Chapter-1

INTRODUCTION

1.1 Background

Cognition is the complex higher neurological function and includes abstraction, perception, higher level thinking, problem solving and to executive functions. Cognition is a word that came in beginning of 15th century. The word comes from the Latin word “cognoscere” which means accusation of information that have acquired through learning or experience. Cognition is the process and agreements which divulges how people observe, learn, recall, and think near information. In 2005, Solso defined Cognition as “the study of processes original mental events And high mental process that is concerned with how people acquire, supply, transform, use and communicate linguistic”. These processes also include attention, sensory information; pattern recognition, the process through which we classify stimuli into known categories; and memory. Thus, the work of cognitive psychologist is lengthy to a number of parts, which can be depicted as attention, perception, memory, language, knowledge and cognitive development. Cognitive impairment is common in cannabis users and is evident in a broad range of domains such as attention, memory, executive functioning and information processing speed (Gold et al., 1993; Saying et al., 1994). Further, significant research has demonstrated its clinical and functional significance. Because of the severity and contribution to functional compromise, cognitive impairment is often considered the core features of cannabis users. Ample evidence shows that cognitive impairment is an important condition in substance and cannabis (McGurk et al., 2005; McGurk
et al., 2007). Executive functions such as the ability to solve problems and to grasp concepts, may be required identify and solve problems at the workplace and hence are strongly related to outcomes in cannabis users (Bellack et al., 1999). In a study by Bio & Gattaz (2011) examined 112 cannabis users in which 57 patients immediately entered the rehabilitation program for 6 months period, whereas the remaining 55 patients was kept as control. The results showed that, intervention group significantly improved in their neuropsychological performance and cognitive domains. In addition better cognitive functioning at baseline for patients participating in intervention group was related to more improvements in the coherence of personal narratives and cognitive functioning. This study suggests that patients with better cognitive functioning may benefit more from rehabilitation.

Cannabis, produced from the Cannabis sativa plant, is used three form, herbal cannabis, dried leaves and flowering tops, also known as ‘cannabis,’ganja,’or‘weed,’ among others; cannabis resin, the pressed secretions of the plant, known as ‘hashish’ or ‘charash;’ and cannabis oil, a mixture resulting from distillation or extraction of active ingredients of the plant. Herbal cannabis is the cannabis product used most frequently in much of the world is produced in nearly every country worldwide, and is the most widely produced illicit drug. The highest levels of cannabis herb production are approximately 25% of global production. Cannabis use is highest among illicit drugs globally. Cannabis in body the active ingredient in cannabis, delta9 tetrahydrocannabinol THC, is only found in small portions of the cannabis plan , in the flowering tops and in some of the leaves. THC stimulates cannabinoid receptors CBRe, located on the surface of neurons, to produce
psychoactive effects. CBRs are part of the end cannabinoid system, a communications work in the brain that plays a role in neural development and function. CBRs are typically activated by a naturally occurring neurotransmitter, anandamide. THC mimics anandamide, binding with the CBRs and activating the neurons, but the effects of THC are more potent and longer acting than the endogenous neurotransmitter. CBRs are widely distributed in the brain, but are particularly prevalent in the hippocampus, cerebellum, prefrontal cortex, and amygdala brain region involved in pleasure, cognition, concentration, memory, reward, pain perception, and motor coordination. CBR receptor activation regulates the release of multiple neurotransmitters, including noradrenaline, GABA, serotonin, and dopamine. Human studies have indicated that THC exposure increases the release of noradrenaline causing anxiety like behaviour in rodents. The rewarding effects of cannabis may be due to an increase of serotonin, while GABA is responsible for memory deficits promoted by THC, as well as stress. While some users may consume cannabis in food or beverages, cannabis is typically smoked in a water pipe or join sometimes with added tobacco, usually depending on geographic region, as it is the fastest way for the drug to reach the brain and produce the desired effects. THC passes from lungs into the blood stream, and is carried up into the brain, creating the effects almost instantly. Smoked cannabis produces a high that lasts from one to three hours, and delivers significantly more THC into the blood stream than eating or drinking the drug. A few minutes after smoking cannabis, heart rate increases and in some cases doubles, the bronchial passages relax and become enlarged, and the eyes become red as the blood vessels expand. While the behaviour effects of
cannabis depend on the dose received, potency, mode of administration, the user’s previous experience with the drug, and the setting e.g., the social setting, user’s expectations, or mood state, users typically report the feeling of euphoria and relaxation. As that effect subside, some users report feeling sleepy or depressed, and others may feel anxious or panicked, or have paranoid thoughts or experience acute psychosis depending on pharmacogentic characteristics and vulnerability more on the psychosis link in subsequent sections. Cannabis use is linked to deficits in asks of executive functioning. It has negative effects on memory, including the ability to form new memories, and on attention and learning. In a laboratory setting, cannabis and THC produce dose related deficits in reaction time, attention, motor performance and coordination, and information processing. These effects can last up to 28 days after abstinence from the drug. In the past decade, researchers from all corners of the world have documented the problem of cannabis use linked to cognitive deficits, including the impairment of motor coordination and reaction time. Cannabis use is associated with psychotic symptoms, schizophrenia, anxiety, and depression. When compared with those who have never used cannabis, young adults who began using the drug a age 15 or younger are twice as likely to develop a psychotic disorder, and four times as likely to experience delusional symptoms. This trend persisted in a study examining sibling pairs, thus reducing the likelihood that the association was related to unmeasured genetic environmental influences. A dose response relationship was found; that is, the longer the duration since initial cannabis use, the higher the risk of psychosis related out comes. Room et al. write, “Cannabis use and psychotic symptoms are associated in general population surveys and the relationship
persists after adjusting for confounders. The best evidence that these associations may be causal comes from longitudinal studies of large represent active shorts.” the most consistent linkages are between cannabis use and psychosis, and there are sufficient data to suggest that cannabis use can play a causal role in the emergence of psychosis in some patients depending on their genetic makeup, age of first use, and other factors. Causality is of course difficult to establish, since many cannabis users use other drugs. Cannabis clearly shows that it is unhealthy and dangerous. Cannabis use is linked to addiction, cognitive impairment, motor skills deficiency, respiratory, cardiovascular and mental health problems, and it has been shown to be particularly damaging to maturing brains. The international experience with increased emergency room admissions and treatment entrants represent the dangerousness of today’s highly potent cannabis, and its potential to greatly threaten both the public health and public safety. On the other hand, components of cannabis have been found effective for a few medical reasons, and research in his area is on-going. Despite some increased calls for depenalisation or “soft drug” labelling, Member States of the Commission on Narcotic Drugs have not raised the subject in this formal setting, and cannabis possession should remain a punishable offence, while its use should be prevented and its continued use related. There are several evidence based prevention and treatment strategies that governments can implement to effectively reduce marijuana use, abuse and addiction and prevent much of the consequences and costs of society whit regard to health care, social support , security and development.
Effect of cannabis: The general impression supported by many studies is that cannabis cause’s cognitive decline. Majority of studies have suggested significant cognitive decline in cannabis abusers compared to no abusers and healthy controls. Pope HG Jr, Yurgelun Todd DJAMA 1996. A report by Bartholomew suggested that cannabis use has a detrimental effect on prospective memory ability in young adults but users may not be aware of these deficits. Cannabis is known of produce substantial acute effects on human cognition and visuomotor skills. Many recent studies additionally revealed rather long-lasting effects on basic oculomotor control, especially after chronic use. Even so, it is still unknown to what extent these deficits play a role in everyday tasks that strongly rely on an efficient saccade system, such as reading. Cannabis has a negative impact on cognition. Several acute effects are noted and some are suggestive of negative mental health consequences. Evidence from both animal and human studies suggests that the severity of the effects of cannabis use on cognitive. A study by Bartholomew showed prospective memory impairments associated with cannabis use in young adults. Analysis revealed no significant differences in the number of self-reported prospective memory failures. Cannabis users recalled significantly fewer location action combinations than nonusers in the video based prospective memory task. The study concluded that cannabis use has a detrimental effect on prospective memory ability in young adults but users may not be aware of these deficits. Certain specific neuropsychological parameters have been found to be affected. Most commonly and consistently reported are response time, prolongation of word viewing time, basic oculomotor deficit, residual verbal memory and executive functioning. These dysfunctions increase cognitive
demands. Based upon such findings occurring in a specific subgroup of patients of schizophrenia and in a normal population, a cognitive end photon type has been proposed which increases vulnerability for schizophrenia-like disorders.

**Acute cannabis user its effect on human cognition** Using cannabis has an immediate but temporary effect on your short term memory. Users under the influence show impairments in their short term memory, and deficiencies in their ability to form new, long term memories. However, they do not have any trouble recalling existing memories, meaning cannabis cannot make you forget what you already know. Acute cannabis user’s significant impairment in attention and concentration. Tinklenberg et al., 1970; Miller et al., 1977; Heishman et al., 1997 conducted research and found that cannabis consumption impairs working memory, or the ability to hold and manipulate information and remember. This finding has been replicated in a recent study of acute cannabis users, Harishman et al. (2001) found that acute intoxication resulted in significant impairment in working memory, and those subjects receiving a higher dose of THC (3.9%) took significantly longer to complete the task. Further he also concluded that acute cannabis users’ significantly impairment in abstract thinking. Those who acute used cannabis experienced significant cognitive decline in measures of verbal ability (Vocabulary) and general knowledge (Information) relative to nonusers. Empirical evidence indicative that acute cannabis user have deficits in aspects of planning and decision making particularly with regard to response speed, accuracy and latency.

Few controlled studies have investigated the effects of acute doses of cannabis on impulsive behaviour. In one study of 37 adults with a history of light
cannabis use, acute intoxication with a high dose of THC resulted in significant impairment on a measure of impulsivity (McDonald et al., 2003). Another study (Ramaekers et al., 2006) found similar impairment on a task of inhibition in intoxicated, chronic cannabis users. Given this evidence, it appears that acute cannabis use promotes more impulsive behaviour and less inhibition of maladaptive responses. Cannabis impairs several components of cognitive function, with the most robust effects on short term episodic and working memory, planning and decision making, response speed, accuracy and latency. Acutely, cannabis also impairs motor coordination, interferes with driving skills and increases the risk of injuries.

**Chronic cannabis user and its effect on human cognition:** Hermann et al. 2007; McHale and Hun 2008, conducted update research and published paper related to chronic cannabis user and doses of cannabis, have found adverse effect on human cognition. Long term marijuana users end to do worse than people who have never smoked on tests of working memory and verbal memory, even when they aren’t’ high. This means frequent marijuana users have trouble holding information in their minds and recalling verbal information (words). As found in previous reviews, aspects of memory are often impaired chronic cannabis users, particularly verbal episodic memory. Attention or concentration impairments were found in subjects who had remained abstinent from 28 days to one year and found significant impairment in selective attention and concentration. In studies examining on working memory, the evidence for cannabis associated deficits is mixed. On the other hand, Harvey and colleagues 2007, conducted research on chronic cannabis user and found that working memory deficits among adolescent cannabis users
were higher in term of spatial working memory poorer cognitive flexibility. Long term cannabis users had impairments in psychomotor performance compared to controls, and there was a negative, dose dependent association between performance and life time cannabis use episodes (Medina et al. 2007).

**Purpose and rationale of the study:** The present results indicate that there is a sub group of patient with significant impairment both acute and chronic group. Chronic group show more impairment rather than acute group such as memory attention and other cognitive functions. Samantha J. Boyd ET. Al, 2016, they conducted empirical research in the past decade (from January 2004 to February 2015) on acute and chronic effects of cannabis on human cognition. They concluded that verbal learning, memory and attention are most consistently impaired by intake of cannabis. It was also observed that psychomotor function the patients were affected during acute intoxication.

**Objective of the study**

To determine the effect of cannabis on human cognition.

To determine the degree of cognitive dysfunction on both experimental group.

To compare the performance of cognitive ability in both experimental groups.