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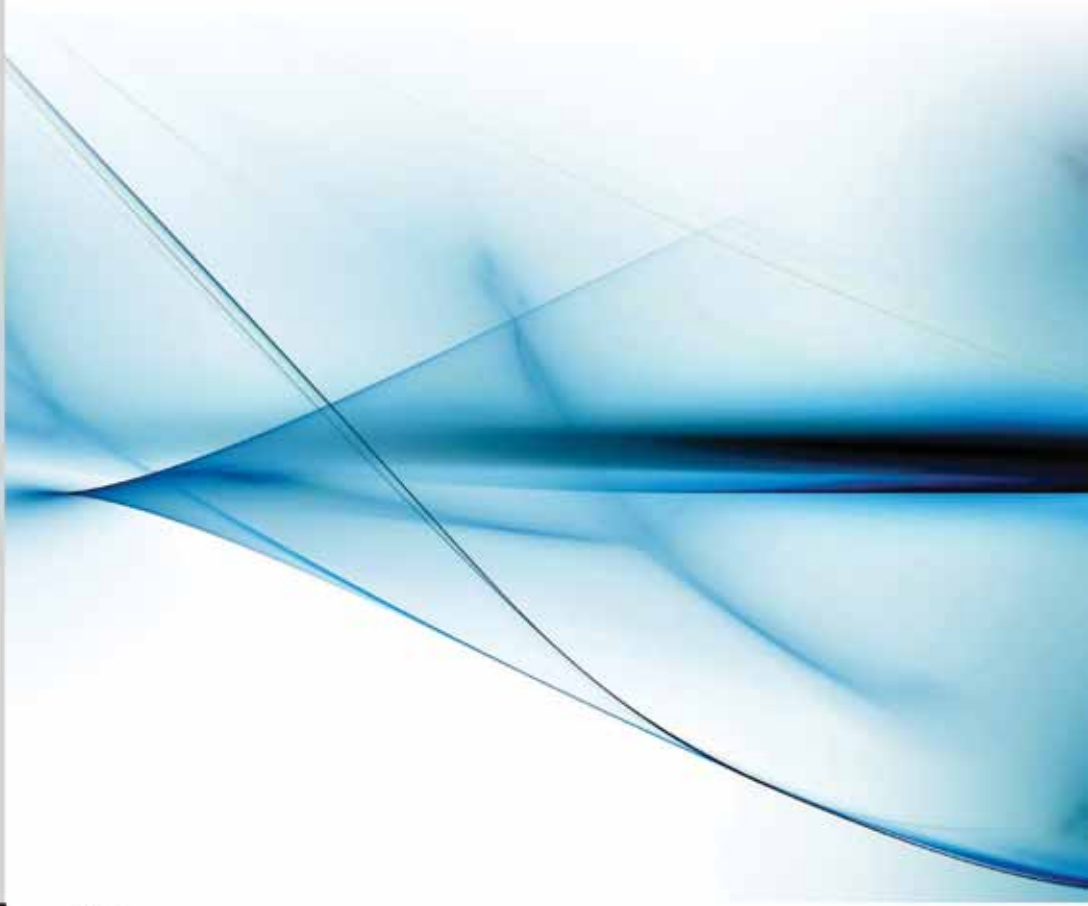

Editors
P K Singh
Om Prakash Singh
Vinay Kumar

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Contents

1. **Nature of Mind: Real or Virtual** 1
   PK Singh
2. **Basic Biological Sciences for Psychiatry** 7
   Rohit Verma, Vanteemar S Sreeraj, Damodharan Dinakaran, Ganesan Venkatasubramanian
3. **Basic Psychosocial Sciences for Psychiatry** 23
   Ajit Avasthi, Swapnajeet Sahoo
4. **Mental Health and Mental Disorders** 41
   Rajesh Sagar, Ananya Mahapatra
5. **Classification and Clinical Evaluation** 49
   Samir Kumar Praharaj, PSVN Sharma
6. **Communication Skills for Effective Medicare** 63
   Baxi Neeraj Prasad Sinha
7. **Organic Brain Syndromes** 72
   Malay Kumar Ghosal
8. **Substance-related Disorders** 90
   Atul Ambekar, Piyali Mandal
9. **Schizophrenia and Other Psychotic Disorders** 110
   R Thara, Aarthi Ganesh, Vijaya Raghavan
10. **Depressive Disorders** 133
    Nishant Goyal, Vinod K Sinha, Vidya KL
11. **Bipolar Disorders** 144
    Om Prakash Singh, Sucharita Mandal
12. **Anxiety Disorders** 153
    NN Raju, N Prasanna Kumar
13. **Obsessive-compulsive and Related Disorders** 159
    YC Janardhan Reddy, Aditi Singh
14. **Somatoform Disorders** 169
    MS Bhatia
15. **Adjustment and Stress-related Disorders** 179
    Nilesh Shah, Avinash De Sousa, Pragya Lodha

JAYPEE BROTHERS

16. Normal Human Sexuality and Sexual Disorders **184**
Shivananda Manohar, TS Sathyanarayana Rao, Abhinav Tandon, Shreemit Maheshwari, Suhas Chandran

17. Sleep and Sleep Disorders **198**
Ravi Gupta, Sandeep Grover

18. Eating Disorders **210**
Rajesh Kumar, Niska Sinha

19. Personality Disorders **220**
Shubhangi R Parkar

20. Childhood and Adolescent Disorders **230**
Savita Malhotra, Akhilesh Sharma

21. Disorder of Intellectual Development **246**
K John Vijay Sagar, Satish C Girimaji

22. Geriatric Mental Health **260**
Om Prakash, Amit Khanna

23. Consultation-Liaison Psychiatry **273**
Swaminath G, Ajit V Bhide

24. Suicide and Psychiatric Emergencies **286**
Lakshmi Vijayakumar, Vinayak Vijayakumar

25. Culture-bound Syndromes **298**
PK Dalal, SK Kar

26. Miscellaneous Other Syndromes of Clinical Interest **306**
Amlan Kusum Jana, Neelanjana Paul

27. Psychiatry and Law **313**
S Nambi

28. Psychopharmacology and Physical Methods of Treatment **319**
Varghese P Punnoose

29. Psychotherapies **342**
Nitin Gupta, Sushmita Bhattacharya

30. Community and Preventive Psychiatry **355**
R Srinivasa Murthy

31. History of Psychiatry **367**
RC Jiloha, Deeksha Elwadhi

32. Future of Psychiatry **375**
Naren P Rao, Santosh K Chaturvedi

Index *383*

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8 Substance-related Disorders

Atul Ambekar, Piyali Mandal

INTRODUCTION

Alcohol and other psychoactive substances induce change primarily in mental functioning. These substances are used voluntarily by people to experience a change in their mood, cognitive functions, and perception or for achieving pleasure. Repeated consumption of these substances or drugs can cause "addiction" or dependence. At a later stage, the primary purpose of substance use is to avoid or reduce the bodily discomfort resulting from the absence of the psychoactive substance (i.e. "withdrawal") rather than seeking pleasure. As per International conventions, certain psychoactive substances have been listed under the category of the "narcotic drugs" and "psychotropic substances".

Some psychoactive substances are legally allowed for trade and consumption within a country and hence are called licit substances. Alcoholic beverages and nicotine (tobacco) are considered licit in most of the countries. In certain parts of India, consumption of alcohol is illegal. On the other hand, the substances for which trade and consumption are strictly prohibited (for nonmedical and nonscientific purpose) are called illicit (or illegal) substances. Many narcotic drugs (such as heroin, ganja, charas, cocaine, etc.) fall in this category.

The World Health Organization (WHO) lists substance use disorders for the following classes of substances:

- Alcohol
- Opioids (opium, heroin, morphine, pethidine, buprenorphine, codeine, etc.)
- Cannabis ("ganja", "bhang", and "charas")
- Sedative—hypnotics ("tranquilizers")
- Cocaine
- Other stimulants, including amphetamines and caffeine
- Hallucinogens [e.g., lysergic acid diethylamide (LSD), "acid"]
- Tobacco
- Volatile solvents (typewriter correction and dilution fluids, kerosene, gasoline, petrol, paint thinners, nail-polish removers, etc.) and other organic hydrocarbons (e.g., those in shoe polish, iodex, etc.)

Of these, the common and major substances used in India are alcohol, tobacco, opioids, cannabis, tranquilizers, and recently, volatile solvents.

Common substances of use are briefly described below:

Alcohol: Among all the psychoactive substances known to humankind, alcohol is the oldest and most popular one. The active ingredient is ethyl alcohol (ethanol). Absolute concentration of alcohol varies depending upon the type of drink **(Table 8.1)**. Because

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Table 8.1: Types and concentration of alcohol.

Types of alcohol	*Concentration (%)*
Beers (standard)	4–8
Beers (strong)	8–11
Wines	5–13
Distilled spirit (whisky, vodka, gin, etc.)	40
Arrack/country/*desi*	33

of these variations, therefore, the standard practice is to measure amount of alcohol in "standard units", where 10 mL of absolute alcohol constitutes one standard unit. For comparing different beverages, the common "rule of thumb" is, one standard drink = ½ bottle of standard beer = ¼ bottle of strong beer = 1 glass (125 mL) of table wine = 1 drink (30 mL) of spirits.

The level of alcohol in the blood (i.e., blood alcohol concentration or BAC) determines the physical and mental effects on the person drinking alcohol. These are given in **Table 8.2**.

Table 8.2: Blood alcohol concentration (BAC) levels and the corresponding acute effects of alcohol.

BAC (in mg/dL)	*Acute effects*
40–80	Elevation of mood, feeling relaxed, able to talk freely, hand and leg movements may be clumsy, while alertness is reduced, and the users believe themselves to be alert
>80	Users becomes noisy and moody, judgment may be impaired, and driving ability is impaired (with risk of accidents)
100–200	The vision gets blurred, gait becomes unsteady, and users talks loudly though the speech is slurred. Behavior changes like quarrelsomeness, aggression are observed. Motor coordination affected grossly
200–300	*The Blackout phenomena:* Person is unable to remember the experiences when they were drunk
>300	May result in coma, and with further increase in levels, even death may occur

Opioids: The poppy plant (*Papaver somniferum*) is one of the well-known plant in many parts of the world, which provides opium the prototype opioid. Substances which act like opium in the human body are called "opioids". They have been classified into three broad categories—(1) Those occurring naturally (morphine and codeine); (2) Those produced by modification of natural opioids—"semi-synthetics" (heroin, oxycodone); and (3) Those that are not produced from natural substances but produced synthetically, though they mimics the pharmacological action—"pure synthetics" (fentanyl and methadone). Opium is legally cultivated in some states of India, for its medicinal value.

Upon consumption, opioids initially produce an unpleasant feeling to a naïve user. However, if people continue to use the opioid, they experience a short-duration intense state of pleasure and euphoria called "rush" immediately after they take opioids. Opioids are excellent analgesics (the reason why they are used as pain killers). They also produce decreased responsiveness to the environment—a dream-like state. At very high doses, severe intoxication may occur leading to decreased breathing and even death ("overdose").

Heroin is a common opioid, used by smoking, chasing (inhaled), or injecting (intramuscular or intravenous routes). Opioid medications (analgesic or cough suppressants) are also sometimes used for intoxication or pleasure. These include morphine, pentazocine, cough syrups (with codeine), and buprenorphine. Injecting of opioids along with potential risk of spread

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of blood-borne infections including human immunodeficiency virus (HIV) is a serious public health risk in many parts of India.

Cannabis: Many parts of the world, including many North and Northeast Indian states, are home to the plant *Cannabis sativa*, which produces various preparations of cannabis. "Cannabinoids" are the active chemical compounds in the cannabis. Among cannabinoids, tetrahydrocannabinol (THC) is the most potent. Different types of cannabis products contain different concentration of THC **(Table 8.3)**.

The effect of cannabis varies with blood level of THC. At low dose, cannabis consumption results in euphoria or a state of well-being, experienced as a dreamy state of enjoyment which is usually followed by a phase of drowsiness. Cannabis can impair coordination and thus tasks like driving or operating heavy machinery can be risky even if cannabis is used at a modest dose. Dexterity and hand steadiness are both adversely affected. With an increase in dose, perceptual and sensory distortions may be experienced. Perception of depth is adversely affected. Auditory and visual stimulus appears more intense along with derealization (an unreal feeling about what is seen or heard) and depersonalization (unreal feeling about one's own body). The sense of passage of time gets affected; time appears to pass much slower than it actually does. Some users may experience "bad trip" (restlessness, fear, and panic). Higher doses may result in delirium (confusion), psychosis, and paranoid ideations (unwarranted suspicion) which may be self-limited.

Nicotine: Among active chemical in tobacco, nicotine is the most important one, which is a very common legally and socially sanctioned substance of use. Tobacco is consumed in various forms: Smoking (cigarette, bidi, hookah, etc.) and smokeless (chewable tobacco, snuff, etc.). Nicotine improves alertness and results in better functioning in continuous repetitive tasks. Other reported effects are relaxation and decrease in fatigue with nicotine use. While trying to quit, smokers report irritability, restlessness, anger and frustration, and difficulty in concentration.

Sedatives/hypnotics: These are often prescribed by medical practitioner for anxiety and sleep disorders. Certain medications like alprazolam, nitrazepam, and pheniramine are widely used at a higher dose than prescribed and also for recreational purpose (without prescription) because of their easier availability and cheap price. These may be used either through oral or parenteral route.

Cocaine: Cocaine comes from the leaves of plant *Erythroxylum coca*, which grows wildly in Latin American region. Its use is largely restricted to the Western countries till date and generally very low in India. It is generally snorted, but can also be chewed and smoked.

Table 8.3: Types of cannabis products.

Cannabis products	*Origin*	*Route of consumption*	*Concentration of tetrahydrocannabinol (mg %)*
Bhang	Dried leaves of the plant	Oral, smoking	1–3
Ganja	Dried flowering top	Smoking	6–20
Hashish	Resinous extract of the plant	Smoking	10–20
Hashish oil	Syrup extracted from resin	Smoking	15–30

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Cocaine use is characterized by "rush" (7–10 minutes of intense pleasure). Therefore, people use cocaine in "binges" or "runs" where they take it every few minutes to hours, continuously for 3–7 days.

Stimulants: Like cocaine, stimulants also activate the brain to increase alertness, produce euphoria, improve performance, and decrease fatigue. The prototype drug of this group is amphetamine. Collectively, they are also called as "amphetamine-type stimulants (ATS)".

Hallucinogens: Hallucinogens or psychedelics change how a person sees or hears things (i.e., produce hallucinations). The classic example is LSD, consumption of which has been described to make one "see music" and "hear light". Other substances of this group include phencyclidine (PCP) and ecstasy.

Inhalants: Inhalants produce vapor without heating. Majority of them are easily available everywhere like petroleum products glues, thinners, cleaners, solvents, etc. People use them by "huffing", sniffing, or "bagging" (rebreathing from a bag). Upon inhaling them, people experience a rush and sense of well-being. Within 5–6 minutes, there is an urge to reuse. Chronic use of inhalants is associated with brain damage and multiple liver and lung problems. In India, among children (particularly the street children), the use of inhalants as intoxicant is growing rapidly.

As per the medical model of diseases, substance-related disorders are recognized as biobehavioral conditions which manifest as chronic relapsing noncommunicable disease. Hence, treatment for these conditions, like many other chronic non-communicable diseases (viz., diabetes mellitus, hypertension), only modifies and alters the course of the disease. The concept of "cure" in traditional sense does not apply to these.

This chapter of this textbook is intended to address substance-related disorders for each of the major classes of substances of use described in the International Classification of Diseases-10 (ICD-10) mentioned earlier.

EPIDEMIOLOGY

While psychoactive substances are used in most countries of the world, the extent, patterns, and consequences of use differ from country to country and from time to time. In India, traditionally, the legal substances (such as tobacco and alcohol) are widely prevalent while a sizable minority of people also use illegal drugs (like heroin and ganja).

In India, a nationwide epidemiological survey titled "National Survey on Extent, Pattern and Trends of Drug Abuse in India" was conducted in 2004. The National Household Survey (as a part of the National Survey) reported prevalence of current drug use (past 1 month use) of various drugs as: alcohol 21%, cannabis 3%, opiates 0.7%, any illicit drug use 3.6%, injection drug use (ever) 0.1%, and polydrug use 22.3% among males of 12–60 years age. Among them, 16.8%, 25.7%, and 22.3% were estimated to be dependent on alcohol, cannabis, and opiates, respectively. Among people seeking treatment for drug dependence, prevalence of various substance found was: alcohol 44%, cannabis 12%, and opiates 26%. The National Family Health Survey (NFHS) reports increasing trend of alcohol use among men and tobacco use among women (NFHS-2, NFHS-3). As per NFHS-3 (2005–2006), 40% of males (youth) and 5% of women use tobacco in any form. Nineteen percent of the males smoke tobacco and 30% report smokeless tobacco use. Use of tobacco (in any form) and alcohol increase sharply from age 15 to 24 years.

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The first nationwide survey "Global Adult Tobacco Survey" India (2009–2010) reported current tobacco use in any form among 34.6% adults (47.9% males and 20.3% females). Among them, 14% and 25.9% adults are current tobacco smokers and smokeless tobacco users, respectively.

Gender and Age

In contrast to most of the other mental-health conditions, substance use primarily affects men but women are also vulnerable. The critical age-group for the onset of substance use is 15–24 years; majority of users initiate substance use in this period. The young people usually start experimenting with substances which are legal, easily available, and have social approval to some extent (such as tobacco, alcohol, and cannabis). Onset of tobacco use may occur at an even earlier age (12–13 years). Usually, boys initiate drug use, earlier than the girls. After using substances like tobacco and alcohol, some of the people using these substances start taking other drugs like cannabis and opioids as well.

Socioeconomic and Cultural Factors

Socioeconomic and cultural factors influence pattern of substance use at an individual level and also at a population level. Religious and cultural practices influence the risk and pattern of substance use. In some cultures in India, home-brewed alcohol use (Northeastern states) or opium (Rajasthan) use is acceptable.

Comorbidity

Among people using substances, a high prevalence of comorbid psychiatric disorders is found, a phenomenon also known as "dual diagnosis". Some studies have even shown that up to 50% of the substance users have a psychiatric comorbidity. These comorbid disorders include other substance use disorders, antisocial personality, mania, schizophrenia, depression, and anxiety disorders.

ETIOLOGY

Substance use disorders are best understood as biopsychosocial disorders. It is a brain disease wherein the voluntary drug using behavior transforms into a compulsive behavior due to change in the structure and neurochemistry of the user. Multiple etiological factors have been implicated for the development of substance use disorders. They can be broadly divided into internal (biological) and external factors (environmental).

Biological Factors

Genetics

Most of the information available on genetics of substance-related disorders relates to alcohol. Family studies show history of parental drinking poses higher risk of drinking in offspring. Twin studies show that the concordance rate of alcohol use disorders in monozygotic twins is almost two times higher than that of dizygotic twins (58% vs. 28%). Adoption studies, assessing the rates of developing substance use disorders among children of alcohol using parents, have reported that the rate of development of this disorder was four times higher among children with alcohol using biological parents than nonalcohol using biological parents, thus establishing the contribution of genetic factors.

Neurobiology

Some of the neurobiological mechanisms of developing dependence on substances are

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Table 8.5: Physical complications of long-term substance use.

Psychoactive substances	*Physical complications of long-term use*
Alcohol	• *Gastrointestinal*: Fatty liver, alcoholic hepatitis, cirrhosis, esophagitis, acute gastritis, pancreatitis, and malabsorption • *Nutritional deficiencies*: Thiamine, pyridoxine, vitamin A, folic acid, and ascorbic acid • *Hematological disorders*: Anemia, leukopenia, and thrombocytopenia • *Cardiovascular system*: Cardiomyopathy, hypertension • *Central nervous system*: Wernicke–Korsakoff syndrome, dementia, and cerebellar degeneration, peripheral neuropathy, and myopathy • *Metabolic disorders*: Ketoacidosis, hypoglycemia, hypocalcemia, and hypomagnesemia • *Miscellaneous*: Fetal alcohol syndrome, osteoporosis, tuberculosis, psoriasis, and domestic and traffic accidents • *Malignancies*: Oral, esophagus, colon, hepatocellular, and breast (women)
Opiates	• *Related to parenteral drug use*: Cellulitis, thrombophlebitis, endocarditis, septicemia, hepatitis B and C, acquired immunodeficiency syndrome (AIDS), and pulmonary hypertension • *Related to inhalation (chasing)*: – Recurrent chest infection – Chronic bronchitis – Pulmonary tuberculosis • Poor immune status • Nutritional deficiencies • Overdose (accidental, deliberate) • Accidental injury during intoxicated state
Cannabis	Not associated with any significant medical complications per se. There is a greater likelihood that individuals who use cannabis regularly, might come into contact with drugs with far greater health consequences with regular use of cannabis
Tobacco • Smokeless tobacco • Smoking tobacco	 • Oral ulcers • Submucous fibrosis • Oropharyngeal malignancies • Chronic bronchitis • Recurrent chest infection • Lung malignancy

use). The long-term hazards depend upon individual vulnerability and pattern of substance use. The long-term health hazards are listed in **Table 8.5**.

Substance-induced Psychiatric Features

Certain psychoactive drugs can induce psychiatric syndromes (e.g., cannabis-induced mania, alcohol-induced depressive symptoms, alcoholic hallucinosis, and alcoholic jealousy) apart from producing dependence, harmful use, intoxication, or withdrawal. These induced psychiatric disorders often remit within a short period of abstinence from the substance.

They also produce various other psychosocial complications **(Table 8.6)**.

DEFINITIONS AND DIAGNOSES

The WHO (ICD-10) has provided guidelines to make uniform diagnosis for substance-related

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Clinical History Taking

Components of clinical history taking are listed below in **Box 8.2**.

Physical Examination

To look for:

- Evidence of intoxication, withdrawals, and route of drug use (e.g., injection marks in case of injection drug use (IDU)]
- Evidence of physical damage due to drug use or medical comorbidity.

Mental State Examination

To rule out presence of any induced psychiatric syndromes or comorbidity, a full Mental State Examination would require to be done, which has been dealt in a separate chapter.

Investigations

Investigations serve two purposes in drug use treatment.

- Confirmation of presence/absence of substance within body or validation of self-report (e.g., alcohol breath test, thin layer chromatography for other substances)
- Identify and measure physical damage caused by substances (complete blood count, liver function test, etc.)
- Monitoring of blood parameters as prerequisite for pharmacotherapy (liver function test in patients on disulfiram, naltrexone).

The investigations provide an objective measure of the substance used and the extent of health damage. The findings of the investigations are utilized in formulation of management plan and also to enhance motivation of individuals who does not accept their drug use as a problem.

Box 8.2: Components of clinical history taking.

- Patient's sociodemographic profile
- Details of drug use
- Complications associated with drug use
- *High-risk behaviors*: Such as injecting drug use with needle sharing and risky sexual practices
- Details of past abstinence attempts
- *Nature of treatment in the past*: Pharmacological, psychological, or combined
- Reason for previous relapse/s
- Reason for treatment seeking and level of motivation
- Psychiatric illnesses such as mood disorder, psychotic disorder, and personality disorder/traits
- Presence of family history of substance use disorder (SUD), psychiatric illness, and the current living arrangements
- Extent of available social support

Treatment Modalities

Irrespective of the nature of substance being used, there are two treatment modalities:

1. *Pharmacological treatment*
2. *Psychosocial interventions.*

Pharmacological Treatment

The pharmacotherapy is aimed at:

- Reversing the acute effects (such as intoxication, overdose, and toxicity)
- Relief of withdrawal symptoms
- Reduction of craving
- Relapse prevention
- Restoring the physiological functions.

Pharmacotherapy can be broadly divided into two phases:

1. Short-term treatment (also known as detoxification)
2. Long-term treatment (maintenance).

Detoxification: Pharmacotherapy plays the major role in this phase of treatment. This phase is aimed at reversing the acute effects and providing relief from withdrawal symptoms. Additional health consequences arising out of substance use, medical, and

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- Alliance and synergy with other health programs
- Utilization of community resources for effective control of environment.

CONCLUSION

Substance use disorders are biopsychosocial disorders with significant public health burden. All physicians are expected to be able to recognize and diagnose the common substance use disorders and provide basic interventions as well as referral to specialists, if required. Effective treatment strategies (both pharmacological as well as psychosocial) exist which can be employed to help a large number of patients suffering from substance use disorders, even in the general healthcare settings.

TAKE-HOME MESSAGES

- Substance use disorders are complex biopsychosocial conditions with a significant public health burden.
- Most commonly used substances in India are tobacco and alcohol. However, a significant number of people also suffer from cannabis, sedative, opioid, and inhalant use disorders.
- Every physician should possess the knowledge and skills to assess and treat/refer patients presenting with common substance use disorders. In all health settings, substance use history should be enquired into and if needed, brief interventions should be provided.
- Physicians should employ an empathetic attitude to patients presenting with substance use problems. A judgmental attitude should be avoided.
- Severe alcohol withdrawal is a medical emergency, which is often unrecognized. However, alcohol withdrawal symptoms can be effectively treated with benzodiazepines.
- Substance use disorders are chronic, relapsing conditions. Most patients require long-term treatment which involves combining pharmacotherapy and psychosocial approaches.
- Most patients of substance use disorders can be treated in the outpatient, non-specialist settings.

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This books contains the basics of psychiatry from the masters of psychiatry. It is the first multiauthor textbook of psychiatry for the undergraduate medical students. The faculty includes the best the country has to offer under the banner of Indian Psychiatric Society. It begins with a discussion of nature of mind, basic principles of psychosocial and biological sciences, clinical evaluation and classification; further goes on to cover all the major psychiatric syndromes and diagnostic categories; also covers various psychiatric subspecialties and ends with a discussion of history and future of psychiatry. Its strengths are simplicity, lucidity and authenticity.

The book is intended to empower all clinicians with insights from the field of mental health to enable them to deliver comprehensive healthcare to their help-seekers. This book is designed for the undergraduate medical students and also as a gate-way textbook for those planning to enter this field as a specialist. This book surely is going to give an experience of enrichment."



PK Singh is MBBS from All India Institute of Medical Sciences, New Delhi and has done his MD in psychiatry from Postgraduate Institute of Medical Education and Research, Chandigarh. His association with the discipline of Psychiatry spans over 40 years starting from the year 1978. He has also worked in a rural area and a preclinical department. Currently he is Professor and Head of the Department of Psychiatry at Patna Medical College, Patna which has the unique distinction of being the seat of first post graduate degree in psychiatry being awarded by Patna University in the year 1941 to Dr. (Prof.) L. P. Varma. Dr. Singh is also holding additional charge of the Director of the only and upcoming Mental Hospital of the state of Bihar known as 'Bihar State Institute of Mental Health and allied Sciences, located at Koilwar, Bhojpur. Dr. Singh has been continuously involved in undergraduate & postgraduate psychiatry teaching, research work, patient care, institutional development, discharging MCI & University responsibilities as well as responsibilities of professional bodies.



Om Prakash Singh is MBBS from Burdwan Medical College and MD from LHMC, Delhi. He has been nodal officer of DMHP, Bankura in 2001 and served as expert on Mental Health Programme to Govt of West Bengal from 2006 to 2011. He has worked in different medical colleges including Medical College, Kolkata and IPGMER, Kolkata. Currently he is Professor and Head, Department of Psychiatry, NRS Medical College; Kolkata. He has keen interest in UG teaching, Public health and Forensic Psychiatry. He is Editor of Eastern Journal of Psychiatry and Deputy Editor of Indian Journal of Psychiatry. He has more than 70 papers in peer reviewed journals, 2 books as Editor, five chapters in different books and one book to his credit. He is Hon General Secretary of Indian Association of Geriatric Mental Health.



Vinay Kumar is Consultant Psychiatrist at Manoved Mind Hospital, Patna. He is MBBS and MD from Patna Medical College, Patna. Despite being in private practice Dr Kumar has always been involved in academic activities. He has presented at national and international levels. He has been editor/co editor of many IPS publications and has contributed chapters. He has received Indian Medical Association's Ramchandra N Murthy Award (2007) for his work in the field of Psychiatry. He has served Indian Psychiatric Society as Member, Editorial Board: Indian Journal of Psychiatry; Editor: Eastern Journal of Psychiatry; Chairperson: Election Commission, Hony Treasurer (2012-16); Chairperson: Publication Committee (2016-18).

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