Theories of Alcoholism

Though the society at large blames the individual for the use of alcohol, there are certain theories which explain an individual's inclination towards the use of alcohol. These theories explain the underlying pattern of behaviour seen in people who crave for alcohol which make certain individuals more prone to the usage of the substance than others.

Genetic Theory

The Genetic Theory of Alcoholism proposed by Jellinek (1960) states that alcoholism is a disorder influenced by genetic factors. It runs in the family through generations and those individuals who have a family ancestral history of alcohol use, are highly prone to become regular alcohol users. The notion that sees alcoholism as a genetic condition has been held from early days, since the time of the Greek Philosopher Aristotle, later supported by Bleuler in 1950. Research states that first degree relatives of people with AUD have four times more chance and second degree relatives have two times higher chance of becoming alcohol abusers (Edenberg, 2013). Sarason and Sarason in 1996 have stated that presence of multiple relatives having the habit of alcohol abuse can be taken as a marker to alert an individual who is at high risk for alcohol overuse and hence fosters chances of prevention.

Genetic Disorders and Alcohol Use

The Genetotrophic Etiological theory developed by Williams (1959) states that alcohol use is caused by a defect in the hypothalamus of the brain. This defect is genetically transmitted across generations and can hence be seen as a genetic cause of alcohol use. The Endocrine Etiological theory shows evidence for a deficiency in the pituitary-adrenocortical pathway, a dysfunction of the endocrine system, which causes hypoglycemia- lowering of blood sugar. Alcohol relieves this condition by elevating blood sugar levels, hence providing reinforcing effects for the individual, which intensifies the condition of alcohol dependence (Rachdaoui & Sarkar, 2013). Low level of thyroid hormone is also found to cause craving for alcohol (Balhara & Deb, 2013).

Alcohol-Prone Personality

Addiction to alcoholism is diagnosed as a disorder in the later stages of alcohol use or over use, but is seen as a condition which is often a symptom of an underlying personality shortcoming. Degeneracy is seen as a personality trait where the individual is generally weak and hence easily instigated to involve in socially inappropriate activities. Increased dependency of individuals on others for their existence is seen as another characteristic which draws the person to the use of alcohol when there is lack of other resources to depend on (Peele, 1990). Psychoanalysis views the lack of oral pleasure to be a cause for alcohol use (Jessor & Jessor, 1977) whereas, other researches identify external locus of control (Rohsenow, 1983), impulsivity (Tarter et al., 1985), values and beliefs of the individual (Jessor & Jessor, 1977) and lethargy (Ludwig, 1986) as causal factors.

Partial Suicide Theory

Menninger (1938) states that alcoholism is a type of suicidal motivation or need for self-destruction. Feelings of defeat, humiliation, insecurity, inferiority, helplessness and loneliness cause people to look for solace or a way of destroying themselves through self-punishment. Few alcohol abusers resort to the consumption of the substance as a way of shortening their life span when they feel worthless about themselves. Reduced alertness or vigilance also acts as a reinforcer to those who wish to forget their existence (Raja, 2011).

Behavioural Theory

Alcoholism as a learned behaviour can be explained through both Pavlov's theory of Classical Conditioning (1927) as a habit that the individual develops due to practice and Skinner's Operant Conditioning (1938) as a habit that is continued through the reinforcing properties of the substance. For new users the temporary 'high' produced by the substance and reduced state of consciousness act as a rewarding factor whereas for regular users, the reduction of withdrawal symptoms after consumption of the substance acts as the reinforcement. Friend's company and group drinking is also found to be an accelerant to the drinking behaviour of individuals (Raja, 2011). In addition, the Social-learning theory (Bandura, 1977) offers an explanation to addictive behaviour where, a vicarious reinforcement or learning by observation can be a cause of alcohol use and abuse.

Socio-Cultural Theory

Different social systems and norms set different standards for drinking where, the societal norms and values play an important role in the drinking behaviour of the members (Hunt & Barker, 2001). Dwight in 1965 had classified cultures into four types based on the terms of alcohol use into Abstinent culture- forbids use, Ambivalent culture- use is in conflict with the societal values, Permissive culture- use of alcohol is permitted and Over-Permissive culture- use is seen as a positive practice (Mandelbaum, 1965). Other factors that can be associated to the abuse of alcohol in a society are availability, urbanization, poverty, exposure, beliefs regarding the medicinal function and stress prevalent in the society (Raja, 2011).

Alcohol Use as a Disease

Alcohol use is considered to be an insidious disease with a chronic onset, manifesting both physiological and psychological damage. The view of alcohol use as a disease is present from the thirteenth century, also advocated by Rush (1784), the founder of modern psychiatry. The first scientific record stating alcoholism as a disease was published by Magnus Huss in 1849, a treatise titled ‘Chronic Alcohol Disease’, coining the term ‘Alcoholism’. The Yale’s Laboratory of Applied Psychology and the Fellowship of Alcoholic Anonymous (AA) founded in 1930 played a significant role in the advocation of alcoholism as a disease. The National Council of Alcoholism in 1944 was involved in educating people on the ‘Disease Nature of Alcoholism’ and the WHO in 1951 formally approved alcoholism as a disease (Raja, 2011).

The ‘Disease Model of Alcoholism’ defines alcohol use as a disease, externalizing its cause, to avoid blaming the individual for abusing alcohol. It helped alter the view of alcohol use as a crime to be punished and propagated the idea of seeing alcoholism as a disease requiring treatment as well as rehabilitation. This assisted the efforts of medical professionals in encouraging more number of alcohol users to seek treatment and expanded the treatment options across the world.

The ‘Disease Model of Alcoholism’ though widely accepted is also criticized as it exonerates, dignifies and excuses the over-use of alcohol. It encourages the use of alcohol as it provides an excuse for those who are dependent on the substance and also reduces the number of people abstaining from alcohol use, owing to its disease nature. Seeing alcoholism as a disease

and not as a behaviour reduces the onus on the individual who has developed the habit of abusing alcohol. It projects alcohol use as a medical condition, reducing the scope of being treated as a psychological problem. This might lead to neglecting the underlying character difficulties that the individual has. Defining alcoholism as a disease fails to account for the familial, social and economic damage caused by the condition, simplifying the complexity. In spite of the criticisms the disease model continues to exist, owing to the boost of hope and morale it provides to the individuals seeking treatment (Raja, 2011).

Phases in Alcohol Use

Jellinek (1960), known as 'Father of the Modern Study on Alcoholism' has stated the development of AUD to follow four stages. Though it cannot be stated clearly during which phase the individual progresses from an alcohol user to an abuser, it has been observed that alcoholism is a progressive disorder, with respective psychological and physiological damages occurring during each phase.

Pre-Alcoholic Symptomatic Phase

Here the use of alcohol progresses from social drinking to regular use, to alleviate daily tensions. Regular need for the substance and tolerance depends on the frequency of alcohol use by the individual. This phase can extend between several months to several years, varying from individual to individual. The individual loses his social inhibitions about the usage of alcohol during this phase and starts believing in the substance to be a reliever of frustrations.

Prodromal Phase

This phase involves progression of alcohol use to one of disorder, involving dependence. The user becomes obsessed with thoughts of drinking and denies his/her problem drinking behaviour. Black outs and alcohol associated amnesia are seen to develop during this phase and the individual might develop disorientation from his environment. He/she becomes a problematic character within the family, resulting in high risk for interpersonal issues, job loss and loss of social status. This phase might involve concealing the drinking behaviour from close circles, lasting from six months to four or five years.

Crucial Phase

Loss of control over the drinking behaviour and the development of withdrawal symptoms are the key features of this phase. The individual begins to use alcohol throughout the day to avoid the withdrawal symptoms and his life becomes alcohol-centered. He shows both remorse as well rationalizes his usage of alcohol and tends to find reasons for drinking. The individual shows lowered levels of self-esteem, showing behaviours such as borrowing money for buying the drink, loss of friends and relatives, job loss, bankruptcy, etc. He/she tends to use different types of alcoholic beverages in order to attain the reward experience and to reduce the withdrawal symptom. An insight that the drink is responsible for the challenges faced by the individual is developed. This leads to inferiority feelings and the individual becomes boastful and exercises power over spouse and children to showcase himself/herself as a perfect person, thereby blaming others for his problems and drinking behaviour.

Chronic Phase

Alcohol completely takes over the individual and he goes to any extent for obtaining the drink. He believes that alcohol is essential for existence, constantly keeping himself under the influence of it. Physiological damage is extensive and hence even lower doses of alcohol can lead to black outs or other serious consequences. The individual also tends to use multiple substances to compensate for the absence of the drink. He/she reaches a state generally referred to as the ‘rock bottom state’. He feels a void in self, friends, relatives, job, personal belongings, etc., losing conviction in totality.

Different views exist on the acceptance of the above phases of the addiction cycle. In some cases the individual does not go through the different phases, but remains a social drinker with controlled use.

Causes of Alcohol Use

Alcohol use as a habit and an addiction is caused by different factors and in most cases a combination of factors. The theories of alcohol use explain the patterns of occurrence, whereas the causal factors explain the influences responsible for the predisposition, precipitation and maintenance of the condition.

Genetic Factors

Having a family member addicted to alcohol can be a causal factor. First degree relatives increase the risk for incidence than second degree relatives. Though all relatives of alcohol addicts do not get into addiction, it possibly acts as a predisposing factor in AUD. Presence of genetic disorders in the brain triggers addiction and there is evidence showing the involvement of multiple genes. Differences in the levels of dependence, tolerance, craving and getting intoxicated are also found to be influenced by genetic factors. Neville of the Salk Institute at La Jolla, California found evidence for genetic differences in the P3 waves of the brain, responsible for decision making, between sons of alcoholics and non-alcoholics (Shuckit, 2006).

Physiological Factors

In addition to genetic factors, certain physiological factors can also cause vulnerability to alcohol use. Brain chemistry can be an important cause, where the levels of dopamine in the brain may be low due to interplay of various factors. Dopamine in its lower levels may lead the individual to feel unrewarded, to balance the effect of which, the craving for alcohol may be high. When an individual uses alcohol, his/her dopaminergic pathway between the ventral tegmental area and the nucleus accumbens gets activated (Addolorato et al., 2005). Studies show evidence for the role of dopamine in modulation of Thyroid Stimulating Hormone level, reflecting a relationship between the level of dopamine in the brain and the level of thyroid hormones T3 and T4. Though the relationship between levels of Thyroid Stimulating Hormone and other factors as a trigger for alcohol consumption has not been clearly established, it can be deduced that low levels of thyroid hormones also increase the craving for alcohol (Delitala et al., 1981; Cooper et al., 1983). Nutritional deficiency is another factor that causes craving for alcohol, where the lack of micro-nutrients in the body leads to mood irregularities, which in turn cause alcohol abuse (Salz, 2014).

Psychological Factors

A person's thoughts and beliefs towards alcohol play a major role in causing addiction in spite of being aware of the health hazards. This in turn shapes the emotions and behaviour of the individual towards alcohol, thus strengthening the need for consumption. Lack of self-control, decision making, problem solving and motivation combined with stress, inferiority and

impulsive feelings lead to the development of AUD (Horvath et al., n.d.). Other factors include curiosity, boredom, feeling grown-up, rebelliousness and experiencing the ‘high’ in using alcohol as a ‘feel good factor’ (Gopinath & Kishore, 2014). According to Freud’s theory of Psychosexual Development, lack of satisfaction in the oral stage causes fixation, leading to alcohol abuse (McLeod, 2017).

Psychosocial Factors

In the Indian context, major psychosocial factors include usage of alcohol by family members, peer influence, perception of alcohol use as a privilege of the male gender, seeing it as a symbol of social status and cultural beliefs. The social environment of an individual with high exposure to alcohol and ready availability of the substance are other causes. The media and advertisements play a significant role by establishing belief systems about alcohol use. It promotes the use as a means of celebration, relaxation and expression of emotions, both positive and negative, thereby justifying the anti-social behaviours of an alcoholic as performed by the substance and not by the intention of the individual. Lack of awareness among the general public on the harmful effects of the substance and lack of proper care at the vulnerable age of adolescence are additional causes for alcohol use (Gopinath & Kishore, 2014).

Alcohol and the Brain

According to Noble et al. (1991), Director, Alcohol Research Centre, University of California, the neuronal membranes consists of large particles of proteins in the midst of lipid molecules, the presence of which forms the cell structure. Neuronal receptors are present in between the molecules of proteins and fats, which when triggered lead to electrical transmission. When an individual consumes alcohol and it is imbibed by the neurons, the fluidity of these fat molecules increases, thereby leading to disorientation and disruption in the ion channels. This leads to reduced activation in the brain, producing a depressing effect on the brain. Regular usage of alcohol leads to adaptation in the brain, necessitating the requirement of alcohol to maintain normal functioning. This adaptation leads to tolerance as well as dependence on the substance. During abstinence, alcohol is removed from the system, causing inability of the ion channels to continue functioning causing hyperactivity in the brain leading to withdrawal symptoms (Noble et al., 1991).

The production of new protein molecules in the brain is also interfered by the presence of alcohol. The protein molecules are responsible for short-term memory, in the event of malfunction leading to memory lapses termed as ‘blackouts’. In addition, alcohol interferes with the process of neurotransmitter release and uptake mechanism causing imbalance in the hormones secreted by the brain. This can lead to decrease in the secretion of certain neurotransmitters and increase in others, thereby altering the body balance. Alcohol is said to produce different effects on the brain of different individuals based on their genetic makeup (Polich & Bloom, 1999).

Outcomes of Regular Alcohol Use

Alcohol is a tricky substance in both drawing an individual into the vicious cycle of alcohol use by the reward mechanisms and prohibiting the individual from refraining usage by the development of withdrawal symptoms. Alcohol is a leading cause of disease as well as death, bearing a number of negative effects to it.

Physiological Damage

Health concerns associated with heavy use of alcohol are liver cirrhosis, pancreatitis, heart diseases, cancer, ulcer, gastritis and malnutrition. It damages not only the vital organs but also the central and peripheral nervous system, thereby interfering with the optimal level of functioning. The skeletal and muscular systems get damaged leading to thinning of bones and frequent muscle cramps (Muller et al., 1985). Short-term use of alcohol is found to increase the risk of cancer and heart attack while long-term usage can lead to death caused by damage to internal organs (Cargiulo, 2007). Children and adolescents are more vulnerable to the physiological damage caused by alcohol in comparison to adults. Pregnant mothers who use alcohol are likely to give birth to babies with Foetal Alcohol Syndrome (Stevenson, 2005). Alcohol intoxication also increases risk of injury through accidents and violence (Salz, 2014).

Psychological Damage

Alcohol has a depressing effect on the brain and regular consumption of it causes a major depressive disorder. Suicidal thoughts and ideation are commonly seen in alcohol abusers. The risk of committing suicide has seen an increase of 20 percent amongst abusers in comparison to

the normal population with 75 percent higher success in completing the suicide attempt (Laatikainen et al., 2003). Dysfunction of the liver results in a condition termed 'Hepatic Encephalopathy', leading to non-removal of toxins in the blood, causing malfunction in the brain. This results in personality changes, emotional imbalance, disruption of sleep patterns and cognitive damage. Severe instances lead to the development of psychiatric disorders (Parsons, 1996).

Cognitive and Neuro-Functional Damage

Alcohol has a depressing effect on the brain which causes short-term effects such as slurred speech, distorted vision and hearing, impaired judgement, inability to concentrate, lack of coordination and memory loss. Regular usage of alcohol reduces the functionality of the brain due to contorted ion transmission channels which in turn impairs the cognitive functioning of the individual. Cognitive short falls are seen in areas of attention, perception, orientation, decision making, problem solving, judgment and language skills. Over-time, the frontal lobe of the brain gets damaged, impairing reasoning and rationalisation (Sabia et al., 2014). Black outs and memory lapses follow in the event of heavy or binge drinking (White, 2003).

Interpersonal Damage

Most regular users of alcohol were reported to possess qualities of being revengeful, cold, socially inhibited and unassertive. Problems with dominance and affiliation are commonly seen, where they exhibit extremes of the characteristics, based on their emotional state. Poor self-control in these individuals creates problems of emotional instability and impulsive expression of emotions, which damage interpersonal relationships (Martinsen, 2008). These individuals are often paranoid, misinterpreting the intention of others, resulting in strained relationships. The intensity of difficulty in interpersonal relationship is magnified by the interplay of criticism and blame between users and non-users (Reaney et al., 2008). Interpersonal damages are found to be a major reason for relapse into alcohol use in the first one year post treatment (Riemann, 2008).

Social Damage

The usage of alcohol by one individual in a family can impact the entire family, causing distress, emotional damage, loss of social status, lack of proper couple and familial relationships and deprivation of love and care from the family members. Profound instances lead to marital separation or familial discord, domestic violence and abuse of family members (Skrtic et al., 2008). Risk behaviours such as 'Drink and Drive', criminal attitude and inappropriate sexual behaviours perpetuate due to heavy drinking (Shand et al., 2003).

Economic Damage

The economic damage caused by alcohol can be viewed as either direct or in-direct. Direct expenses include the cost of the drink, medical expenses, expenses resulting from accidents or property damage and compulsive recreation. Indirect damage includes discontinuity in education, unemployment, penury and liquidated assets (Ray & Sharma, 1994). The dependent family members of an alcohol user encounter tertiary costs such as lower quality of life, poverty, lack of health and hygiene, illiteracy, child labour and unemployment which have an effect on the economic growth of the society (WHO, 2006). While sale of alcohol is a source of potential revenue, its consequences are detrimental to the growth of a healthy nation (Gururaj et al., 2005).

Legal Damage

Alcohol associated crimes and misconduct are very common. An alcohol user resorts to higher magnitude of risks than a sober person. A person with AUD, lacking self-control over his emotions and experiencing increased impulsivity becomes belligerent, quickly picking up a quarrel than his sober counterparts. Conflicts with the legal system include domestic violence, sexual offences, involving in extortion and financial mishandling at the work place. Procuring alcohol from unauthorized sources is a legal violation as well (Lal, 2005).

Characteristics of Alcohol Users

An alcohol user is generally depressed, disappointed, dishonest and defiant. They are sensitive to criticism with low frustration tolerance. A regular user of alcohol feels helpless, with low self-esteem, hence craving dependence on the substance as a compensatory mechanism.

They tend to isolate themselves from non-users for the fear of being criticized or questioned about their behaviour. Their constant craving for the substance keeps them on the lookout for reasons to drink, picking up even petty reasons such as a minor argument with spouse, low academic achievement of children or a difficult day at work (West, 2015).

Co Morbidity of Alcohol Use Disorder

AUD is generally co morbid with a wide range of psychiatric disorders. Alcohol use plays a significant role in disorders associated with anxiety such as social phobia, agoraphobia and generalized anxiety disorder; multiple personality disorder or dissociative identity disorder, eating disorders, mood disorders, stress and adjustment disorders, schizophrenia and personality disorders especially of cluster B. Long-term usage can also be associated with sexual disorders such as sexual deviations, pedophilia and performance anxiety (Carson et al., 2014). Psychiatric symptoms may lead to alcohol use or vice versa. Some psychiatric symptoms such as anxiety, hallucinations and depression can also occur as a withdrawal symptom when refraining from usage of the substance after a period of regular use (Preuss et al., 2017).

Gender and Alcohol Use

The difference in the physical built and genetic makeup of men and women reveals variations in the way they respond to alcohol (Giancola & Mezzich, 2003). The physiological differences such as strength of muscle tissue, types of body tissues, muscular in men and fat in women, and the hormonal changes during puberty make women more vulnerable to the effect of alcohol even when the consumption is in smaller quantities (National Institute of Alcohol Abuse and Alcoholism, 1993).

Schuckit and colleagues (2005) have compared the differences in the digestive abilities of men and women and have concluded that women are quick to absorb the alcohol content in the drink, thus making them easily intoxicated. Though women's system absorb higher levels of alcohol within a short duration, the female hormones speed up the breakdown of alcohol molecules, thus helping women to recover quickly from the alcohol-high when compared to men.

The brain of women is found to comprise of a greater volume of grey matter than the brain of men, hence making women more efficient at the cognitive level, even when under the influence of alcohol (Lenroot et al., 2007). Nigg et al. (2004) comparing the functioning of male and female brains when under the influence of alcohol found that the female brain continues to function effectively even under the influence of alcohol due to the increased number of synaptic connections in the brain. The reduced water level in a woman's body prevents the alcohol molecules from crossing the blood brain barrier, thus reducing the effect of intoxication on the female brain (Nixon, 1994).

Regular alcohol consumption causes hormonal imbalance in both men and women, due to the effect of intoxication on the endocrine glands, regulated by the brain. Changes in the hormonal levels and inadequacy of oxygen supply causes difficulty in attaining orgasm in both men and women. In men, chronic alcohol use causes shrinkage of the gonads, increasing the estrogen levels in the body, leading to the development of female secondary sexual characteristics (Thomasson, 2002).

Cultural beliefs, values and other environmental factors cause difference in the drinking behavior and patterns in the genders. In the Indian settings, familial norms, social beliefs, cultural practices and media, portray alcohol use to be generally associated with men than women, encouraging men to abuse the substance. Life style has led to view alcohol use as a status symbol among men and women of the upper class and as a sign of power and manliness among men of the lower class. The differences in the drinking behaviour between genders is further widened by parenting, inter and intra personal relationships, model learning and vicarious reinforcements (White, 2004).

Diagnosis of Alcohol Use Disorder

AUD is diagnosed using the criteria proposed by the DSM-V or ICD-10. The severity of the condition and the major symptoms involved are assessed using different psycho-diagnostic tools. The common tools in use are discussed as follows.

Alcohol Use Disorder Identification Test

The Alcohol Use Disorder Identification Test (AUDIT) is a ten-item tool used for screening aspects of the AUD such as amount of alcohol consumed, drinking behaviour and other problems related to alcohol use. It was developed by the WHO in 2001. The test consists of two forms, one to be rated by the clinician and the other as a self-rating form on the usage of alcohol. The tool is widely used both in the clinical setting as well as for research purposes. It has been validated across cultures and is translated in different languages. A short version of the AUDIT is the Fast Alcohol Screening Test, consisting of four items (Health Development Agency, 2002).

Alcohol Dependence Scale

The Alcohol Dependence Scale (ADS) developed by Skinner and Horn (1984) consists of 25 items with multiple choices .The individual is asked to respond according to his habits of alcohol usage in the past 12 months. The tool covers areas such as withdrawal symptoms, loss of control over the drinking behaviour, compulsive drinking, tolerance to alcohol and craving for it. The treatment formulation is developed based on the severity of the test scores. The tool is widely used for clinical assessment and research purposes, administered to adults as well as adolescents.

Michigan Alcohol Screening Test

The Michigan Alcohol Screening Test was developed under the National Council on Alcoholism and Drug Dependence of the San Fernando Valley, in the year 1971. The test consists of 24 items including areas such as social, vocational difficulties and family problems caused due to the abuse of alcohol. Shorter versions of the test are also available, consisting of ten items and thirteen items respectively.

Other tools widely used by clinicians in the diagnosis, measuring the severity, assessing level of damage and planning for management include the CRAFFT Screening Test (Knight, 1999), CAGE Questionnaire (Ewing, 1984), Form-90 (Miller, 1996), Drinker Inventory of Consequences (Miller et al., 1995) and the Alcohol Use Inventory (Horn et al., 1990). Further

diagnoses involve use of domain specific tools for assessment based on the needs of an individual client.

Treatment for Alcohol Use Disorder

The treatment for AUD is based on the suggestions of the American Society for Addiction Medicine. The management plan for AUD, be it inpatient care or basic counseling, is decided on the scores obtained on ADS. The scores obtained from ADS classify the level of dependence to decide the individual's requirement for inpatient care or basic counselling. The management strategies provided to individuals with AUD follow certain theories or schools of thought.

Pharmacotherapy

The 'Disease Model of Alcoholism', owing to the physiological underpinning of alcohol use, demands medical prescription to treat withdrawal symptoms as well as for reducing the drinking behaviour (Hebert, 2016). Three common drugs used for the treatment of AUD are:

Disulfirum. This drug is used to un-condition the pleasure associated with alcohol consumption. Consuming alcohol when under the influence of the drug inhibits metabolism of alcohol, causes feelings of nausea. This helps in unlearning the association developed between alcohol consumption and pleasure, paving way for a new association between alcohol consumption and unease.

Naltrexone. Naltrexone works on the opioid receptors in the brain, the activation of which produces pleasurable effects when alcohol is consumed. This drug inhibits the functioning of the opioid receptors and reduces the secretion of dopamine, thus lowering the euphoric-pleasure associated with alcohol consumption and also decreases craving for the substance.

Acamprosate. Acamprosate works on the glutamate receptors of the brain, leading to increased secretion of glutamate. The drug when taken during periods of abstinence regulates the normal functioning of the brain, reducing dependence and craving for alcohol, facilitating the individual to stay in sobriety for longer periods, thus maintaining abstinence (Robinson et al., 2014).

Detoxification

Sustained usage of alcohol causes changes in the body so as to accommodate the penetration of the foreign molecules into the system by bringing certain changes in the cellular system. Detoxification is a rapid reduction in alcohol consumption to neutralize the changes brought about in the cells and to remove the toxins in the body. When abstaining from alcohol, the body moves from a state of alcohol dependence to one of abstinence, paving way for withdrawal symptoms. Common withdrawal symptoms of alcohol include hypersensitivity to external stimuli, heightened reflexes and alertness, tremors, muscular tension, anxiety, sleeplessness and seizures. Detoxification is carried out on in-patients and very rarely in out-patients thus catering to patients away from medical risks.

Psychotherapy

Psychotherapy is employed in bringing about changes in an individual's alcohol using behaviour, through psychological means of managing stress and developing coping strategies. Common forms of psychotherapy include:

Psycho-Education. Psycho-education involves educating the individual on aspects of psychological importance. In the case of treatment for AUD, the individual is informed of the physiological, psychological and social complications caused by the prolonged use of alcohol. Case histories, sources of scientific knowledge and videos, either through one-on-one or group sessions are employed to impart psycho-education. The awareness created in the individual and his family encourages in refraining from alcohol abuse.

Aversive Therapy. Here, the individual who has a previous learning and conditioning regarding the pleasurable effects produced by alcohol is made to unlearn or uncondition this habit. Alcohol is usually paired with unrewarding situations like using medication to produce nauseating symptoms, punishing the individual by exposing them to undesirable activities such as social avoidance or elimination, rejection by family members, cutting-down on incentives at the work place, restricting the flow of money, etc. The individual therefore associates these aversive stimuli to alcohol as a negative reinforcement.

Cognitive Behaviour Therapy. Cognitive Behaviour Therapy (CBT) is employed in bringing about changes in the cognitions of individuals who abuse alcohol. It focuses on identifying and addressing potential thoughts, feelings and personality characteristics that cause the individual to involve in heavy or problem drinking. Techniques of CBT are used in training the individual to be more stress tolerant and in enhancing their coping skills. Therapy is offered individually or in group sessions, encouraging to help stay away from the drinking behaviour.

Motivational Enhancement Therapy. This is a short-term treatment model, where the therapist motivates the client to give up the drinking behaviour, involving four or five sessions. The positives and negatives involved in seeking treatment and the challenges that may arise are explained to the individual, making them ready to undergo the process. A treatment plan is constructed by the therapist following which the individual is trained and motivated to follow the therapeutic plan devised in order to refrain from the usage of alcohol. The individual is encouraged to maintain sobriety and handle stressors through practice of other safer alternatives like spending time with loved ones, engaging in physical exercises and recreational activities.

Brief Interventions. Brief interventions focus on the stressors encountered by the individual which in turn causes the drinking behaviour in them. As the name suggests, this intervention is employed for a maximum of four sessions, where the problematic behaviour or characteristic of the individual is identified and alleviated. The therapist sets goals for the client which they are directed to follow post termination of therapy.

Couple and Family Counselling. The partner and the family members are brought into the therapeutic alliance so as to enhance support and fight AUD.

Twelve Step Program

The 12-step program was formulated and published by AA in the year 1939. This provides the individual suffering from alcohol addiction a set of guidelines to follow as part of the healing process. The principles of the 12-step program postulate acceptance of lack of control over self's drinking behaviour, recognition of the need for a higher power to provide strength in fighting against alcoholism, exploration of the past experiences and understanding their faults with the help of another participant, amendment of previous errors, learning of a new behaviour pattern to lead a better living and to help other individuals who are addicted to alcohol. The 12-

step program is employed by recovering alcoholics on other addicts, but not by professional helpers. The 12-traditions are a set of guidelines framed in directing these groups to carry out their functions effectively (Bill, 2001).

Mutual-Help Groups

Self-help groups or mutual help groups are collections of individuals who come together to help each other to work towards specific problems. AA, Women for Sobriety, Adult Children of Alcohol Addicts are a few groups which work with individuals who are addicted to alcohol and their families. These groups conduct regular group meetings where, members are open to share their concerns and experiences, gain mutual support from one another in dealing with their problems, comprehend ways in which another individual had dealt with their problem, offer motivation to one another and work together as a team in fighting the cause. These groups are long-term in nature so as to provide assistance and mutual support to one another throughout their lives. Group members also take up the responsibility of helping and protecting each other during times of stress which might cause craving for the substance, thus inhibiting relapse (Kelly & Yeterian, 2011).

Rehabilitation Homes

Rehabilitation Homes are special-care facilities for people with psychological or medical issues, where they are treated on a holistic basis with different techniques and are helped by professionals to deal with their problems by effective and efficient methods. Alcohol rehabilitation centers are ‘in-house’ treatment zones where the complete treatment package required for alcohol addiction is provided to the in-mates. These centers admit individuals for a period of one to three months, where they undergo the process of detoxification with medical assistance, followed by counselling and involvement in the 12-step program. These centers provide a conducive atmosphere for those who require treatment for alcohol addiction, away from day-to-day stressors, providing them time and space to rebuild themselves into better individuals under professional supervision (Csiernik, 2016).

Alternative Healing Practices

Alternative practices of healing for alcoholism operate in accordance with the cultural and spiritual beliefs of different communities. These methods of healing are coordinated or supervised by cultural heads, spiritual healers or community helpers with localized beliefs and practices. These practices follow religious preaching, sharing stories regarding the beliefs of the community and of life histories of ancestors, performance of chanting, group offerings, fasting, lent periods or rituals, practices of black-magic or witch-craft, thereby redirecting the schedule of the individual to a culture-based traditional life style so as to keep them away from alcohol consumption (Rowan et al., 2014). Some communities used their traditional music such as singing and drumming in order to heal the individual (Saylors, 2003), whereas some communities follow the use of indigenous medications prescribed by the traditional community healers (Nebelkopf & Penagos, 2005).

Cognitive Abilities

Cognitive Abilities are referred to as the General Mental Abilities, involving sensation, perception and processing of information. Basic Cognitive abilities include attention, perception, intelligence, language, memory and visuo-motor activities. Other higher order abilities of the brain include reasoning, problem solving, planning, abstract thinking, comprehending, accommodating and assimilating, which are referred to as the executive functions. Both the basic functions and the executive functions are utilized in different combinations and strengths in order to fulfill the day-to-day activities (Robinson, 2012).

The DSM-V (APA, 2013), classifies the neurocognitive domains into complex attention, executive functions, learning and memory, language, perceptual, motor and social cognition. These domains though discretely classified, are interlinked with one another and act in coordination to exhibit the response. The ability of an individual varies across different domains, based on their genetic makeup, learning from the external environment, physiological differences, personality and other ecological and social conditions. These abilities also differ across the life span of a person, where initial development, trauma or injury, neuronal degeneration, aging, etc., can bring about changes (Boogert et al., 2018).

Measurement of Cognitive Abilities

Cognitive Abilities are assessed using a branch of psycho-diagnostics termed 'Neuro-Psychological Testing'. It is used to study the functionality of an individual in different domains of cognition. Neuro-psychological testing involves understanding of the brain-behaviour relationship through laboratory experiments. These assessments are conducted as a battery of sub-tests with different tasks measuring different abilities. In some cases individual abilities are tested using respective tasks (Bondy, 1994). Commonly used neuro-psychological batteries include the Halstead-Reitan Battery (1958), Luria-Nebraska Battery (1976), Neuropsychological Assessment Battery developed by Stern & White in 2003 (Gavett, 2011), NIMHANS Neuropsychological Battery (Rao et al., 2004) for adults and similar batteries are also available for specific populations (Lezak et al., 2012).

Cognitive Deficits

The term cognitive deficit is used to include any form of impairment caused in the cognitive domain of functioning, which can be whole or partial, caused by physiological changes due to the effect of a drug-induced state or neuronal degeneration (Coren et al., 1999). Cognitive deficits can be inborn or caused due to environmental factors and may be acute or chronic and reversible or irreversible (Hockenbury & Hockenbury, 2004). Alcohol is one such mind-altering drug, which when consumed either in mild to moderate doses can lead to cognitive damage, even after discontinuing the habit of liquor consumption (Devere, 2016).

Cognitive Remediation

Cognitive Remediation Therapy was developed by professors Gerard Hogarty and Samuel Flesher at the University of Pittsburgh. Also referred to as Cognitive Enhancement Therapy, it focuses on enhancing various aspects of cognitive functioning such as attention, memory, language and information processing which in turn leads to improving neuro-behavioural and psychosocial functioning. Psychological illnesses are associated to certain deficits in the brain skills, which when remediated respectively can help in overcoming the cognitive deficits. Different activities are used to train different faculties of the brain and produce better results when combined with other traditional forms of treatment such as pharmacotherapy and psychotherapy (Favrod et al., 2006).

Art Therapy

Art therapy is a creative therapeutic form of expressing one's thoughts and emotions so as to enhance one's physical, psychological and emotional well-being. Art therapy is also known as Creative Arts Therapy or Expressive Arts Therapy, where expression through creative art is found to bring about the therapeutic change. The use of art therapy in healing has been in practice since the 18th century, when Margeret Naumberg, the founder of art therapy, started the first school for children in the year 1914. Art therapy was used both as an individual therapeutic form and as a part of traditional psychotherapy. The term 'Art therapy' was coined by Adrian Hill in 1942, which evolved as an established therapeutic model in the 20th century.

Art therapy was found to be successful and useful owing to its ability to elicit in individuals, a creative imagination, as an outcome of one's thoughts and emotions, based on previous learning and experiences. The venting out as well as the inbuilt healing abilities of art forms contributed to the effectiveness of the therapy. Art therapy is found to be promising in dealing with physiological, psychological, social and emotional conflicts. The convenience of using art therapy is advantageous in different settings, for people of all age groups, with varying abilities. The inspiration of the individual and the relaxation derived from it in turn enhances their satisfaction and confidence.

Art therapy produces a number of changes in the brain. It is found to strengthen the neuronal connections in the brain areas that are associated with the particular art form thereby activating regions of the brain associated with emotions, memories as well as expressions. It helps an individual to become more optimistic and to be resilient. Different forms of art used as therapy include music, dance, drawing, painting, colouring, doodling, clay modeling, sculpting, story-telling, creative writing, photography, designing, knitting, etc.,. Art forms can be used not only as a therapeutic tool but also as a means of exploring one's inner self through self-expression (Edwards, 2004).

Art therapy and Cognitive Remediation

Art therapy is getting increasingly popularized for its beneficial aspects and low cost of application. Art therapy is found to be increasingly effective in enhancing social, emotional and cognitive skills, inhibiting brain damage and enhancing brain plasticity. Art therapy has been

widely used for cognitive remediation in individuals of different age groups, affected by conditions such as Alzheimer's disease (Alders, 2012), traumatic brain injury (Kline, 2006), anorexia nervosa (Lock et al., 2017) and also in special children (Hina, 2010).

The Present Study

The present study aims at understanding the Cognitive Abilities of individuals with AUD. The pilot study explored the personality, cognitive and Neuro-Behavioural Functioning of alcohol addicts undergoing treatment for AUD in a de-addiction centre. Based on the findings of the pilot study, areas of cognitive damage in the individuals were identified. Respective art forms were selected and employed in bringing about cognitive remediation in the sample. The therapeutic module developed was applied on the sample to study its effectiveness in enhancing the cognitive and Neuro-Behavioural Functioning of people with AUD.

Holistic Art-based Cognitive Remediation Technique

Holistic Art-based Cognitive Remediation Technique (HACRT) is a therapeutic module formulated by me, where three different art forms, viz, Colouring, Music and Story-Telling are relatively used to bring about cognitive remediation in the sample group. This module is developed to enhance the cognitive functioning of people with AUD, by the practice of these therapeutic art forms for a period of 48 consecutive days.

Colouring

Colours affect the brain activity and bring about changes in behaviour, emotions and cognitions, having both a stimulating and calming effects on the brain. Certain bright and vibrant colours have a stimulating effect on the brain cells whereas sober, light colours produce calming effects. Hence the use of different colours alternatively stimulates as well as calms the brain, thereby producing therapeutic outcomes (Soldat et al., 1997). Research evidence indicates the effect of motor activities in enhancing brain plasticity, thereby making the remediation process quicker than in a no-intervention condition. Motor activities also play a role in the preservation of the brain cells, thereby preventing further damage (Cai et al., 2014).

Colouring involves black and white pictures of different forms and figures from the immediate environment. Forty-eight different pictures were selected and compiled to form a

colouring booklet, with one picture coloured each day by the individual. The sample were provided with crayons to tactfully colour the pictures within the outline, to help enhance fine and gross motor skills, sensory processing, spatial awareness, eye-hand coordination, dexterity, maintaining the motivation and concentration to complete colouring the image and colour identification. Colouring elicits similar effects as produced by meditation and mindfulness training (Colleen, 2018).

Music

Music being an abstract art form without language or other explicit stimulation, it can be safely used as a therapeutic art form. The role of music is both stimulating and calming the brain and has been prevalent from the ancient times. Beats that follow a particular rhythm have the capacity of aligning the brain to the same rhythm, thereby producing different states of brain activation. The effect of music on the brain results in complete drop of activity in the parietal lobe and hence helps in improving concentration through transcending consciousness. The healing properties of binaural beats were first discovered by Heinrich Wilhelm Dove in 1839, where he discovered that using two different frequencies to stimulate the different ears simultaneously results in the perception of a third tone of different frequency. Binaural beats of the beta wavelength were used to enhance focused attention, stimulating cognitive functioning and analytical thinking (Oster, 1973).

Instrumental music is found to stimulate the dorsal and ventral striatum of the brain leading to the release of dopamine. The repeated hearing of the same sound leads to activation of the caudate nucleus of the brain, in anticipation of the favourite beats of the individual. The variations in the tones of the beats bring about changes in the brain activation leading to increased dopamine release, which in turn arouses the brain (Lindekugel, 2015). The present intervention module uses instrumental music and binaural beats, combining both to maximize the benefits attained.

Story-Telling

Story-Telling involves presenting of one's experiences, emotions, thoughts and imaginations in the form of verbal accounts. Owing to the activation of different neural pathways when a story is being related, it produces heightened levels of brain arousal, activating pathways

and enhancing neuronal functioning (Yuan et al., 2018). The emotional reactions brought out by stories lead to the release of oxytocin in the brain, which plays a major role in enhancing the social behaviour of the individual, thereby enhancing skills of cooperation and communication (Zak, 2014). The presence of external cues produces activation in the primary and associated areas of the visual cortex, stimulating regions responsible for vision. Narration of a story activates the wernicke’s as well as the Broca’s regions, improving the verbal learning fluency (Bray, 2017).

Story-Telling as an intervention in the present study involves presenting visual cues to the sample, to narrate a story based on their perception of the visual cue. Forty-eight different images portraying different ideas were presented to them on forty-eight consecutive days to improve their fluency.

Need for the Study

Alcohol use being a widely prevalent condition, constantly on the rise, requires awareness towards the prevention of addiction and the practice of effective strategies for management. The prevailing treatment models available for the management of AUD focuses on the physiological, psychological, emotional and social aspects, with hardly any treatment focusing on the cognitive aspects. Cognitive ability is necessary for the effective functioning of the individual both in day-to-day living and in relation to education and employment. Hence people with AUD need to be rehabilitated to enhance their cognitive abilities and help them resume normal functioning. The study focuses on exploring the areas of cognitive damage in people with AUD, evolving a treatment module for the same and exploring its effectiveness in providing cognitive remediation.

Art having a natural inclination and an in-built ability to treat and heal will help in bringing about change at a quicker pace. The entertaining capacity of art would create ease in maintaining the interest of the individual undergoing treatment and motivate the individual to show involvement. The after effect of the art form will foster confidence in the individual and also provide a sense of creation and achievement. Lack of motivation being a common characteristic of people with AUD, art therapy will be highly effective in treating them and

exploring the effectiveness of art therapy, can lay grounds for future development on these lines. The Art therapy will be a useful and effective tool for future research.

Implications of the Study

The findings of the study will help in understanding the personality, cognitive and Neuro-Behavioural Functioning of the sample. This can further be employed in creating awareness on the harmful effects of alcohol and in developing treatment modules for the management of the cognitive and neuro-behavioural deficits. The treatment module developed will be helpful in managing the cognitive damage and strengthening their efficiency to resume their career objectives post rehabilitation. The module can also be applied for different conditions which require cognitive remediation. Owing to the simplicity, motivational and entertainment benefits provided by art, the therapeutic module will be convenient to apply.