THE BASICS OF ADDICTION COUNSELING: DESK REFERENCE AND STUDY GUIDE

MODULE I: THE PHARMACOLOGY OF PSYCHOACTIVE SUBSTANCE USE, ABUSE AND DEPENDENCE

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**INTRODUCTION**

The purpose of this module is to introduce addiction counselors and other helping professionals to the field of pharmacology and to increase their familiarity with the signs and symptoms of psychoactive substances. Application of effective counseling techniques must contain factual information on the various types of psychoactive substance use, abuse and dependence and their effects on the human body. In this module, the terms alcohol, drug and substance abuse have been exchanged with psychoactive substance use and dependence. These terms are more appropriate in using the pharmacological approach as an educational model.

Before pharmacology can be explored, it is important for addiction counselors and other helping professionals to understand the direct connection between psychoactive substance use, brain functioning and addiction. Addiction is a brain disease mostly characterized by an individual’s inability to control his or her thoughts of and intake of psychoactive substances. It develops after psychoactive substances are repetitively consumed and the brain readjusts to their constant presence. The threshold for the amount of psychoactive substances that an individual can consume before becoming dependent, however, is unclear. This threshold is determined by the individual’s brain chemistry, genetics and environment. Understanding the course of addiction and the effects of psychoactive substances on the human body will allow addiction counselors and other helping professionals to more effectively treat their clients.

**OBJECTIVES OF THIS MODULE**

This module is not intended to make addiction counselors or other helping professionals experts in pharmacology, but it will provide facts that will assist in the assessment, treatment and referral of clients. For the purpose of this module, all psychoactive substances are grouped into eight classes: central nervous system depressants, central nervous system stimulants, narcotics, hallucinogens, cannabis, solvents/inhalants, anabolic steroids, and psychotropics. Each category provides basic pharmacological information essential to diagnosis and treatment. The purpose of this module is to provide information to help addiction counselors and other helping professionals become familiar with:

- the clinical signs, symptoms, and behaviors that may be indicative of psychoactive substance use, abuse, or dependence;
- the classifications and names of psychoactive substances that are being self-administered, along with their major clinical effects; and
- the functions of the central nervous system and how psychoactive substances affect it.

Psychoactive Substance Use, Abuse and Dependence

The Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision, known as the DSM-IV-TR, is a comprehensive manual that defines psychiatric disorders and is published by the American Psychiatric Association (APA). Psychoactive substance abuse and dependence are included in this manual as psychiatric disorders, but it fails to mention the root cause of each - psychoactive substance use. All psychoactive substance abuse and dependence begin as use, but luckily, not all psychoactive substance use ends with abuse or dependence. Psychoactive substance dependence and psychoactive substance use are perhaps best seen as conditions on opposite ends of a continuum, with a single episode of psychoactive substance use often having no adverse effects, at one end, and repeated episodes of use with many adverse consequences on the other. These distinctions are important to keep in mind when assessing a client’s situation, especially when recommending treatment or some other intervention.

There are several different levels of psychoactive substance use, varying in frequency of use and severity. The first, and arguably least severe, is recreational use. This type of use usually occurs in a social setting among friends who are also using for the purpose of experiencing the psychoactive substance’s effects. This type of use tends to be limited to infrequent social situations and involves small to moderate amounts of the particular psychoactive substance(s) that are being used.

A second pattern is circumstantial use, which is motivated by a desire to obtain a specific effect that is perceived as desirable within a certain context. Examples of this type of user would be soldiers in Vietnam who used marijuana or heroin to relax while in combat or truck drivers who take amphetamines to stay awake and alert for longer periods of time.

The third pattern of psychoactive substance use is intensified use, which occurs when psychoactive substances are taken daily or almost daily, usually in low to moderate doses. This level of psychoactive substance use is usually motivated by an individual’s need to achieve relief from a persistent problem, such as anxiety or depression, or to maintain a desired level of performance.

Finally, the most dangerous and severe pattern of psychoactive substance use is compulsive use. This is characterized by daily or almost daily use of high doses of a psychoactive substance to obtain a desired physical and/or psychological effect. Psychoactive substance use becomes the most important thing in the individual’s life, around which all other activities are organized, usually to the individual’s detriment. This pattern is most likely to come to the attention of others, either at home or in the work place.
According to the *DSM-IV-TR* definitions, recreational use and some forms of circumstantial use are classified as psychoactive substance use; other forms of circumstantial use and intensified use are termed psychoactive substance abuse and compulsive use is classified as psychoactive substance dependence. The criteria required to meet each of these conditions is outlined below.

**Psychoactive substance abuse is distinguished from dependence in the *DSM-IV-TR* and is defined as:**

“A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12-month period:

1. recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; neglect of children or household)

2. recurrent substance use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by substance use)

3. recurrent substance-related legal problems (e.g., arrests for substance-related disorderly conduct)

4. continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (e.g., arguments with spouse about consequences of intoxication, physical fights)

The symptoms of the use have never met the criteria for dependence for that particular class of psychoactive substance.”

**Whereas, psychoactive substance dependence is defined as:**

“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 for the substance
   b. the same (or closely related) substance is taken to relieve or avoid withdrawal symptoms

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

4. 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 or driving long distances), use the substance (e.g., chain-smoking), or recover 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 (e.g., current cocaine use despite recognition of cocaine-induced depression, or continued drinking despite recognition that an ulcer was made worse by alcohol consumption).”
A person who follows the typical pattern of misuse to dependence sets the process in motion with the first single rewarding psychoactive substance use experience. Any rewarding experience usually results in repetitive behaviors, and the same is true for psychoactive substance use in humans. If the experience is unpleasant, the individual will most likely not repeat the experience. The following chart exemplifies the pattern of progression from use through misuse to dependence:

**PSYCHOACTIVE SUBSTANCE DEPENDENCE**

Based on the criteria outlined in the *DSM-IV-TR*, psychoactive substance dependence is distinguished from abuse in that dependence is a repetitive and harmful activity that involves behavioral changes that would be considered pathological in almost any culture. The individual’s life becomes dominated by the desire to obtain and use psychoactive substances, a situation most individuals refer to as addiction. It leads individuals to do things that are often contrary to their values, best judgment and common sense in order to use psychoactive substances. Psychoactive substance dependence is an illness that requires treatment, and the recommended treatment modality depends on the type and degree of dependence, the kinds of adverse effects that are occurring, the available resources and the motivation of the client.

- **physical dependence**
  an altered physiological state produced by the repeated administration of a psychoactive substance that necessitates the continued administration of the psychoactive substance to prevent withdrawal.

- **psychological dependence**
  perception that the effects produced by a psychoactive substance, or the conditions associated with its use, are necessary to maintain an optimal state of well-being.
Psychoactive substance dependence consists of two equal components: physical dependence and psychological dependence. The difference between these two types of dependence is that physical dependence results in the individual experiencing physical withdrawal symptoms in the absence of the psychoactive substance, and psychological dependence makes the individual experience mental cravings in the absence of the psychoactive substance.

**Psychological Dependence**

Psychological dependence occurs when an individual repeatedly consumes a psychoactive substance to obtain a subjective experience that is often described as satisfying a “hunger” or a “need.” This can develop into a pervasive feeling that a particular psychoactive substance is required for adequate functioning, and dependents often say they do not feel normal unless they take the psychoactive substance. Psychological dependence is a behavioral phenomenon often perceived as a relentless desire to use a psychoactive substance, sometimes referred to as a craving. Researchers have determined that cravings are actually biochemically-based reactions of the pleasure centers in the brain and therefore, are likely physical withdrawal symptoms, as well. Locations in the brain responsible for cravings become permanently altered through the continuous use of psychoactive substances, resulting in sensitivity to neurochemical activation long after the individual discontinues use of the psychoactive substance. This type of psychological dependence is usually, but not always, accompanied by physical dependence.

**Physical Dependence**

In the absence of psychoactive substances, the human brain carefully coordinates the activity of all the billions of neurons throughout the body. When the brain is exposed to psychoactive substances, the brain is overridden and functioning is altered. Typically, when an individual does not chronically abuse psychoactive substances, the brain is able to return to normal levels of functioning after the psychoactive substances have been detoxified from the body. However, when an individual repeatedly consumes a psychoactive substance, the brain is in a constant state of imbalance. The brain naturally seeks to always function in a state of equilibrium, called homeostasis, and it will work to restore the balance in spite of the presence of psychoactive substances. Physical dependence is established when the brain adapts to the constant presence of psychoactive substances.

**Withdrawal**

Withdrawal is a physiological process in which the brain has become used to a certain level of a psychoactive substance and has adapted to the presence of it. Once the psychoactive substance is removed, the brain and therefore, the body, in response become very sensitive to its absence. Withdrawal is a normal and expected response to many psychoactive substances and is not alone a diagnostic for misuse.
Withdrawal signs and symptoms usually occur in two phases. The first phase, acute or primary withdrawal, which last from two to seven days, depending on the psychoactive substance, the length of time since the last psychoactive substance was taken and the dose. Withdrawal symptoms are most pronounced during this phase. Acute or primary withdrawal symptoms are easy to remember because they are typically the opposite of the psychoactive effects experienced by the individual after consumption. For example, if a psychoactive substance causes constipation after consumption, one can expect the presence of diarrhea during the primary withdrawal phase.

The second phase is called post-acute withdrawal and can last for weeks or even months after the acute withdrawal has ended. These symptoms are much less intense than the acute phase and have been shown to occur with sedatives, narcotics, cocaine and alcohol, to name a few. Symptoms usually consist of mild nervousness, mood swings, sleep disturbances and changes in bodily functions, such as hormonal secretions, and can be quite uncomfortable.

Unfortunately, withdrawal symptoms can be alleviated immediately by taking the psychoactive substance. Sometimes, individuals in the late stages of a psychoactive substance use disorder no longer use psychoactive substances to produce the psychological effects, but rather to avoid the uncomfortable withdrawal symptoms. Though individuals begin using psychoactive substances for pleasurable effects, when dependence develops, they may have only a few or very brief pleasurable sensations, yet still show uncontrolled and compulsive use.

**TOLERANCE**

Individuals who consume a particular psychoactive substance regularly find that they must consume higher and higher doses to achieve the same intensity of effects as the original dose. This is because the individual has developed a *tolerance*, or acute tolerance, to some of the psychoactive effects of the psychoactive substance. This can occur in as little as three to four weeks of use. Most psychoactive substances produce some level of tolerance if they produce dependence; however, tolerance is different for each psychoactive substance, and it does not occur for each of the psychoactive substance effects. For example, tolerance to the euphoria or high produced by narcotics occurs fairly quickly and to a considerable degree, but tolerance to the constriction of pupils associated with the use of narcotics occurs to a very small degree or not at all.

Tolerance does not only apply to one particular psychoactive substance; it also carries over to all other substances of the same category or classification. This is known as *cross-tolerance*. An example of cross-tolerance is when an individual who is dependent on and tolerant to heroin will also have tolerance to all narcotics, such as methadone or morphine.
DISTINGUISHING ADDICTION

While discussing addiction, it is important to understand that addiction is not a professional term, but rather a social or lay term. The proper terminology is physical and psychological dependence, as both are used in the *DSM-IV-TR* and the *International Classification of Diseases, tenth edition (ICD-10)*. In addition, it is important to appreciate the fact that not everyone who is tolerant to and dependent on a psychoactive substance has problematic or pathologic dependence. Addiction counselors and other helping professionals may occasionally see clients who are regularly prescribed one or more psychoactive substances for a chronic medical condition. These individuals often become physically dependent on and tolerant to the psychoactive substance’s effects but are not psychologically dependent. A typical example of this type of client would be an individual with a very painful and chronic condition, such as cancer or a severe form of arthritis, who must use narcotics for pain relief.

Given the various medical conditions requiring such prescription psychoactive substance use, it can be very difficult for a counselor to determine when someone has crossed over from legitimate use into an addictive state. If a person is determined to have lost control over his or her intake of medication, is using the medication for other symptoms or is getting the medication from more than one prescriber, he or she may have a problematic disorder and should be carefully evaluated.

DETOXIFICATION

*Detoxification* is not a treatment modality but is the necessary first step in and part of in the treatment process. The purpose of detoxification is to help the client stabilize physically and psychologically until the body becomes free of the effects of psychoactive substances or alcohol. It is recommended that detoxification be monitored in a hospital or addiction treatment facility so medical and supportive services can be administered to alleviate the short-term symptoms of physical withdrawal, such as discomfort, cravings and mood changes. However, some clients prefer to be treated with medications, such as benzodiazepines or buprenorphine, by his or her private physician in an office setting. Regardless of the location, symptoms of craving and withdrawal must be controlled in order for treatment to begin.

Within the broad goal of alleviating withdrawal symptoms, there are several additional objectives that can be targeted during the detoxification process. Promoting the health of the individual can be accomplished through measures to reduce and control seizures that occur with some psychoactive substances. It also includes screening for and treating infectious diseases and other medical problems. Psychoactive substance education and relapse prevention programming can begin during detoxification. Some attention may also be given to family, vocational, religious and legal problems. Finally, it is important that the detoxification process be used as an opportunity to recruit and prepare persons for appropriate longer-term treatment programs.
ABUSE LIABILITY AND SCHEDULING

Before most pharmaceutical psychoactive substances are placed on the market, they are tested for their level of abuse liability, or potential for abuse, determined by assessing the likelihood that the psychoactive substance will be taken repeatedly and lead to addiction. The abuse liability varies among psychoactive substances, but it seems that animal experiments, especially those using monkeys or chimpanzees, accurately predict the abuse liability in humans. For example, animals that were allowed to self-administer cocaine were observed to like it so much that they sometimes chose cocaine over sex, food and water and would have died.

Psychoactive substances that are found to have an abuse liability are placed under restricted use by the Drug Enforcement Administration (DEA) and are called controlled substances. Psychoactive substances with the highest abuse liability are generally those that produce euphoria and have a rapid onset of action. It is thought that this sudden onset of a euphoric, pleasant feeling, often accompanied by a reduction of uncomfortable feelings like anxiety or depression, seems to entice some individuals to repeatedly take controlled substances and become dependent.

Controlled substances are placed by the Comprehensive Drug Abuse Prevention and Control Act of 1970 into schedules that range from I to V, depending on their degree of abuse liability and medical usefulness. Since the federal government’s main approach to psychoactive substance abuse prevention is to reduce the availability of the psychoactive substance, the psychoactive substances with the highest abuse liability are policed more aggressively. The following chart outlines the criteria involved in each psychoactive substance’s classification, established by the United States Congress and the DEA.

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Description</th>
<th>Abuse Liability</th>
<th>Medical Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule I</td>
<td>may lead to severe psychological or physical dependence</td>
<td>high potential for abuse</td>
<td>no accepted medical uses and cannot be dispensed by an authorized prescriber</td>
</tr>
<tr>
<td>Schedule II</td>
<td>may lead to severe psychological or physical dependence</td>
<td>high potential for abuse</td>
<td>has some accepted medical uses with severe restrictions and can be dispensed by prescription from an authorized prescriber</td>
</tr>
<tr>
<td>Schedule III</td>
<td>may lead to moderate or low physical dependence or high psychological dependence</td>
<td>moderate potential for abuse</td>
<td>has accepted medical uses and can be dispensed by prescription from an authorized prescriber</td>
</tr>
</tbody>
</table>
DESIGNER PSYCHOACTIVE SUBSTANCES

Based on the language in the Controlled Substances Act of 1970, specific psychoactive substances were regulated and classified according to its formula of chemical properties. Therefore, psychoactive substances that were produced to have a slightly different chemical composition were not classified under the Act and were not regulated by the DEA. These substances are called designer psychoactive substances and are invented by chemists to intentionally circumvent the law. These chemists use their skills to invent a substance with psychoactive effects similar to a traditional controlled substance, such as a narcotic, but with a slightly different chemical formula. They then manufacture and distribute this substance to psychoactive substance dealers for a fee. Many individuals, especially young adults, combine designer psychoactive substances with common over-the-counter or prescription antidepressants to intensify or extend the euphoric experience; unfortunately, this combination also increases the lethality of the psychoactive substance cocktail ingested.

Under past laws, it was technically impossible to arrest individuals who manufactured and sold such designer psychoactive substances because they did not exactly fit the legal definition of an illicit substance. As a result of multiple situations in which severe adverse effects occurred in users of these new designer psychoactive substances, several new laws were passed that gave enforcement agencies authority to prosecute such cases. Despite new laws regulating all psychoactive substances, new variations continue to be produced around the world.

METHOD OF ADMINISTRATION

There are several different ways for an individual to consume psychoactive substances. Each psychoactive substance has unique administration methods, though usually, the fastest and most intense method is preferred. The method selected to introduce the psychoactive substance into the body will dictate the speed and intensity of the desired psychoactive effects. There are eight basic ways to consume a psychoactive substance:

- **Orally** - consumed through the mouth, by either smoking, which is rapid and intense, or in pill form. If the psychoactive substance is a solid, like a pill, it is absorbed through the stomach and intestines. If the psychoactive substance is inhaled, it is absorbed through the large bed of capillaries on the surface of the lungs.
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- **Nasally** - snorting or inhaling the psychoactive substance through the nose, which is longer acting.

- **Intramuscularly (IM)** - injecting the psychoactive substance into a muscle. This method can cause damage to the muscle after repeated injections.

- **Intravenously (IV)** - injecting the psychoactive substance into a vein, which is often called “shooting,” and is the most intense, rapid and efficient method of administration. Most individuals prefer this method above others due to the increased perceived intensity of the euphoria. However, along with this pleasure comes an increased risk of HIV/AIDS, tuberculosis, and hepatitis B and C and other infectious diseases when individuals share dirty needles.

- **Subcutaneous (SC)** - injecting the psychoactive substance directly beneath the skin. This method can irritate the skin and cause infection to this area.

- **Topical** – applying the psychoactive substance onto the top layer of the skin (e.g. LSD blotter paper or duragesic patches). This method provides a systemic effect if it is able to penetrate the skin tissues and be absorbed into the blood stream, especially if heat is applied.

- **Sublingually** - dissolving the psychoactive substance under the tongue and absorbing it through the mouth tissue

- **Rectally** – inserting the psychoactive substance into the rectum so it can be absorbed through the rectal tissue

**WHERE DOES IT GO ONCE CONSUMED?**

When a psychoactive substance is consumed, regardless of method of administration, it is absorbed into the blood stream and circulated throughout the entire body. This distribution takes approximately a minute if it is successful at penetrating the **blood-brain barrier**. This barrier is a series of tightly pressed together cells that only allows for the passage of certain chemicals. If a psychoactive substance is fat-soluble and has a small enough molecular size, it can easily pass through the blood-brain barrier; whereas, large, water-soluble psychoactive substances cannot penetrate the blood-brain barrier. Most psychoactive substances are fat-soluble.

Immediately after the psychoactive substance is distributed, the body works diligently to rid itself of the substance. The body most often accomplishes this by turning the psychoactive substance into **metabolites**, which can be discarded from the body through a process called

- **blood-brain barrier**
  a series of cells that prevents certain chemicals from reaching the brain

- **metabolites**
  by-products from the liver breaking down a psychoactive substance that can be eliminated from the body

- **metabolism**
  the process of breaking down a psychoactive substance into metabolites so they may be eliminated from the body

- **half-life**
  the amount of time necessary to eliminate one half of the original dosage of a psychoactive substance from the body

- **elimination**
  the process of ridding a psychoactive substance from the body by excreting it either through urine, feces, sweat, saliva or breath
metabolism. The liver is responsible for metabolizing most foreign substances, with the kidneys providing necessary support. A psychoactive substance’s half-life is the amount of time it takes to eliminate one half of the original dosage from the body. Once metabolism has occurred, the metabolites are most often excreted by urine or feces, called elimination, but they can also be removed via sweat, saliva or breath.

The age of the individual and his or her tolerance level can drastically affect the rate of absorption, metabolism and elimination of psychoactive substances. Young children and older adults are slower to rid their bodies of psychoactive substances, whereas, individuals who have developed a tolerance to a particular psychoactive substance tend to metabolize and eliminate psychoactive substances faster than individuals without tolerance.

**POLYSUBSTANCE ABUSE**

It is important to remember that psychoactive substance use, abuse and dependence can involve both licit and illicit psychoactive substances, and that psychoactive substance dependents commonly use more than one psychoactive substance to heighten the experience. This simultaneous use of one or more psychoactive substances is called polysubstance abuse. Almost any combination of psychoactive substances can be abused; however, some patterns are more common than others. For example, alcohol is commonly used with cocaine, marijuana and/or nicotine, and heroin is often used in conjunction with marijuana, alcohol or benzodiazepines (especially diazepam). It is important for an addiction counselor or other helping professional to assess which psychoactive substances are being used by the client and in what combinations.

In addition, psychoactive substance dependents will sometimes be intoxicated with one substance while withdrawing from another. For example, an individual who is dependent on sedatives and narcotics can be drowsy and intoxicated from the use of sedatives, but have a runny nose, nausea, anxiety and diarrhea as a result of simultaneous withdrawal from narcotics. These situations can be very confusing. The addiction counselor or other helping professional must be sensitive to these symptoms because they can present special problems in identification and referral for treatment.