

DRUG ABUSE

clinical and basic aspects

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TO
THE EXPLORERS OF THE MICROCOSM

who
knowingly or unknowingly
undertook their "trip"
in pursuit of peace and pleasure,
for prevention of pain and anxiety,
or with mystical and spiritual ends in view
but
in all probability lost their way

FOREWORD

ADDICTION: A SEEMING UNWISDOM OF THE BODY

Some 50 years ago the physiologist Walter Cannon, while studying the appetitive behavior of animals, introduced the term "homeostasis." This useful expression emphasized the purposeful nature of diverse activities that maintain the internal environment of the body. Substances lost by catabolism or excretion are systematically sought and ingested. As he pointed out, the wisdom of the body can be seen in the accuracy with which fluctuations in composition of the body are recognized and translated into behavioral drives. When survival is threatened, as in severe dehydration, the thirst drive becomes overwhelming, superseding all others. Deficiencies generate specific appetites, making it possible for animals to survive even in unfavorable environments.

But not all appetitive behavior is wise in the homeostatic sense. Some preferences, such as that for the nonnutritive sweetener saccharin, seem misguided. Others, such as the ingestion of alcohol, narcotics, and nicotine, seem self-destructive. Many lesser appetites, such as are reflected in the drinking of coffee and seasoning of food, may or may not be harmless but at best we cannot see the necessity for them in physiological terms. Is the body unwise, or does the homeostatic view give us only a partial understanding of drive processes?

Many of the activities associated with reproduction, dominance, migration, play, and exploration are nonhomeostatic in the

limited sense of the term, although clearly important to survival of the species. But even when the concept of survival is broadened from the individual to the species, various activities remain outside of the explanation. For these appetites we fall back upon subjective terms such as a desire for pleasure or avoidance of pain, curiosity, or perversity. In proportion to our ignorance, we become moralistic. The field awaits another Walter Cannon to give order to what today seem to be unwisdoms of the body.

Several hundred thousand persons in this country are physically dependent on narcotics and feel a compulsive need for them, acquired by an unhappy combination of exposure to the drugs and individual susceptibilities that we do not understand. The modern, or nonjudgmental, era in the field of drug addiction might be dated from the opening of the Addiction Research Center of the U.S. Public Health Service in Lexington, Kentucky. Studies of men and animals receiving narcotics under controlled conditions gave rigorous meanings to the clinical phenomena of physical dependence, abstinence, analgesia, and drug-seeking behavior. All treatment programs today—especially those using chemotherapy—are derived from these basic studies. We are still far from a cure of addiction, but at least the problem can now be defined objectively.

Many of us believe that this abnormality of appetitive drive will some day be ex-

plained in biochemical terms, and that truly curative treatment will be found. For the present we can only do our best with empirical measures, which inevitably lead to differences in opinion. The essential condition is that we accept the failures as our own and do not waste time blaming the addicts, or nature, for being unwise. All of us in this field have known some success and considerable failure—but with documentation

of the results, we will do better tomorrow. A book such as this, bringing together the perspectives and differences in interpretations of professionals, renders an important service.

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PREFACE

Drug abuse is a serious sociomedical problem. Although mostly youth is involved, other age groups have also been affected to varying extents. Drug abuse is no longer restricted to lower socioeconomic strata of the society. The problem, which was considered to be waning a few years ago from its peak at the early sixties, is again becoming serious. Abuse of older drugs like heroin and amphetamine are on the rise again; sniffing of industrial solvents and other inhalants is popular; introduction of newer drugs for abuse continues.

Effective handling of this problem needs participation of various organized groups. While pursuit for scientific knowledge pertaining to prevention and management of drug abuse is extremely important, dissemination of such knowledge among the involved public as well as the concerned and responsible members of society is also important. While much benefit can be derived by educating lay abusers and their parents, friends, and associates about the evils of drug abuse, participation of the well-informed medical community in handling and solving the problem from both the clinical and the preventive aspects will also be extremely important. Technical journals, reviews, and symposium proceedings provide available scientific knowledge on both basic and clinical aspects of drug abuse, although in scattered forms, and many popular books and literature have been written in nontechnical language for the

lay public. However, for busy personnel of the medical community and allied professions only a few books provide digested but authoritative and comprehensive technical information on clinical and basic aspects that will be useful for management and prevention of drug abuse. The primary objective of this book has been to provide such information.

In the compilation of this book attempts have been made to provide digested information in important clinical aspects on drug abuse as far as possible, while for better comprehension, background and supporting materials on pharmacology, psychology, sociology, epidemiology, and legal and educational aspects are also provided. For further information on topics dealt with in the book, selected references of papers, reviews, and monographs have been listed; extensive cataloging has been avoided to eliminate unnecessary details and increase in volume.

The book is primarily intended for the use of the medical community including physicians, dentists, nurses, pharmacists, physician assistants, and advanced students of these respective professions who are acquainted to some extent with the background knowledge in various disciplines relevant to drug abuse. In addition, this will provide valuable information on drugs of abuse and drug abuse to interested psychologists, social workers, narcotic treatment center assistants, and basic and clinical researchers in the field.

We gratefully acknowledge the advice of many individuals in the preparation of this book and the help of a number of faculty members from Howard University and George Washington University, as well as several scientists from the National Institute on Drug Abuse, for their expert reviews and helpful comments pertaining to various chapters of this book. We are also greatly indebted to Dr. Judith K. Lawrence of the Drug Enforcement Administration, Depart-

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Sachindra N. Pradhan
Samarendra N. Dutta

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Section I

**GENERAL ASPECTS OF
DRUG ABUSE**

1

INTRODUCTION

SACHINDRA N. PRADHAN

Nonmedical use of drugs
Compulsive drug use and after-effects
Terminology
 Drug addiction and drug habituation
 Drug abuse
 Psychic (psychological) dependence or habituation
 Physical dependence
 Cross-dependence
 Tolerance
Factors involved in drug abuse
 The drug
 Drug as a reinforcer
 Tolerance and dependence
 Tolerance
 Physical dependence
 The abuser
 The environment
Drugs of abuse
Scope of this book

From time immemorial human beings have looked for substances or have practiced methods to make life more pleasurable and to avoid or decrease pain, discomfort, and frustrations. For the purpose of changing his mood the primitive man has looked for substances around him, particularly in the plant kingdom. His search led to the discovery of valuable medicinal plants, many of which affect the mind. Psychotropic effects of several such drugs of plant origin were known to the primitive man in many parts of world; to name a few, opium in ancient Sumer and later in China; cannabis in China, India,

Egypt; peyote in Mexico; coca leaves in the high Andes. Some of these substances produce euphoria or relieve pain; others alter perception. Accordingly, in many cultures while some of them were used for medicinal purposes, others became valuable adjuncts of socioreligious rituals, by helping at least some individuals to explore their minds. Use of these substances in various phases of life was accepted in many cultures and countries, and probably did not create any concern or cause many problems.

Today, the drug culture is much more widespread and extensive. Although the motivating factors for initiating drug use, such as search for pleasure and relief of pain, probably remain the same in many cases, other factors such as curiosity, boredom, peer pressure, and persuasion by drug pushers play important roles. Furthermore, to the number of psychoactive agents from the plant kingdom, resources of the chemist's laboratory have been added to lengthen the list of drugs with abuse potentiality.

NONMEDICAL USE OF DRUGS

Although drugs in the usual sense of the term are mainly intended for medical uses, they have also been used for many nonmedical purposes. However, in the broad sense, a drug may be defined as "any substance that, when taken into the living organism, may modify one or more of its functions."² Many substances that possess psychoactive properties but may not have any approved medical uses have also been used for some other

purposes. The nonmedical uses of drugs may vary from occasional drinking of alcohol or smoking of marijuana to compulsive use of opioids. Such use may be “casual” or “recreational,” such as when a modest amount of a drug is taken for pleasurable effects; or use may be experimental, just to test the effect of a drug out of curiosity or under peer pressure. A drug such as amphetamine may be taken under special circumstances, for example, by students during examination time or by truck drivers on the road to keep them awake and alleviate fatigue. Such self-administration of a drug that is not approved medically or that deviates from the social pattern within a given culture may be considered as drug abuse.

COMPULSIVE DRUG USE AND AFTER-EFFECTS

One of the hazards associated with the use of mood-altering drugs is that some users eventually behave as if the effects produced by such a drug or the conditions associated with its use are necessary to maintain an optimal state of well-being. Such individuals develop feelings that vary from a mild desire to a “craving” or “compulsion” to use the drug. The various forms of nonmedical drug use may lead to more intense use, both in terms of frequency and amount, and, in some cases, to compulsive drug use. This can also occur after initial, medically approved use of some of the psychotropic drugs. Since self-administration of such drugs is generally considered as deviation from medically or socially approved patterns of use, the terms “compulsive drug use” and “compulsive drug abuse” are interchangeable.

Abuse of a psychoactive drug involving its repeated self-administration causes several after-effects. Apart from the acute and chronic toxic manifestations, important phenomena that will be discussed later include psychological dependence (habituation), tolerance, and physical dependence (abstinence syndrome).

TERMINOLOGY

The various terms used in connection with drug abuse to some extent have been confus-

ing and modified through the years.^{1,4} The problem of drug abuse has not only involved professionals from various medical and paramedical disciplines, but also attracted the attention and participation of persons from legal, social, and psychological professions, the executive and legislative branches of the government, and the community at large. Members of these diverse groups have used various terms according to their own interpretations of the problem, and sometimes the same term has been used to connote different meanings. To clarify some of these confusions several terms used in connection with drug abuse will be briefly discussed and their current definitions will be presented.

Drug addiction and drug habituation

An important early attempt to characterize different patterns of drug abuse with pharmacological criteria was made by Tatum and Seevers⁶ in 1931 with their definitions of the terms “drug addiction” and “drug habituation.” In drug addiction, physical dependence to a drug developed and the withdrawal or abstinence syndrome was produced when the use of the drug was reduced or stopped; drug habituation was associated with psychological, but not physiological, involvement. In subsequent years much confusion arose in connection with the use and implication of the word “addiction.” In 1950 the Expert Committee on Drugs Liable to Produce Addiction (now a subdivision of the World Health Organization) defined “drug addiction” as:

... a state of periodic or chronic intoxication, detrimental to the individual and society, produced by the repeated consumption of a drug (natural or synthetic). Its characteristics include: 1. An overpowering desire or need (compulsion) to continue taking the drug and to obtain it by any means; 2. A tendency to increase the dose; 3. A psychic (psychological) and sometimes a physical dependence on the effects of the drug.⁹

“Drug habituation” was defined in the following way:

A habit-forming drug is one which is or may be taken repeatedly without the production of all of