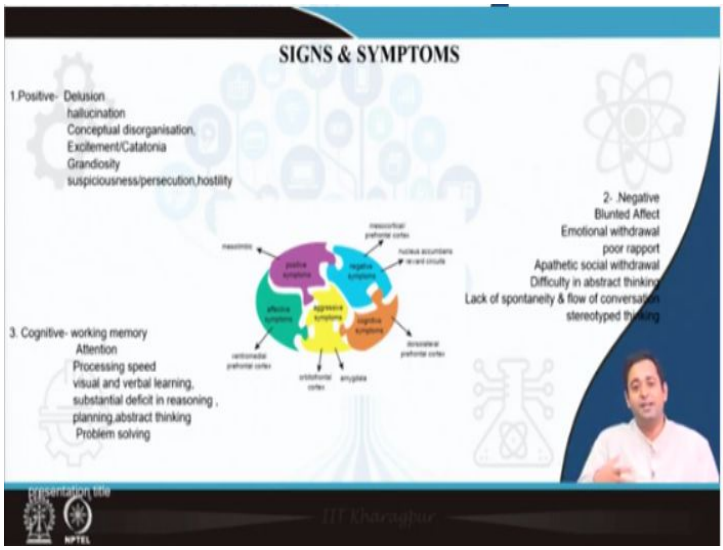

Now what are the signs and symptoms of schizophrenia? Positive symptoms. There are negative symptoms and there are cognitive symptoms. In positive symptoms we all know delusion is there, hallucinations, conceptual disorganization, patient is not able to think properly. There are, there is problem in the analyzing ability. There is catatonia. Catatonia is a very important neuro, neuro psychological condition which, happens or happen in schizophrenia as well as in biological this bipolar disorders.

So, in catatonia, patient might experience mutism negativism. There is equal aquip apraxia, there is posturing, all those kinds of things. There is severe suspiciousness and persecution which the patient might feel that he or she might be persecuted or there are persons after him. When you are talking about negative symptoms, there there can be a (hell), there can be a lot of host of reasons where patient might experience this negative symptoms in the form of blunted effect.

They are very dull. They are very, very sulky. They do not interact with their family members, their family, their friends at school and college or when you are at at your workplace there is no rapport with your fellow mates, your families and there is difficulty in

communication. You are not able to communicate properly. So, these are the things which actually contribute to negative symptoms.

What are the cognitive functions? Cognitive function means you are not able to do your normal calculations, your processing speed, your learning ability, your memory. These all get affected very sequentially.

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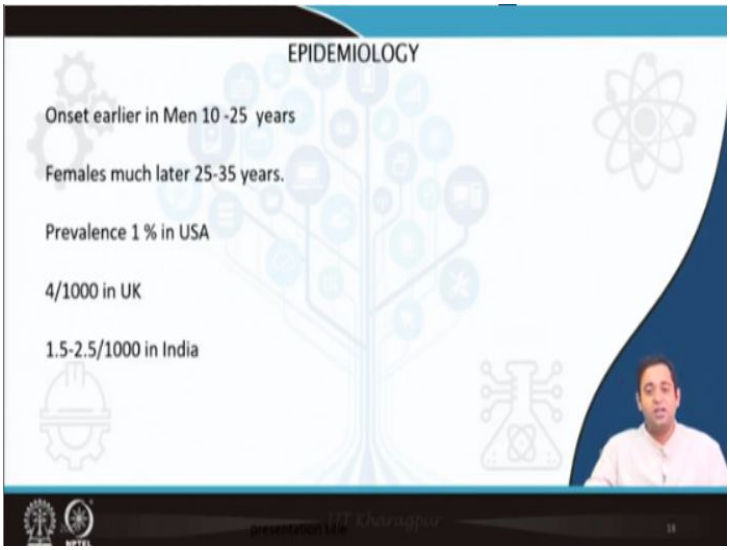

Let us look at the epidemiology. Onset is early in male and females, it is in much later course. USA you have one person prevalence, UK it is 4 and 1000 and in India it is 1.5 to 2.5 per 1000 percents.

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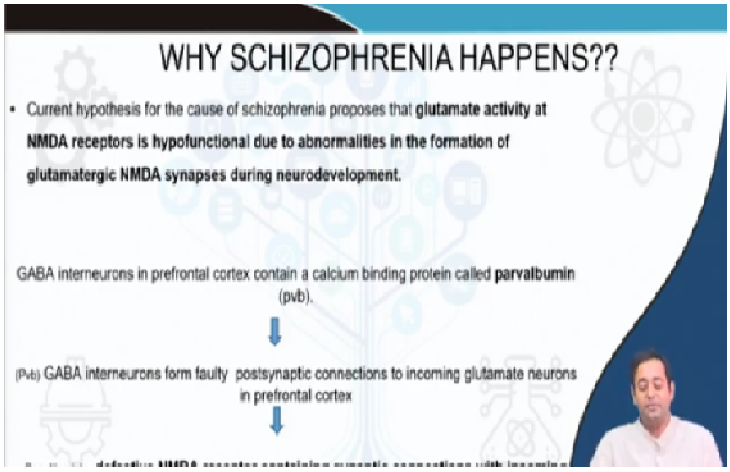

Now why is schizophrenia happens? Current hypothesis is because of the glutamate activity that is NMDA receptors is hyper functional due to abnormalities in the formation of glutamatergic NMDA in its synapses During neurodevelopment. This GABA interneurons in prefrontal cortex contains a calcium binding protein called parvalbumin. Now this parvalbumin GAVA interneurons form faulty connections to incomming glutamate neurons in prefrontal cortex. This results into defective NMDA receptor synaptic connections with the incoming pyramidal neurons.

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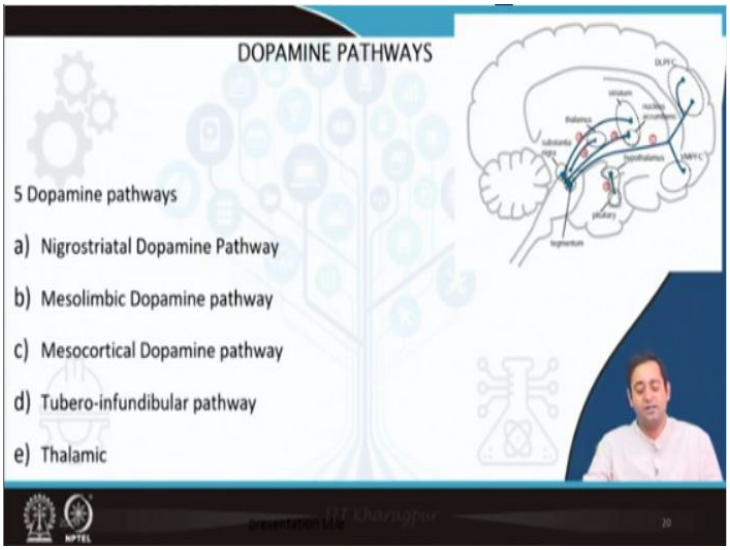

There are five dopamine pathways in the brain; nigrostriatal, mesolimbic, mesocortical, tubero-infundibular and thalamic.

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Mesolimbic pathway is basically which projects from ventral tegmental area. This is ventral tegmental area to the brain nucleus accumbens in the ventral striatum. And this is involved in emotional behaviours which is believed to be the predominant reason for the positive symptoms of psychosis, which actually leads to hyperactivity and is accounting for delusion and hallucinations.

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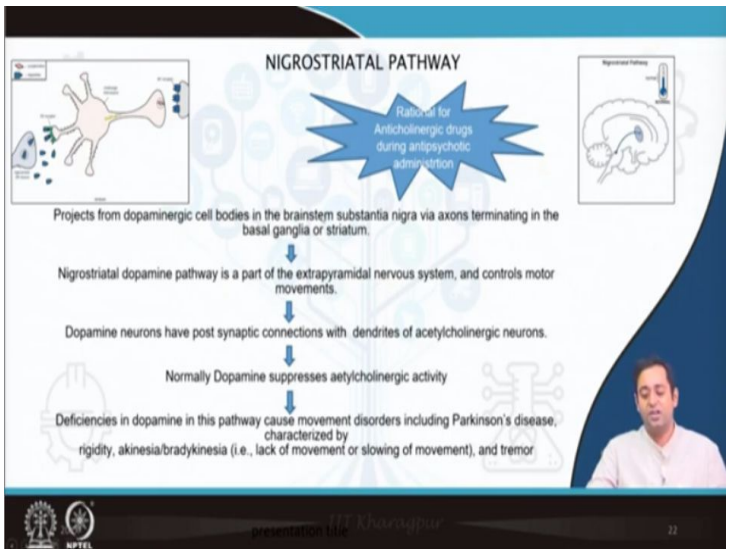

Nigrostriatal pathway. This projects from dopaminergic cell bodies in the brainstem sub substantial nigra via axons terminating basal ganglia or stratum. These, this nigrostriatal pathway is actually the extrapyramidal nervous system which controls the movement. So, this dopamine neurons, they have a postsynaptic connections with dendritic acetylcholinergic neurons. So, they are under feedback negative inhibition. So, dopamine is more, the dopamine is actually trying to control the acetylcholi.

So, what is happening when we actually try to treat patients, this psychotic patients, we actually give antipsychotics. So, antipsychotic they decrease the level of do dopamine and eventually when this dopamine is decrease, so there is release in there is feedback release of this acetylcholinergic levels which actually results into extrapyramidal symptoms in the form of tremors and (reg) rigidity. That is why the rational for anticholinergic drugs during antipsychotic administration is this pathway which actually contributes to the movement disorders.

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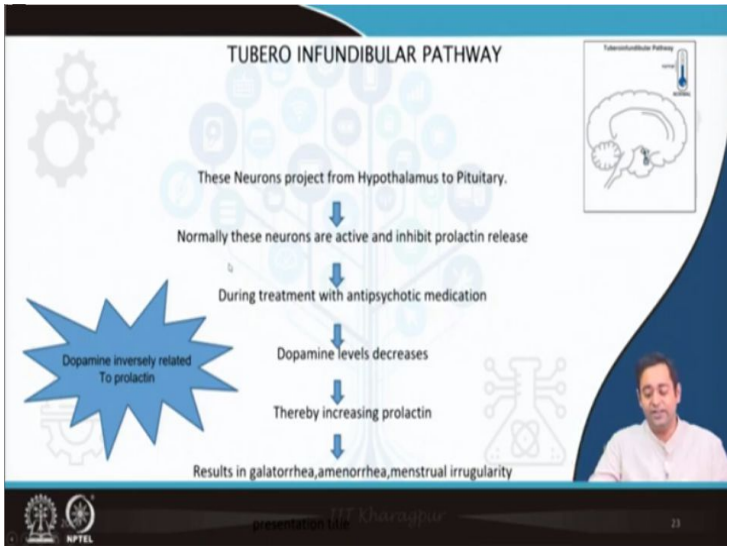

What is tubero-infundibular pathway? These neurons project from hypothalamus to pituitary. These neurons are active and they are actively inhibiting the prolactin release normally and during treatment with antipsychotic medication, dopamine level decreases, thereby increasing the prolactin levels. So, normally this dopamine is inversely related to prolactin. So, when antipsychotic medications are given, they actually decrease the dopamine level. So, when the dopamine level is decrease, prolactin is inversely increased, which later results into galatorrhea, amenorrhea and menstrual irregularities.

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Let us talk about mesocortical pathways. Mesocortical pathway basically governs ventromedial pathway and dorsolateral prefrontal cortex and ventable prefrontal cortex and

dorolateral prefrontal cortex is basically responsible for cognitive and exhibitive functions. And ventromedial pathway is basically responsible for emotional and effective functions.

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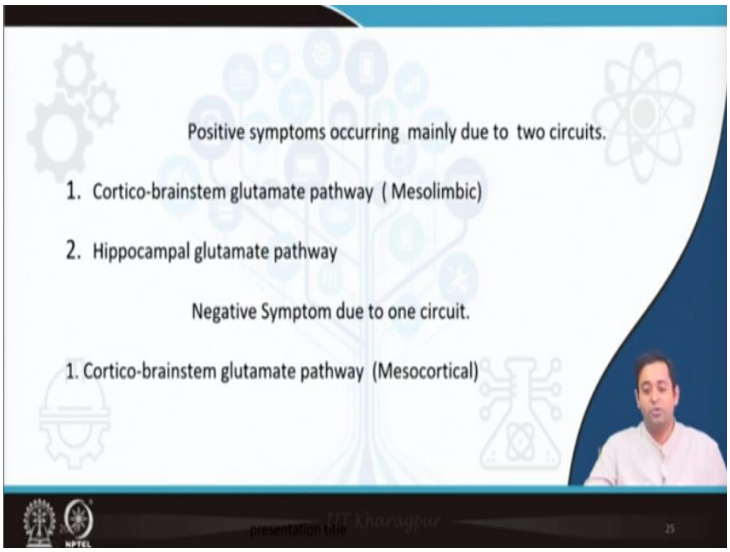

Now why is this happening? Why positive symptoms and negative symptoms? Positive symptoms is basically due to two circuits; from cortex to brainstem glutamate pathway and the second is hippocampal glutamate pathway. And the negative reason is due to cortical brainstem glutamate pathway.

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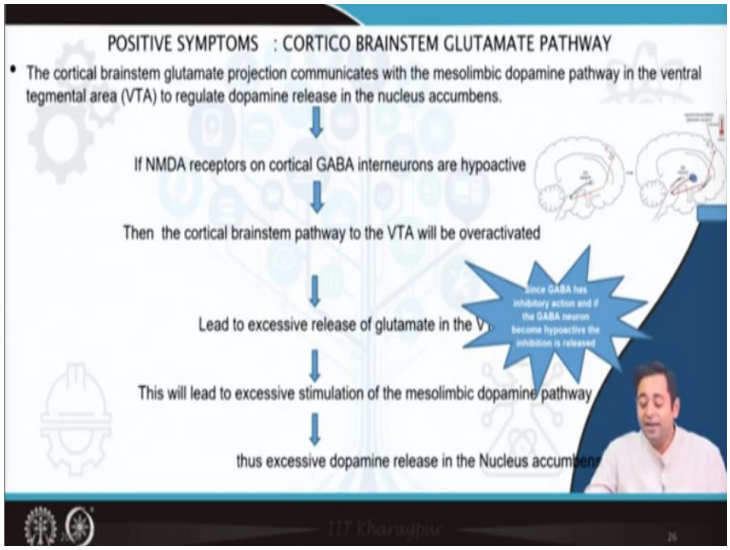

Now what is happening when it is contributing to positive symptoms? Most important reason is cortical, cortico brainstem glutamate projections communicates with the mesolimbic dopamine projections in the ventral tegmental area to regulate dopamine release in the

nucleus accumbens. If NMDA receptors on cortical neuro neurons are hypoactive, then the cortical brainstem pathways of VTA will be overactive, which leads to excessive release of glutamate and excessive stimulation of mesolimbic dopamine pathway, which causes excessive dopamine release in the nucleus accumbens.

Now since GABA has inhibitory reaction and if this GABA neuron becomes hypoactive, the inhibition which was there in the cortical area is released and that is why it leads to increase in the dopamine in the VTA.

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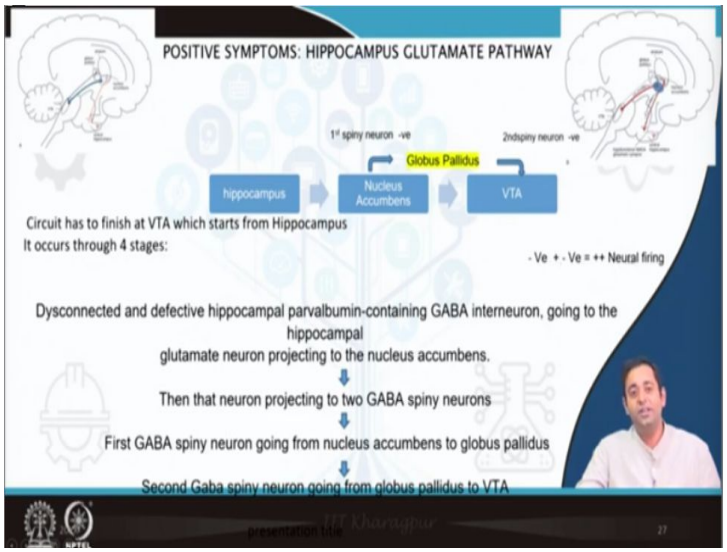

Now there is another pathway circuit which actually (res) contributes to positive symptoms. This is from hippocampus to VTA. There is a disconnect and defective hippocampal parvalbumin connecting deep GABA interneurons going to the hippocampal glutamate neuron, which is projecting to the nucleus accumbens. Then that new neuron projecting to two spiny neurons. So, this is presenting two two GABA spiny neurons. So, they both are under negative inhibition.

So, first GABA spiny neuron going from nucleus accumbens to nucleus globus pallidus from here to here. Second GABA spiny neuron going from the globus pallidus to VTA. So, you have two negative pathways which are getting cancelled off inhibited. So, they become positively. So, there is excessive firing of the neural impulses which leads to your delusions and hallucinations.

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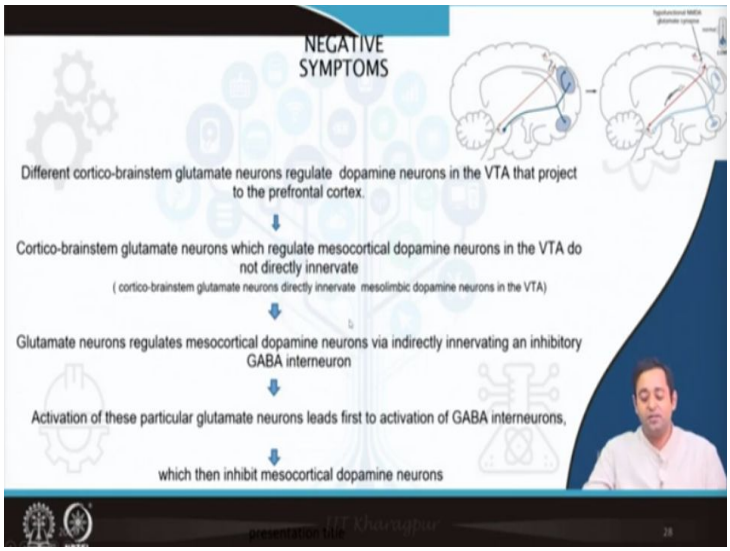

Now what is the reason behind the negative symptom? Negative symptom is caused by cortico-brainstem glutamate neurons regulating dopamine neurons in the VTA that project to the prefrontal cortex. The cortico-brainstem glutamate neurons which regulate mesocortical dopamine neurons in the VTA do not directly innervate. They do so by in indirectly innervating an inhibitory GABA neuron.

So, there you go. Initially if you compare it with the positive symptoms there you have two negative pathways which were being negated. So, there you have a heightened positive neural impulse. Here you have a normal neural response which is being inhibited. So, there that is why in mesocortical area, the dopamine levels are less and which contribute to negative symptoms.

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Radiological findings of schizophrenia, you have loss of brain volume, cerebral cortex, thalamus, basal ganglia all in reduced, leads to reduced density of axon, dendrites, which is because of excessive crooning of the synopsis in adolescence. MRI findings are suggestive of size of the amygdala hippocampus. They all are decreased and there is dilation of these cerebral ventricles.

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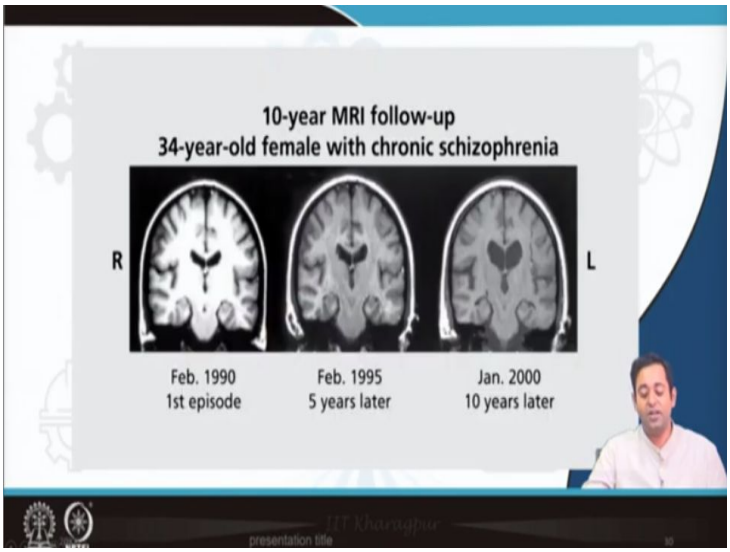

So, you can see in this figure there is sequential dilation of the cerebral ventricles. There is atrophy of the white matter and this is observed. This is a MRI which is being followed up for a female from 34 years. So, this is a sequential increase in the size of the cerebral ventricles and there is sequentially increase in the atrophy of the soft tissues.

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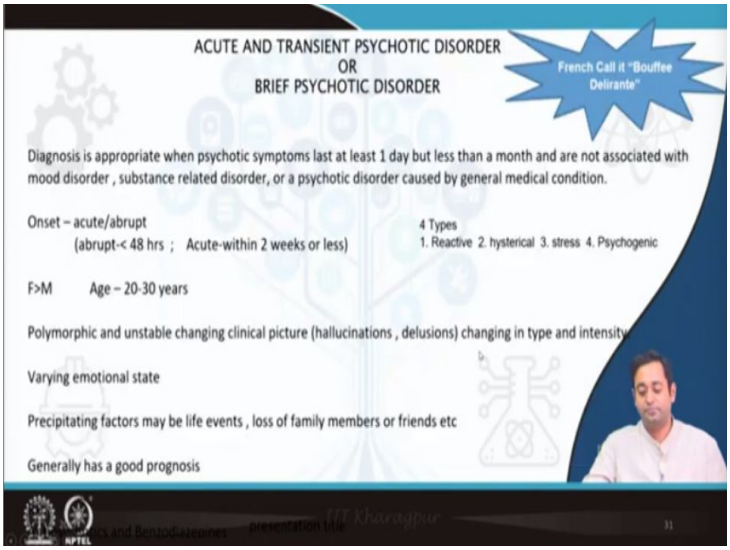

Let us talk about acute and transient psychotic disorders. Diagnosis is appropriate when psychotic symptoms last for at least 1 day and but less than a month and are not associated with mood disorders, substance related disorders, psychotic disorder or caused by a general medical condition. Onset can be abrupted within 48 hours or acute within 2 weeks or less. There are several subtypes, reactive, hysterical, stress induced and psychogenic.

Females, they are most commonly seen and age group is 20 to 30 years. Polymorphic and unstable, rapidly changing delusion and hallucinations can be delusions, can be hallucination, can be both, variation, there can be variation in the intensity also. Precipitating factors can be life events, loss of fam, family members or friends. Generally has a good prognosis. The treatment is antipsychotic for this patient.

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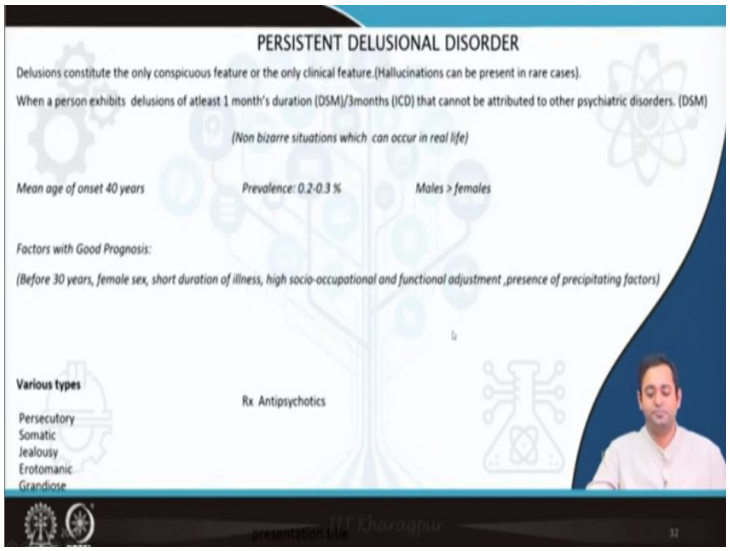

In persistent delusional disorder, you only have a can speak with picture that is delusion, which is constantly present. Here the psychosocial impairment is not present. The patient actually is freely mobile and he is capable of doing his all day-to-day life activities. Mean age of onset is 40 years. Prevalence is 0.2 to 0.3 percent and it is most commonly seen in males. Factors with good prognosis of persistent delusion disorder. Females if they are of 30 younger than 30 years, short duration of the illness. And yes, they have a high socioeconomic adjustment with precipitating factors giving rise to this psychotic process.

There are various subtypes, persecutory, somatic, jealousy, erotomania, grandiose. Persecutory when you have been followed by somebody else. Somatic illusions, when you have some delusion developing that you might have, a tumor developing inside your stomach. You have a tumor developing inside your throat or your lungs are collapsed or something is happening in your body. Jealousy is when you develop kind of jealousy towards your spouse that you have the spouse has extramarital affair.

Erotomania is when you are in love, the person is in love with somebody else who belongs from a higher socioeconomic state. And grandiose is when you have a feeling of richness. Those, heightened power you have skills which is not being acquired by somebody else.

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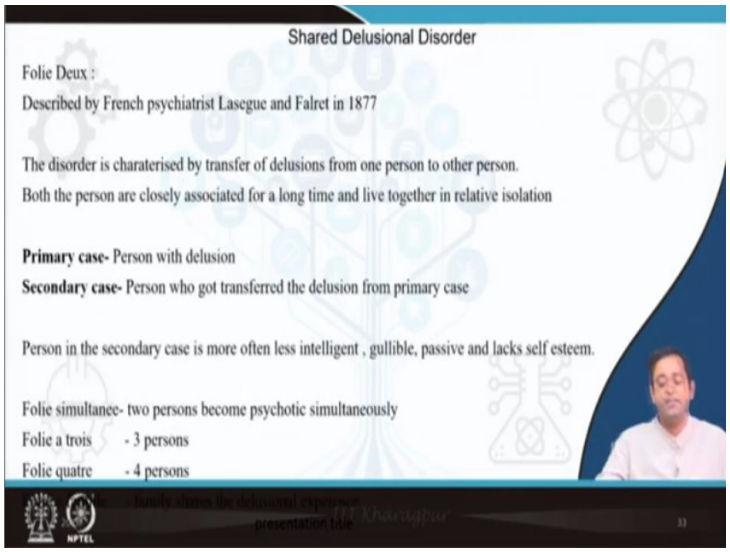

Next is shared delusion disorder. So, shared delusion disorder is basically described by French psychiatrist. First time by French psychiatrist Lasegue and Falret in 19 88, 87, 77. This disorder is characterized by transfer of delusions from one person to another. Both the persons are closely associated for a long time and they live together in relative isolation. So, primary cases, is a person which is harboring the delusion and secondary case, which he transfers it to the other person.

So, folie simultance is when you have two persons psychotic simultaneously. Folie a tro is when 3 persons and quatre is when you have 4 persons who is harboring the delusion. Treatment for this shared delusion disorder is separation of the primary case from the secondary case and obviously antipsychotic treatment.

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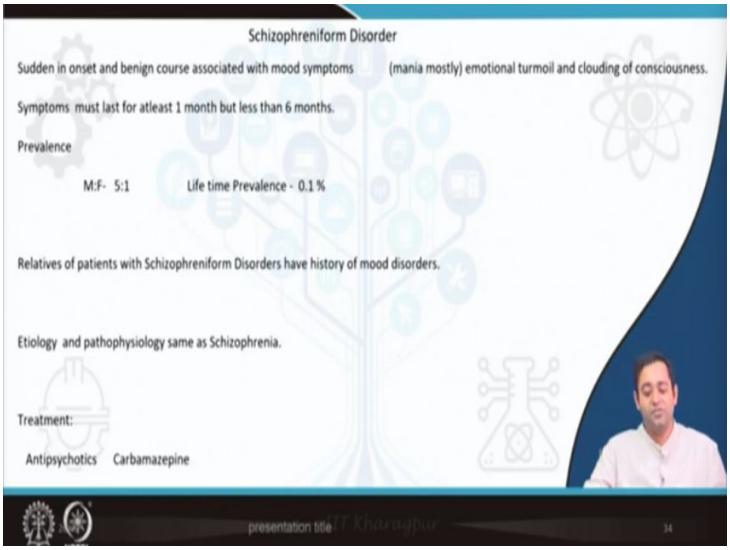

Versus is what is schizophrenia from disorder. It is sudden in onset benign cords associated with mood symptoms, emotional turmoil and clouding of consciousness is present. Symptoms versus persist must last for at least 1 month but less than 6 months. Prevalence is 5 is to 1 and lifetime prevalence is 0.1 percent. Etiology and pathophysiology of this psychological is same as schizophrenia and treatment is antipsychotic.

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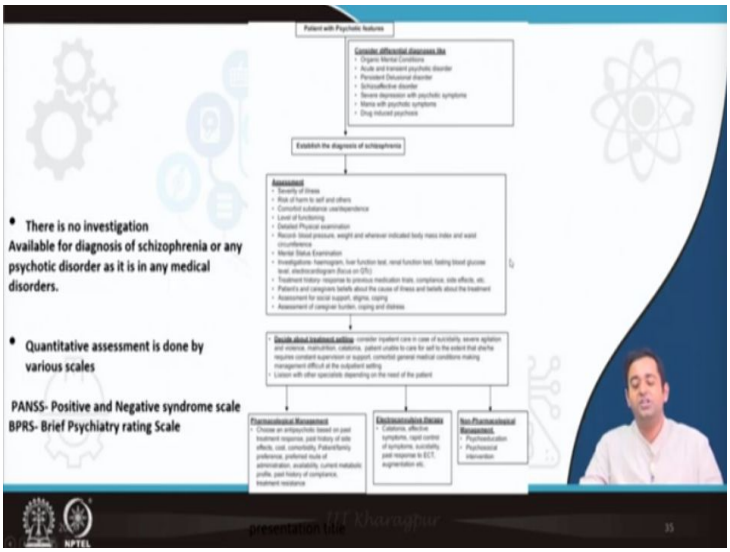

Now since there is no investigation available for schizophrenia or any other psychiatric illness, because as we see in medical disorders, you have a lot of variety of investigations to prove or to have a confirmation that this patient might be suffering from this medical disorder. Whereas, in here in psychiatry, we do not have any kind of confirmatory

investigation, which is which actually with these patient might be suffering from schizophrenia, bipolar depression.

But yes, you have a assessment. You can actually quantify the psychiatric disorder with the help of some quantitative assessment mythologies. Like here in schizophrenia or various other psychotic spectrum disorders, it can be quantified with the help of some scales that is BPRS psychiatric rating scale or PANSS that is positive and negative syndrome skill.

Now this is a chart which actually, when the patient is assessed, when the patient is being assessed and a protocol is being formed on how to get patient treated, we actually follow certain guidelines. So, patient, if at all, he is having a psychotic symptoms, so there has to be a differential diagnosis there. These are the differential, these are the queries that patient might have, patient might be suffering from. These are disorders that the patient might be suffering from. This can be the variety of other explanations, other disorders.

So, we need to rule out those other disorders. There can be organic mental conditions which can give rise to psychotic process. We have ATPD, acute transmission, psychotic disorders. You have schizophrenia, you have drugs related to psychotic conditions. You have severe depression with psychotic condition or mania with psychotic features. So, we have to get confirmed that, the psychotic disorder, which we are dealing with the patient is this. And after getting confirmation we should proceed with the illness.

So, establishment of, if we are a 100 percent sure that, the person we are dealing with is having a symptoms of schizophrenia, we should move in line of initiate the treatment in the lines of schizophrenia. So, there are various assessment that has to be done. The severity of the illness has to be assessed, the risk has to be assessed, comorbid substance abuse, if the patient is taking some kind of addiction smoking, cannabis, all these things are actually being associated with the schizophrenia.

There is detailed physical examinations to rule out any other problems with the patient might be suffering, which is actually contributing to this schizophrenia or is being actually not looked after. Mental status examination, investigations, various investigation, blood investigations that has to be done. Caregiver. So, you have to take a definite and elaborative history from the caregiver that if the patient is psychotic, he will or she will not be able to give his or her problems to you. So, for that, the caregiver has to be perfectly probed and ask what are the problem your patient is suffering from.

Assessment of the caregiver support, the coping mechanism, the skills which the patient have or the caregiver has according to this as far as the psychiatric illness is concerned. Decide about the treatment setting, whether the patient is very violent or he can be managed in the OPD. Then last is the treatment part. Treatment part consists of psychological as well as the pharmacological treatment. So, psychological treatment will be discussing in other lectures and in, pharmacological we be there are various anti-psychotic, typical atypical anti-psychotics along with benzodiazepines and anxiolytics in order to calm down the patient's agitation, aggression.

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So, what have you learned in this lecture? We have learned that in order to have a uniformity between treating mental health professionals, two classification systems were formed, DSM

and ICD. The description of various psychotic disorders in brief, the etiology and pathophysiology of schizophrenia and the reason behind positive and negative syndromes along with the treatment regimen in very brief. Thank you.