CHAPTER - I

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1.1 Early History

History shows that men and women have used chemical and herbal materials throughout the age to alter bodily and psychological sensations. Various drugs have been used in different ways for many years. Use of Narcotic drugs dates back to the days of first cultivations of opium. It is believed that the opium poppy was being cultivated in the West Mediterranean Region in the sixth millennium B.C. from opium capsules found in grass bags in Neolithic burial sites in Northern Spain dated to about 4200 B.C. (Rudgley, 1995). Opium, the dried juice of the poppy, papaver somniferom and other drugs have been used as long as 5000 years back. The history and definitions of opiate use may be traced since the time of Sumerian civilization.

The earliest written reference to opium is a Sumerian idiogram that is translated as "joy plant". The use of this symbol has been dated to about 4000 B.C. Knowledge of its cultivation seemed to have spread from Asia Minor across the length and breadth of the ancient world. The use of opium seemed to have spread from the Middle East in every direction. It was carried east to India by Arab Traders in the ninth century and then from India to China. (McKim, 2000).

The earliest mention of the therapeutic use of opium and snake venom is believed to be pointed out by the specialists in Ayurveda, in ancient India in the 'Charak Samhita'. Even 'Papyrus' an Egyptian Medical Treatise that dates to the 16th Century B.C., suggest the drugs as a means of pacifying 'crying babies'. A recommendation made accordingly by many of the American patent medicine manufacturer in the late 1800 AD. (Shah, '98). The famous Greek Physician Hippocrates (400 B.C.) used opiate for medical
purposes. Galen (130-201 AD) a physician mentioned use of it to reduce headache, deafness, epilepsy, jaundice, spleen and many other conditions. In 1700, John Jones an English Pharmacist first recognized the unpleasant symptoms that occur when chronic users of opium try to discontinue its use. Thomas De Quincey, author of ‘Confessions of an English Opium Eater (1821)’, reported that he had an increased sensitivity in both hearing and vision when taking opium orally. He was one of the first to write about the effects of opium.

In 1803, a German Pharmacist, F. Sirturner had isolated the principal opium alkaloid, C17 H1g, NO₃ and named it morphine, after the Greek God of dreams, Morpheus, and published it in 1803. But morphine was first manufactured and sold commercially only in 1830, and it was under the control of the medical profession mostly. It was not sold openly like opium. Moreover, in 1821 the second active ingredient codeine was isolated by Pierre Robiquet while he was experimenting with a new process for isolating morphine (MC Kim, 2000). Gradually, the narcotics of present day came in existence one by one.

In 1875, two English Chemists G. H. Beckett and C.P. Alder Wright (Anon, 1875) synthesized diacetylmorphine. In 1898, Eberfield, Germany, the Farbenfabriken Vorm Friendrich Bayer and Company produced the drug commercially. An employee of the Company, H. Dresser named the Morphine product Heroin (Anon, 1898). By 1908, medical authorities in America had recognized the addiction producing qualities of heroin.

1.2 Narcotic Drugs

The word 'drug' is derived from the French 'drague' meaning dry powder. Medically, a drug is a substance used in the preparation of medicine. The traditional way is to define a drug as any substance that alters the physiology of the body. This definition however includes food and
nutrients, which are not usually thought of as drugs. (Mc Kim, 2000) National Commission on Marijuana and Drug Abuse, U.S.A. (1973) defined drugs as “any substance other than food which by its chemical nature affects the structure or function of the living organism”. According to Mc Connell (1977) “A drug is any chemical, which when taken in relatively small amounts, significantly increases or decreases cellular activities somewhere in the body”. The alteration in functional state, is usually referred to as the effect of the drug.

Narcotic drugs are defined also as a substance which are generally used as the components of medicine (of very low proportion) which can alter the systemic functions of body and mind – as required for therapeutic purpose. It is neither a nutritious material nor a component of balanced diet, yet it has some medical value. National Commission on Drug, U.S.A. (1973) identified certain psychoactive substance which can develop systemic dependence, after prolonged use, for example sedatives.

The year 1893, marks the next important date in the history of narcotics use and abuse. It was in this year that a Scotsman, Alexander Wood, succeeded in perfecting the most efficient drug delivery system known, the hypodermic needle. Until then, morphine had been taken orally and because much of it was broken down by the patients digestive system before it entered the bloodstream, its pain killing potential was severely limited. Now, physicians can introduce the drug directly into the patients bloodstream enhancing the pain killing properties of morphine. Five years after Wood perfected the hypodermic needle, injected morphine was introduced into American medicine by Fordice Baber and George Thompson just in time for the American Civil War (Shah, 98).

Besides opium and its derivative, sedatives or depressant such as barbiturates have been used and abused for a long time. In Germany in 1864, Adolt Von Baeyer, a 29 year old research assistant, successfully
synthesized a new substance, malonylurea, by condensing malonic acid and urea (Dundee & Mellroy, 1982), which became known as barbituric acid. Barbituric acid, although not a behaviourally active drug, with slight modification of the molecule, produces a family of chemicals known as the barbiturates. The first barbiturate barbital, was synthesized in 1882 and marketed in 1903. Pheno barbital was synthesized by Emil Fischer and marketed in 1912. At present about 50 barbiturates have been marketed out of the thousands synthesized. (Reinisch & Sanders, 1982). But in the 1990's benzodiazepines have replaced barbiturates in almost all medical uses. The first benzodiazepines was marketed as Librium in 1974, (Greenblatt & Shader, 1974) and it was developed by Sternback. Diazepam (Valium), one of the most popular one is also developed by Sternback and marketed in 1963.

Besides opium, the use of coca plant – a psychomotor stimulant – has dated to great antiquity. Coca leaves have been found in burial middens in Peru that date back to 2500 B.C. Large stone monolithic idols found in Colombia and dating to 500 B.C. have the puffed-out cheeks of the Coca chewer. The Incas were thought to have use it and make it sacred when they conquered the region. The Incas were conquered by the Spanish, and the interest in the Coca plants grew. In 1749, samples were sent to Europe, where Linnaes, gave its family, Erythroxylaceae. In 1786, Lamarck named the most important species, Erythroxylon Coca. (Aldrich & Baker, 1976). But the credit for isolating and naming cocaine goes to Albert Neimann of Gottingen, Germany who published his results in 1860. Sigmund Freud, it may be said was the one who made cocaine popular, by trying it and published a paper on it. But it was, Karl Koller, his associates, who discovered the only real medical use of cocaine – it was the world's first local anesthetic.

Ephedrine a stimulant in the herb "ma-huang", has been used in China for more than 5,000 years. It was isolated from the herb in the 1880's,
but only in 1924 were its properties investigated by two Americans, Ko Kei Chen and C.F. Schmidt, who pointed out its similarity to epinephrine, a stimulant. Due to widespread use of ephedrine, a substitute was searched, which was already discovered without anyone knowing it in 1887, by L. Edealeno, (what is now known as amphetamine) but without testing its properties and remained untested until 1910, when G. Barger and Sir H. H. Dale published a paper on the effect of amphetamine. The significance of the findings was grasped in 1927 by Gordon Alles, a chemist in Los Angeles. In 1937 the American Medical Association sanctioned the use of amphetamine as medicine (Grinsspoon & Hedblom, 1975).

Khat (Cathinone) use has been known for a long time. Alexander the Great was believed to have sent Khat to General Harrar to cure his melancholia. Amda Sion, a fourteenth - century ruler of Ethiopia, was the first recorded Khat addict. Khat has been known in Europe since the early 1600's, but has only recently been used there because of transporting difficulty of the leaf. The earliest scientific report on that presented to western culture was in the 18th Century when the botanist Peter Forskal identified the plant in Yemen and called it catha Edulis (Edward, G. 1983).

Cannabis is believed to have originated in Central Asia and assumed to have spread in the middle of the second century B.C. by the scythions to Egypt, Russia and Europe. The word ‘cannabis’ is also a Scythian word. In China, cannabis has been known since Neolithic times about 6000 years ago. The use of cannabis is believed to have spread from China to India, then from India to Africa by Arab Traders. In Africa it is known as bangi or dagga (Toit. 1976). The hemp plant or cannabis sativa was given its name and classification by Linnaeus in 1753. Scientific medical attention towards cannabis was first taken by W.B. O'Shaughnessy, a chemistry professor of the University of Calcutta in 1839 and reported it as an effective anticonvulsant and an appetite stimulant. Since then various claims had been made in its usefulness. The intoxicating effects of the drug remained
un-noticed by the Europeans until the publication of Le Club des Hachichins by the French writer Théophile Gautier in 1846. The use of the Cannabis plant for smoking and the word marijuana were introduced into the United States by Mexican labourers in the early twentieth century.

1.3 Reported Effects of Psychotropic Drugs

Hallucinogens are another group of drugs that cause the user to have hallucinations which are a direct result of the drug. There are many hallucinogens, but L.S.D. is the most popular. Albert Hoffman of the Sandoz Laboratories, in Basel, Switzerland in 1938 synthesized a series of lysergic acid compounds, and found them uninteresting, but it was in 1943 that he made a new batch of the twenty-fifth derivative (which he called L.S.D. 25). Thus this came to be the starting point for L.S.D., which reached its peak in the 1960's, due to restriction of sale – (Brecher & the Editors of Consumer Reports, 1972).

Psilocybin is found in several species of mushroom (psilocybe) and are found to have hallucinogenic effect, they are difficult to produce synthetically. These mushrooms had been found to be considered sacred in Mexico and Central America for thousands of years. But psilocybin are found to be less potent than L.S.D. It was Albert Hoffman, who isolated two substances from the psilocybe mushroom, psilocybin and psilocin (De Ropp, 1961).

Hallucinogenic effects have also been found from Lysergic Acid Amide (also called Engine) an ingredients of the seeds of the plant Morning Glory. The major active ingredient in the morning glory seeds, lysergic acid amide was discovered and identified in 1960 by Albert Hoffman (Schultes & Hoffman, 1980). L.A.A. (Lysergic Acid Amide) is about \(\frac{1}{10^{th}}\) one tenth as potent as L.S.D. and is readily absorbed when taken orally, and takes effect about 20 minutes from taking. Its effect are short lived and leave no hangover.
Dimethyltryptamine (D.M.T) can be found in several plants. Most of the 45 to 60 species of the genus Virola contain it in their bark. It is easily synthesized and was first produced in 1931. Synthetic DMT was used as a hallucinogen along with L.S.D. by the hippie sub-culture. It is sniffed.

Bufotenine is a derivative of DMT. It was first isolated in the United States in 1954 by V. L. Stromberg of the National Heart Institute from the seeds of the Aradenanthera peregrina. It is also found in the flesh of a fish called the dream fish, from Norfolk Island. It was originally discovered in the skin of a species of toad from which it derives its name. It is either injected or inhaled to acquire hallucinogenic effects. Harmine, Harmaline and Ibogaine are also considered to have some amount of hallucinogenic effect but are not very popular.

Mescaline is the active ingredients in a cactus known as Peyote. It was isolated by Arthur Heffter, a German Chemist by the end of the nineteenth century. In 1919, the structure of mescaline was determined and the drug was first synthesized. It is absorbed easily from the digestive system, but is not as potent as L.S.D. Its half life is 1½ to 2 hours. The drug is excreted in the urine, about half of its is metabolized (Brown, 1972).

Phencyclidine, also known as PCP, is a synthetic drug developed by the Parke-Davis company as an analgesic and anesthetic in 1963. But it was found to have some after effects like delirium, & disorientation, and is also being misused. At present, it is sold as salt – like crystal to be mixed with some other drug.

Besides the above mentioned drugs there are certain other chemical substances like volatile solvent type (glue, paint etc) alcohol, nicotine, caffeine etc. which are considered to be addictive, but they do not come under the purview of the present study.
1.4 Addiction Concept

According to the U.S. Federal Law, the term addict means any person who habitually uses any habit forming narcotic drug — so as to endanger public morals, health, safety or welfare or who is or has been so far addicted to the use of such habit forming drugs as to have lost the power of self-control with reference to his addiction (Pescor, 1952). The Departmental Committee on Morphine and Heroin Addiction in Great Britain defined the addict as "a person who, not requiring the continued use of a drug for the relief of the symptoms of organic disease, acquired as a result of repeated administration, an overpowering desire for its continuance and in whom withdrawal of drug leads to definite symptoms of mental or physical distress or disorder". (Shah, G.R. 98) Ausubel (1954) defines drug addiction in terms of defense and believed that the drug addict is a person who has selected drugs as a way of coping with his problems. Of course, to select drugs as a way of avoiding the realities of life there must be access to drugs.

The World Health Organization, (1957) defined addiction as "a state of periodic or chronic intoxication which is detrimental to both individual and society and which is produced by repeated consumption of natural or synthetic drugs". An addict has an overpowering need / compulsion to continue taking the drug, no matter what means may be required to secure the supply of it. Vetter (1972) does not distinguish between drug habituation and drug addiction. According to him, if logic rather than custom dictated the meanings of words, an addict would be defined as a person who, for no compelling medical reason, habitually takes harmful substances into his body. Lindsmith (1974) has defined addiction as "a complex behavior characterised by an intense continuous desire for the drug which dominated the addict when he is on drugs and impels him to resume its use when he is abstinent".

Buss (1978) described addiction in terms of "continuum of abnormality and states that addiction of alcohol, heroin and other drugs are
not only abnormal in the sense that they are excessive behaviors but are also serious threats to health and addiction, leads to cumulative problems, because addicts usually require more and more of the drug leading to physiological accommodation to the drug "........." –

An addict can be described as "someone who exhibits a behavioral pattern of use characterized by overwhelming involvement with the use of a drug, the securing of supply and a high tendency to relapse after withdrawal".

Finally, the term 'addict' refers to a person who cannot stop taking the drugs and is harmful to himself and society and addiction refers to the state of constant need for drugs to function normally. Addicts are notorious for abusing or misusing a drug or psychotropic substance – as a persistent or sporadic excessive use, inconsistent with or unrelated to acceptable medical practice. As described by the WHO Expert Committee, they are as follows:-(i) Unsanctioned use, (ii) Hazardous use, (ii) Dysfunctional use and (iv) Harmful use.

1.4.1 Addiction, Dependence, Substance Abuse

The American Psychiatric Associations Diagnostic and Statistical Manual of Mental Disorders (DSM) IV, (1994), distinguishes between the term substance dependence and substance abuse. The criteria for substance dependence are given below.

A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12 month period:

1) Tolerance, as defined by either of the following:

a) A need for markedly increased amounts of the substance to achieve intoxication or desired effect.
b) Markedly diminished effect with continued use of the same amount of the substance.

2) Withdrawal, as manifested by either of the following:

   a) The characteristic withdrawal syndrome of the substance.

   b) The same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms.

3) Substance is often taken in larger amounts or over a longer period than was intended.

4) There is a persistent desire or unsuccessful efforts to cut down or control substance use.

5) A great deal of time is spent in activities necessary to obtain the substance (e.g. visiting multiple doctors), use of the substance (e.g. chain smoking) or recovering from its effects.

6) Important social, occupational or recreational activities are given up or reduced because of substance use.

7) The substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance. (American Psychiatric Association, 1994, pp 181 – 183).

Here, for the present study, only DSM IV criteria of substance dependence will be used
1.5 The Indian Scenario

Since the beginning of the twentieth century, British rulers in India took severe steps to prevent illegal drug trafficking en route India, particularly Calcutta. Subsequently, The Dangerous Drug Act was implemented to prevent usage of unlicensed drugs beyond certain quantity and its abuses for self-destruction (poisonous substance). Since the implementation of the Narcotic Drugs and Psychotropic Substance Act (1985) (by repealing The Dangerous Drug Act) the Govt. of India became interested not only to combat the illegal trafficking of drugs and other illicit substance but also about the prevention of swiftly spreading wave of drug abuse and about helping the drug – victims to get rid of drug habits or dependence through rehabilitation approaches – as directed by the World Health Organization (W.H.O.)

A brief report on the survey of relevant scientific literature has been presented in the following chapter – to indicate the current trends in this area of research.