American Handbook of Psychiatry

DRUG ADDICTION

MARIE NYSWANDER

DRUG ADDICTION

Marie Nyswander

e-Book 2016 International Psychotherapy Institute

From *American Handbook of Psychiatry: Volume 3* Silvano Arieti

Table of Contents

DRUG ADDICTION

Marie Nyswander

Drugs with a potential for addiction may be considered by the practitioner from several viewpoints: as chemical agents with predictable pharmacological properties; in terms of their psychological effects for the individual concerned; or in terms of the wider sociological implications. Among these, only the pharmacological actions have remained constant with the passage of time and changing environmental conditions.

Addiction Defined

For some years, the term "addiction" has been used chiefly to define a state arising from repeated consumption of a drug capable of inducing *physical* dependence and an overwhelming compulsion to continue its use. The term "habituation" has been reserved more for drugs associated with *psychological* dependence. However, often the terms have been used interchangeably, resulting in confusion as to which drugs actually produce a physical dependence. In recognition, the World Health Organization recently observed that "It has become impossible in practice and is scientifically unsound to maintain a single definition for all forms of drug addiction or habituation." Noting that a feature common to these conditions, as well as to

drug abuse in general, is “dependence, psychic or physical, or both, of the individual on a chemical agent,” WHO recommended use of the broader term “drug dependence” for “a state arising from the repeated administration of a drug on a periodic or continuous basis.” Moreover, since drug dependence may be associated with use of a variety of drugs, the term was qualified further as “drug dependence of the amphetamine type,” and so on. This chapter will be devoted chiefly to a discussion of narcotic drug dependence of the morphine type produced by natural derivatives of opium, such as morphine itself, heroin, Dilaudid, and codeine, or by synthetic equivalents thereof, for example, meperidine and methadone.

Historical Background

Chemical agents that alter mood and behavior have been known since ancient times. Historical data tell that opium (from the opium poppy, *Papaver somniferum)* was well known to the Egyptians before 1500 B.C.; earlier, at the height of the Sumerian civilization, opium was not only known but given a name it still holds today: “plant of joy.” Ancient writings attest to the popularity of opium throughout the rise and fall of the Babylonian, Egyptian, Greek, and Roman empires. Homer referred to the poppy and its properties of “lethal slumber.”

Significantly, as opium use increased, presumably for the gratifications

it provided, it was acknowledged also as a medically important drug, valuable as a sedative and for its analgesic properties. In the centuries that followed, the use of opium spread throughout Europe and elsewhere in the world. Medical records around the time of the American Revolution attest to the use of opium as an analgesic in various gastrointestinal disorders, to allay the pain of childbirth or of cancer, and in control of fever. It is ironic that despite physicians' familiarity with opium, its addictive properties long remained unsuspected.

With the synthesis of the morphine derivative heroin in 1898, its medical use was encouraged as a nonaddictive substitute for morphine. Rather quickly, heroin became readily obtainable in a number of over-the-counter pharmaceutical preparations. According to records of the time, its availability probably helped to create new addicts in large numbers.

However, an earlier development—invention of the hypodermic needle in 1853—was also encouraging the spread of drug abuse. Introduced to the United States from Europe around 1856, the hypodermic needle was widely used during the Civil War to administer morphine to the wounded and for relieving the symptoms of dysentery. After the war, opium derivatives continued to be taken by any of several routes: orally (in tincture form), rectally (pulverized), or intravenously by hypodermic needle. It was reasoned by many that drug dependence was not possible when administered by a

needle—as the drug did not reach the stomach, a "hunger" for it was unlikely to develop. With the advent of heroin at the end of the century, preference for the needle as the means of drug intake was clearly established. Despite its illegality, heroin has been the addict's "drug of choice" since about 1915. Its manufacture or use here has been illegal since the 1920s.

Legal Controls

Early in this century, laws went into effect in virtually all states and many municipalities governing use of opiates. The medical profession, recognizing by then the dangers of drug dependence, had been giving broad publicity to the adverse effects. Lawmakers, as well as the public at large, were increasingly aware that addiction had become a major social problem, although how rapidly incidence was increasing was unknown. (Terry and Pellens estimated the incidence of narcotics addiction in the U. S. Population in 1885 to be between 1 percent and 4 percent.)

Mounting concern over the addiction problem led to the passage of federal legislation (Harrison Narcotic Act of 1914) that could be more vigorously enforced than local or state laws. As is known, the Harrison Narcotic Act sought not to make addiction illegal but to control production and distribution of narcotic drugs so that they would be dispensable only by physicians. One effect was to reduce, temporarily, the number of addicts.

Since the passage of the Harrison Narcotic Act, U. S. enforcement policy attempting to regulate the behavior of addicts and the physician-addict relationship has been the most restrictive in the world. (By legal definition, all drugs regulated under the Harrison Narcotic Act and subsequent federal laws are classified as narcotics, although some are non-narcotic in their pharmacological action, for example cocaine and marijuana.)

Unfortunately, in controlling the flow of narcotics from the manufacturer to the physician, the Harrison Narcotic Act and court decisions that followed also limited the physician's role in treating drug dependence. Dispensing of narcotics in diminishing quantities to "break" the drug habit was permissible, but supplying narcotics in a controlled setting for those addicts who were unable to forego drug use was strictly forbidden. It is of interest that prior to these rulings some forty medical clinics throughout the U.S. were dispensing narcotic drugs to addicts as part of a planned treatment program. However, by 1924 all such facilities had been forcibly closed. This action was strongly favored not only by state and local authorities but by the American Medical Association, reflecting the emerging view that drug dependence was a moral evil, in no way to be encouraged. As these policies went into effect, legal difficulties confronted physicians. Referring to this legal harassment of doctors, John Ingersoll, Director of the Bureau of Narcotics and Dangerous Drugs, recently stated:

> Prosecutions and intimidations [during that period] were sufficiently successful to eliminate the interest of the medical profession generally in engaging in the treatment of addicts, other than in the two approved federal hospitals at Lexington (Kentucky) and Fort Worth (Texas). Government policy was broadly supported by existing medical opinion and seems to have achieved the desired end. It was, however, a policy which succeeded in terminating both the sincere and insincere efforts without distinction.

Addiction and Crime

For the addict unable to forego drug use, the only alternative was to turn to illegal sources of supply which prior to that had been a minor factor in the spread of drug abuse. The tragic consequences for the individual addict, and for society at large, have been readily apparent as the incidence of addiction has increased, particularly among the young. In our cities, where drug addiction is most concentrated, the economic decline and deterioration, as well as the increase in crime, have been part of the price paid. Needless to say, the social consequences of addiction vary with the laws governing the use of drugs, as well as the physician-addict relationship. In England, where physicians have long been permitted to prescribe narcotics as part of the management of drug-dependent patients, there has been little association of addiction and crime. Economic background also plays a role. It is well known that in this country the wealthy addict rarely comes to the attention of authorities; in contrast, the poorer addict is too readily forced into a life of crime to meet his increasing need for narcotics.

Failure of Treatment Models

For nearly a thirty-year period ending in i960, essentially the only treatment facilities for all voluntary patients were at the U.S.P.H.S. hospitals located at Lexington, Kentucky, and Fort Worth, Texas. A major treatment aim was to keep the addict drug-free for a period of time (ranging from four months to five years). It is no secret that the treatment provided proved unsuccessful; the relapse rate following detoxification was in the range of 95 percent. As we now know, this approach was found to fail since the problem of drug abuse is a chronic illness and unlikely to respond to measures involving incarceration or punishment."

In 1960, New York City pioneered in launching a program for the study and withdrawal treatment of drug dependence. It opened fifty beds in a general hospital, and within a year, to meet the demand, increased the number to some four hundred. After a forty-year absence, physicians were once again participating in the treatment of addiction. In 1965, five years after the return of treatment to the local communities, a new branch of medicine emerged: the medical treatment of narcotic addiction. At the present writing, some 65,000 addicts are receiving medical and rehabilitative services in methadone programs throughout the country, and research is continuing to search for a more effective agent.

Physical Dependence

Physical dependence is in effect a form of physiological adaptation to the presence of a drug. Once such dependence has been established, the body reacts with predictable symptoms if the drug is suddenly withdrawn. The nature and severity of withdrawal symptoms (referred to in their totality as the abstinence syndrome) depend on the drug in question, as well as on the daily dosage level. For example, symptoms of withdrawal from morphine-like narcotics (after as little as eight doses over a two-day period) include neuromuscular twitching, mydriasis, lacrimation, rhinorrhea, shivering, yawning, and sneezing. If allowed to continue, more severe symptoms appear: increased breathing rate and blood pressure, profuse sweating, severe vomiting, and diarrhea. Typically, onset of the abstinence syndrome occurs within eight to twelve hours after the last dose; symptoms peak at thirty-six to seventy-two hours. Death is unlikely, but the intensity of symptoms is such that it is medically negligent to allow them to run their full course. Only administration of a narcotic can bring relief; without doubt, prison suicides of narcotic addicts would occur less often if this were done.

Tolerance

With the continued use of narcotic drugs, the addict finds he must increase the dose to avoid symptoms of abstinence. This is a consequence of narcotic tolerance. The sedative, analgesic, and respiratory effects may be so greatly diminished that a dose expected to be fatal for a normal individual

may be taken without untoward effect. When patients are maintained in a steady state of narcotic tolerance by the regular administration of a long-acting narcotic drug (such as methadone), they are likely to be functioning normally as measured by tests of reaction time, co-ordination, and mental performance. However, high tolerance does not exist in an addict who is not using drugs, and so giving large amounts of a narcotic to such a person is very likely to produce signs of an overdose.

Tolerance can be built up in a pre-exposed addict in a matter of days. Experimentally, it has been demonstrated that a tolerance to 1200 mg. of morphine daily can be established in about four months.

Several theories have been advanced to explain the mechanism of tolerance; thus far, those that have been tested have been pretty well disproven while the others can merely be speculated upon. Among the possibilities that have been considered are that tolerance is due to changes in enzymatic activity in the liver, to adaptation on a cellular level in the central nervous system, or to altered turnover of a neurotransmitter. It seems certain that metabolic processes are involved both in tolerance and in physical dependence; however, whether they are basic to either or to addiction itself remains to be determined. (A detailed review with bibliography of research in these areas is to be found in the *Annual Review of Biochemistry.)*

Both tolerance and the abstinence syndrome have been well documented with use of experimental animal models;' in most such studies, animals have been repeatedly injected with morphine until the drug is needed to prevent withdrawal symptoms. According to an early experiment by Spragg, animals so treated became "drug-seeking," refusing food, and instead turning to the syringe and narcotics to alleviate their symptoms. In another experiment, animals fitted with an indwelling catheter, to self-administer drugs, became addicted within a few days. Once addicted, they would sustain narcotic dependence by maintaining drug intake at a fairly steady level. Thompson, in an interesting experiment, found that addicted animals given a dose of methadone "self-diminished" the amount of morphine injected in proportion to the dose of methadone given.

In animals as in man, symptoms of abstinence can be curbed only by administration of a narcotic. Tranquilizers and sedatives have proven ineffectual for this purpose.

Relapse

It has been assumed that once an addict has been withdrawn from physical dependence on a narcotic drug and remains drug-free for a time, he is in effect cured of his drug dependence. On this basis, it is reasoned that if he returns to the use of drugs, it must be for psychological reasons. This

tendency to relapse has long been considered due to lack of motivation and/or an inherent weakness in the addict's personality. Hence, according to this theory, the major hope of salvaging the relapsed addict should be through psychotherapy and related techniques. However, psychotherapy has had very limited success. The rate of relapse to drug use following psychotherapy may be as high as 90 percent, which is no better than the result of no treatment.

Research findings suggest an explanation; that relapse may be the result of neurochemical or neurophysiological changes, or perhaps a combination of the two, that persist long after narcotic drugs have been withdrawn. For example, manifestations of the abstinence syndrome—elevated body temperature, mydriasis, increased blood pressure and respiratory rate—may remain for months after withdrawal of a narcotic; this was consistently observed by Himmelsbach in studying detoxified patients at the government facility at Lexington. Confirming these findings, Martin et al. showed that in detoxified addicts abnormalities of metabolism—such as hypothermia and decreased sensitivity of the respiratory center to $C0_2$—persisted into a later phase of secondary abstinence. Rats withdrawn from high doses of morphine likewise showed lasting metabolic abnormalities. Increased tolerance to the narcotic effects of drugs appears to persist long after drug use has been terminated. According to Cochin and Kornetsky, response to a challenge dose of morphine is significantly different in previously addicted and control rats after as long as a year of abstinence; initially, the former had been given but a

single injection of morphine. These findings suggest that the central nervous system of the post-addict remains biochemically and physiologically abnormal after so-called detoxification. The persistence of drug hunger, reflected in relapse after detoxification, may be explainable on this basis.

Clinical Course of Addiction

Despite beliefs to the contrary, narcotics per se do not cause serious impairment to body or mind, as do barbiturates and alcohol. Addicts who have used opiates for as long as fifty years have shown no evidence of mental deterioration. To be sure, addicts neglect themselves physically; the time and money spent in drug-seeking leaves little room for self-care. There is of course the risk of hepatitis from use of contaminated needles, or pulmonary disorders from injected particulate matter, but the pathology seen in addicts does not appear to be due to the opiate.

Typically, the heroin addict is likely to make repeated attempts to be rid of his addiction. Virtually all patients, even recently addicted adolescents, tell of their efforts to find treatment. Most recently, patients applying for treatment have attempted detoxification one to five times a year.

Initial Exposure to Narcotics

Among the misconceptions about drug dependence is the theory that

use of marijuana predisposes to heroin addiction; widespread use of both drugs among youths tends to reinforce that belief. Closer analysis reveals that these forms of drug usage tend to involve two different social groups. In the urban ghetto, initial exposure to heroin usually begins without prior experience with other drugs; curiosity and desire to emulate friends or neighbors, plus the availability of heroin, may be sufficient precipitating factors. Economic deprivation, lack of privacy at home, and lack of recreational opportunities outside the home, increase the temptation. Although heroin addiction occurs in privileged middle-class youths, the drugs abused by this group at the present time are more likely to be barbiturates and amphetamines. Apparently, the large majority of college students have tried marijuana without becoming regular users. Drug abuse in this group may be symptomatic of the intense middle-class pressures for achievement, coupled with a sense of alienation. Generally, use of these drugs tends to decrease with time; by the mid-twenties it has usually stopped.

Diagnosis of Addiction

Recognition of the extent of narcotic drug use in various population groups has increased with improved methods of diagnosis. Until quite recently, the diagnosis of active drug addiction was often difficult to establish. The presence of old or new needle marks or “tracks” over the veins of the hands, arms, or legs is certainly good presumptive evidence of heroin

addiction, but there may be an absence of other clues. Development of a diagnostic urine test, utilizing thin layer chromatography, has permitted identification of a variety of drugs, including morphine, quinine, barbiturates, amphetamines, cocaine, methadone, and some tranquilizers. Unfortunately, no sooner was the value of the test established than it become subject to misuse, employed for purposes of identifying addicts and refusing them employment or advancement at work. Given the far-reaching consequences when an individual is labeled an addict, a diagnosis should never be made on the basis of a single urine test; moreover, the reliability of the laboratory should be assured. Too often, neither of these requirements is met.

Psychodynamics of Addiction

It is well known that not all individuals exposed to narcotics become addicted. Even with narcotics easily obtainable by city youths "on every street corner," only some people become addicts; others with similar backgrounds of poverty and deprivation do not. This would seem to give support to the thesis that there is a basic personality pattern or character defect that leads to drug dependence or makes a given individual especially vulnerable. The addict is said to be emotionally dependent, unable to form meaningful relationships, driven to seek pleasure through drugs as an escape from reality. Tendencies to opiate addiction and criminality are also closely linked.

These theories implicating psychological or mental abnormality as a cause of addiction have been advanced by a number of investigators over the past thirty years. Once they gained credence, they became part of the dogma concerning addiction; they continue to be cited in textbooks and in teaching. However, the accumulated data from institutions managing large number of addicts have failed to confirm them. No specific personality pattern has emerged. The range of personal characteristics in addicts is as varied as in any other group; comparisons of addicts with other population groups have failed to differentiate between the two. Nor are there psychiatric tests or other measurements that can indicate who is already addicted, or predict who might become addicted with exposure.

Clearly, addiction is the result of the repeated use of an addictive drug. It can and does occur in individuals of all emotional capacities and psychiatric backgrounds. It may occur in psychotics and neurotics, in the mentally retarded, and in persons of high intelligence and productivity. On the other hand, individual differences, as well as the social context in which addiction occurs, do help to explain variations in response to drugs and in drug-seeking behavior. Thus, a physician-addict may contain his addiction to such an extent that he manages to live a productive and useful life; another individual with similar access to drugs may become totally incapacitated.

The view that the tendencies to addiction and criminality are linked,

which unfortunately persists, reflects a confusion between consequences and causes of addiction. The reason why one individual becomes an addict after exposure to heroin, and another not, is at present unknown. Whether or not the susceptibility to addiction has a metabolic basis is a question for future research.

Conditioned Reflex Theory

Some investigators think it unlikely that biochemical factors will prove important either in causing addiction or return to use of drugs after detoxification. An alternative explanation of relapse has been offered by Wikler and others. On the basis of animal experiments in which conditioned associations were established by pairing certain environmental stimuli with drug effects during a cycle of active addiction, it is suggested that relapse may be the result of conditioning. The experiments have involved either classical or operant conditioning in addicted animals (rats or monkeys) subjected to drug withdrawal. In classical conditioning, a neutral stimulus—for example a signal light—becomes associated with the abstinence syndrome by repeated pairing of the signal and the abstinence state; subsequently, the signal is paired with relief of symptoms by provision of the narcotic needed to eliminate them. In operant conditioning, the animal is trained to perform a certain action—pressing a lever, going to a designated area in the cage, moving its head or a limb in a given direction—and rewarded by relief of

withdrawal symptoms with a drug injection. There seems an obvious parallel in the behavior of human addicts who resume use of drugs on returning to a familiar neighborhood and meeting old friends. According to histories of addicts, conditioned associations are often involved in relapse after a period of abstinence. However, the observations in animals should not be taken to imply that conditioned associations are likely to be the sole or chief cause of relapse among human addicts. Even if conditioning plays a role, as it undoubtedly does, it may be secondary to narcotic drug hunger having a physiological or biochemical basis.

Withdrawal Treatment

Methadone has, for twenty years, become the drug of choice for detoxifying heroin addicts. Its use is associated with milder withdrawal symptoms than produced by other narcotics. Adult addicts are initially given 40 mg. of methadone daily in divided doses. The amount of narcotic is slowly reduced over a three-week period; usually, chloral hydrate sleeping medication is given as well. The treatment period may be extended over eight weeks if desired. Detoxification is carried out either within the hospital (on a closed ward) or on an ambulatory basis, in which case the patient reports daily for medication. (The procedure described is that presently used at the Morris J. Bernstein Institute of Beth Israel Hospital in New York City, presently the largest detoxification facility in the country, with which the

writer is associated. Other hospitals follow a similar routine.)

Inasmuch as about half of the patients are unable to complete detoxification and virtually all relapse after return to the street, it can no longer be held as an effective therapy of drug abuse. For the “street addict” it offers only brief respite, at least reducing the drug habit. In addition, it brings him into a medical facility, and provides an opportunity for diagnosis and treatment of co-existing medical problems.

Methadone Maintenance Therapy

The failure of detoxification treatment spurred efforts to find other approaches that might reduce or eliminate the desire for heroin. The experience with the temporary benefits of methadone in detoxification suggested that maintenance therapy with this agent might provide the means. Initial clinical studies begun at Rockefeller University Hospital in New York City in 1964 demonstrated that methadone could effectively block the euphoric action of heroin and hence remove drug hunger. Methadone itself produced no euphoric or other narcotic effects when given to patients stabilized on a constant dose. With extension of the program to the Beth Israel Hospital, these observations were confirmed. Methadone tolerance could be maintained without escalation of dosage; moreover, the dosage could be reduced or the drug stopped altogether without creating a desire for

methadone itself. The greater duration of action of methadone (twenty-four to thirty-six hours) than of heroin (four to six hours) proved a basic advantage; in addition, it could be taken orally. (There is no indication for dispensing methadone in injectable form, except if a patient is unable to take oral medication for medical or surgical reasons.)

Initially, the patients who were admitted to the methadone research program were addicts with a history of at least four years of "mainline" heroin use and repeated relapses after detoxification. Now, the programs are open to addicts eighteen years or older who have been addicted for two years or more. The diagnosis must be documented by physical signs and urine testing, and the history corroborated by the family and/or medical records. As a measure of the success of these programs, more than 70 percent of patients continuing in one for two years or more have obtained employment or returned to school. Drug-related crime has been reduced to less than 10 percent of the pre-treatment rates.

There appears to be no medical contraindication to use of methadone; in the eight years the program has been operative in New York City, no toxic effects or idiosyncratic reactions have been observed. (More than 10 million doses have been given.)

In initiating maintenance therapy,' the dose must be low at first and

increased gradually over a four-to-six-week period. On the first day, 20 to 40 mg. (depending on the amount of heroin being used) can be given in divided doses; increments of 10 mg. daily are added every three or four days, unless the patient complains or appears oversedated. The increase is added to the morning dose so that eventually only one daily dose need be taken. In general, patients feel no drug hunger when maintenance dose is about 50 mg. daily; however, in localities with high narcotic usage, investigators tend to increase the amount to 100 mg. daily; this is to assure a sufficient blocking dose should the patient experiment with heroin.

Adjunctive services of methadone maintenance programs should depend on the nature of the population served. In clinics treating chiefly inner city addicts, the services most needed involve housing, jobs, and provision for other essential needs. In programs primarily for the middle class, provision for psychiatric services is usually indicated.

Under some circumstances, physicians can now provide methadone maintenance therapy in their private office. Of course, since methadone is a narcotic, its use anywhere is regulated by federal and state guidelines. In the case of the private physician, specific government provisions must be met.

Despite the success of methadone maintenance therapy, other agents are being tested. Methadone is dangerous if taken by a nontolerant adult or

by a child. (Death of a child after taking a dose intended for a stabilized adult has been described in several reports.) As a narcotic, methadone creates physical dependence; it would be preferable to have an agent equally effective in blocking drug hunger without creating dependence. Ideally, such an agent would be capable of reversing the central nervous system effects of past exposure to heroin or another addictive agent so that treatment would not have to be continued indefinitely.

For the present, whether or not a physician is himself involved in methadone maintenance therapy, he should be aware of the rapid growth of such programs in the past few years. Given the large number of patients being treated, problems of methadone overdose can and do occur. Physicians should be familiar with use of naloxone as an antidote (to be given repeatedly over a twenty-four-hour period); hospital emergency rooms should have supplies of the antidote on hand.

Narcotic Antagonists

The possibility that narcotic antagonists might be useful in treatment of heroin addiction was first tested with cyclazocine and more recently with naloxone. When given to detoxified addicts, these agents block the euphoric effect of narcotics; they also have the advantage of being nonaddictive. However, blocking the euphoric effect may not be sufficient to prevent clinical

relapse. Experience with cyclazocine in a number of programs over the past six years indicates that only a small minority of patients remain in treatment for more than a year; most return to drug use much sooner. The short blocking action of cyclazocine (less than twenty-hour hours) may be a chief reason why drug hunger remains virtually unaffected. Work with naloxone is proceeding in the hope that it will prove more useful; as yet, there are no definitive results.

Therapeutic Communities

Residential facilities managed by former addicts had their start with the founding of Synanon in California in 1958; at present, ex-addicts operate a group of Synanon residences throughout the country; similar programs, modeled after Synanon, include Daytop Village, Phoenix House, Odyssey House, Exodus House, to name but a few.

The theory underlying most such programs is that drug dependence is rooted in specific psychopathology manifested by immaturity and irresponsibility. The aim is to encourage addicts to work toward greater responsibility within the organization. Those who progress are rewarded with more desirable work assignments; those not measuring up are reassigned at a more menial level. Group therapy and “encounter” sessions are an integral part of the program.

Several descriptive accounts of the procedures used have been reported; however, little of the published material provides a detailed analysis of results and, in general, directors of these programs have been reluctant to allow outsiders access for evaluation. From what is known, there seems little question that patients who remain in the therapeutic community fare well, particularly if employed by the program; however, apparently a significant proportion (reportedly about 50 percent) drop out fairly early. Other evidence suggests a high relapse rate among ex-addicts who complete the therapeutic program and return to the community. According to some estimates only 10 percent remain drug-free after two years. Other findings suggest that therapeutic communities may be beneficial to certain addicts, particularly the young middle-class abuser of amphetamines or barbiturates. The true value of such programs can only be speculated on until more data are available.

Concluding Remarks

Present treatment options in the management of narcotic drug abuse have their basis in either a psychological theory of addiction, or a theory that neurochemical and/or neurophysiological factors may be critical in creating or maintaining drug dependence. The first theory postulates the existence of pre-existing psychiatric problems, plus a need for drugs to escape from reality. According to the second, the initial impulse is likely to reflect a

combination of adolescent curiosity and social exposure; and adaptive changes in the central nervous system, induced by physical drug dependence, tend to persist long after the drug is withdrawn.

Naturally, the principles of therapy are dissimilar. Proponents of a psychological basis for drug abuse are apt to ask total abstinence from narcotics; the treatment program may involve confinement in a therapeutic community or another setting providing some form of psychotherapy. Proponents of neurochemical-neurophysiological causation define their successes in terms of behavior, indicated by an addict's ability to pursue a reasonably normal and useful existence despite drug dependence.

To resolve the issue, questions must be answered. Do patients blockaded with methadone exhibit significant residual psychopathology in facing the challenge of giving up heroin and taking on responsibilities of work, school, and family life? According to evaluations from a number of sources, including reports from correctional and social agencies, the large majority of methadone-treated patients are freed of drug hunger and can turn their energies to more productive endeavors. On the other hand, one may ask, are patients treated in a psychologically oriented program with seeming success likely to remain drug-free? It appears, from the evidence, that without continued group reinforcement and perhaps further institutionalization, few are able to do so.

Bibliography

Berle, B., and M. Nyswander. "Ambulatory Withdrawal Treatment of Heroin Addicts," *New York State Journal of Medicine,* 64 (1964), 1846-1848.

Cochin, J., and C. Kornetsky. "Development and Loss of Tolerance to Morphine in the Rat After Single and Multiple Injections," *Journal of Pharmacology and Experimental Therapeutics,* 145 (1964), 1-10.

Dole, V. P. "Biochemistry of Addiction." *Annual Review of Biochemistry,* 39 (1970), 821-840.

----. "Narcotic Addiction, Physical Dependence and Relapse," *New England Journal of Medicine,* 286 (1972), 988-992.

Dole, V. P., A. Crowther, J. Johnson, M. Monsalvatage, B. Biller, and S. Nelson. "Detection of Narcotic, Sedative and Amphetamine Drugs in Urine," *New York State Journal of Medicine,* 72 (1972), 471-476.

Dole, V. P., F. F. Folder, H. Trigg, J. W. Robinson, and S. Blatman. "Methadone Poisoning," *New York State Journal of Medicine,* 71 (1971), 541-543.

Dole, V. P., and M. Nyswander. "Rehabilitation of the Street Addict," *Archives of Environmental Health,* 14 (1967), 477-480.

----. "A Medical Treatment for Diacetylmorphine Addiction," *Journal of the AMA,* 193 (1965). 646-650.

----. "Methadone Maintenance and Its Implication for Theories of Narcotic Addiction," in *The Addictive States,* pp. 359-366. Baltimore: Williams and Wilkens, 1968.

Dole, V. P., M. Nyswander, and M. J. Kreek. "Narcotic Blockade," *Archives of Internal Medicine,* 118 (1966), 304-309.

Dole, V. P., M. Nyswander, and A. Warner. "Successful Treatment of 750 Criminal Addicts," *Journal of the AMA,* 206 (1968), 2708-2711.

DuPont, R. L. "Profile of a Heroin Addiction Epidemic," *New England Journal of Medicine,* 285 (1971), 320-324.

DuPont, R. L., and R. N. Katon. "A Heroin-Addiction Treatment Program," *Journal of the AMA,* 216 (1971), 1320-1324.

Eddy, N. B. "The Search for a Potent Non-addicting Analgesic," in E. L. Way, ed., *New Concepts in Pain and Its Clinical Management,* pp. 65-84. Philadelphia: Davis, 1967.

Eddy, N. B., H. Halbach, H. Isbell, and M. H. Seevers. "Drug Dependence: Its Significance and Characteristics," *World Health Organization*, 32 (1965), 721-733.

Gearing, F. "A Road Back from Heroin Addiction." *Proceedings of the Fourth National Conference on Methadone Treatment,* San Francisco, Cal., Jan. 1972, pp. 157-158.

----. "Death Before, During and After Methadone Maintenance Treatment in New York City." *Proceedings of the Fourth National Conference on Methadone Treatment,* San Francisco, Cal., Jan. 1972, pp. 493-494.

----. "Evaluation of Methadone Maintenance Treatment Program," *International Journal of Addictions,* 5 (1970), 517-543.

Gendreau, P., and L. P. Gendreau. "The 'Addiction Prone' Personality: A Study of Canadian Heroin Addicts," *Canadian Journal of Behavioral Science,* 2 (1970), 18-25.

Goldstein, A. "Heroin Addiction and the Role of Methadone in Its Treatment," *Archives of General Psychiatry,* 26 (1972), 291-297.

Gordon, N. B. "Reaction Times of Methadone Treated Ex-heroin Addicts," *Psychopharmacologia,* 16 (1970), 337-344.

Gordon, N. B., A. Warner, and A. Henderson. "Psychomotor and Intellectual Performance Under Methadone Maintenance." Presented to the Committee on Problems of Drug Dependence, National Academy of Sciences, National Research Council, 1967.

Ingersoll, J. Testimony before Subcommittee on Public Health and Environment, U.S. Senate,

1971.

Isbell, H. "Addiction to Barbiturates and the Barbiturate Abstinence Syndrome," *Annals of Internal Medicine,* 33 (1950), 108-121.

Isbell, H., and V. Vogel. "The Addiction Liability of Methadone and Its Use in the Treatment of Morphine Abstinence Syndrome," *The American Journal of Psychiatry,* 105 (1949). 909-914.

Jaffe, J. "Drug Addiction and Drug Abuse," in Goodman and Gilman, eds., *The Pharmacological Basis of Therapeutics,* pp. 285-311. New York: Macmillan, 1965.

Joseph, H., and V. P. Dole. "Methadone Patients on Probation and Parole," *Federal Probation,* (1970), 91-93.

Karkus, H. "Methadone Failures: Patient or Program?" *Proceedings of the Fourth National Conference on Methadone Treatment,* San Francisco, Cal., Jan. 1972, pp. 401-403.

Kramer, J. C. "The State versus the Addict: Uncivil Commitment," *Boston University Law Review,* 50 (1970).

Levine, R., A. Zaks, M. Fink, and A. Freedman. "Naloxone Pamoate: A Long Acting Opiate Antagonist," (to be published).

Lowinson, J., and I. Zwerling. "Group Therapy with Narcotic Addicts," in J. Kaplan, and J. Sadock, eds., *Comprehensive Group Psychotherapy,* pp. 602-622. Baltimore: Williams and Wilkens, 1971.

Martin, W. R. "Opioid Antagonists," *Pharmacological Review,* 19 (1967), 463-521.

Martin, W. R., A. Wikler, C. G. Eades, and F. T. Pescor. "Tolerance to and Physical Dependence on Morphine in Rats," *Psychopharmacologia,* 4 (1963), 247-260.

Nichols, J. R. "How Opiates Change Behavior," *Scientific American,* 212 (1965), 80-88.

Nyswander, M. *The Drug Addict as a Patient.* New York: Grune & Stratton, 1956.

----. “The Methadone Treatment of Heroin Addiction,” *Hospital Practice,* 2 (1967), 27-33.

Resnick, R., M. Fink, and A. Freedman. “Cyclazocine Treatment of Opiate Dependence, a Progress Report,” *Comprehensive Psychiatry* (in press).

Seevers, M. H., and G. A. Deneau. W. S. Root, and F. G. Hofmann, eds., in *Physiological Pharmacology,* pp. 565-640. New York: Academic Press, 1963.

Solitaire, G. B. “Neuropathologic Aspects of Drug Dependence, (Narcotic Addiction),” *Human Pathology,* 3 (1972), 85-89.

Spragg, S. D. S. “Morphine Addiction in Chimpanzees,” *Comparative Psychology Monographs,* 15 (1940), 1.

Terry, C. E., and M. Pellens. *The Opium Problems.* New York: Bureau of Social Hygiene, 1928. (Reprinted by Patterson Smith Co., Montclair, N.J., 1970.)

Thompson, T. “Drugs as Reinforcers: Experimental Addiction,” *International Journal of Addictions,* 3 (1968), 199-206.

Wallach, R. C., E. Jerez, and G. Blinick. “Pregnancy and Menstrual Function in Narcotics Addicts Treated with Methadone,” *American Journal of Obstetrics and Gynecology,* 105 (1969), 1226-1229.

Weeks, J. R. “Experimental Narcotic Addiction,” *Scientific American,* 210 (1964), 46-52.

Weppner, R. S., and M. H. Agar. “Immediate Precursers of Heroin Addiction,” *Journal of Health and Social Behavior,* 12 (1971), 10-18.

Wieland, W., and C. Charles. “Methadone Maintenance: A Comparison of Two Stabilization Techniques,” *Journal of Addictions,* 5 (1970).

Wikler, A. “Some Implications of Conditioning Theory for Problems of Drug Abuse,” *Behavioral Science,* 16 (1971), 92-97.

----. “A psychodynamic study of a patient during experimental self-regulated re-addiction to

morphine." *Psychiatry Quarterly,* 26:270-293, 1952.

----, H. F. Fraser, and H. Isbell. "N-allylnor-morphine: Effects of Single Doses and Precipitation of Acute 'Abstinence Syndromes' During Addiction to Morphine, Methadone on Man (Post-addicts)," *Journal of Pharmacology and Experimental Therapeutics,* 109 (1953), 92-101.

---- and F. T. Pescor. "Classical Conditioning of a Morphine Abstinence Phenomenon, Reinforcement of Opioid-drinking Behavior and 'Relapse' in Morphine-addicted Rats," *Psychopharmacologia,* 10 (1967), 255-284.

Zaks, A., M. Fink, and A. M. Freedman. "Levomethadyl in Opiate Dependence," *Journal of the AMA,* 220 (1972), 811-813.

Zaks, A., T. Jones, A. M. Freedman, and M. Fink. "Naloxone Treatment of Opiate Dependence," *Journal of the AMA,* 215 (1971), 2108-2110.