DRUG AND ALCOHOL USE WITH DIABETES

About the Author

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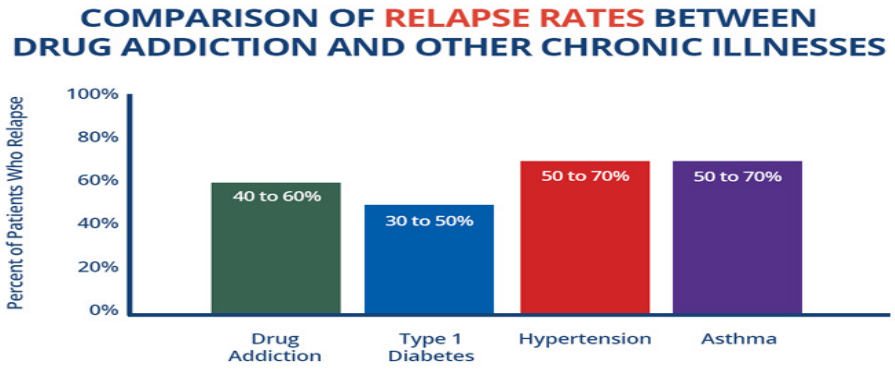
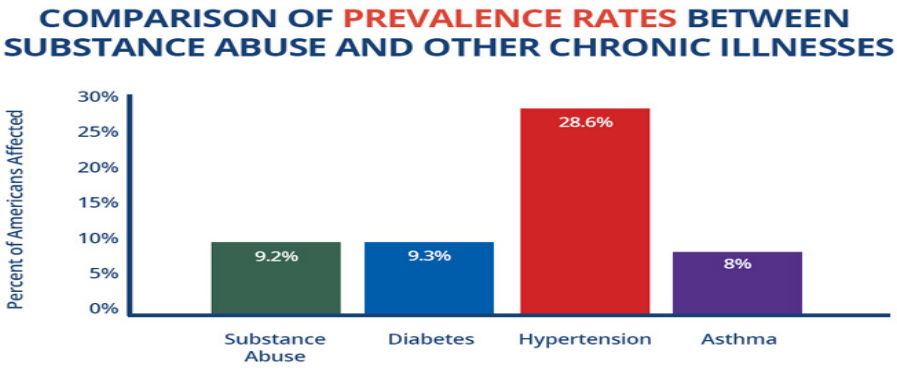
Comprehensive Guide to Research on Risk, Complications and Treatment

Substance abuse is described as the excessive use of a substance such as alcohol or drugs that results in significant clinical impairments as well as the loss of ability to function academically, professionally, and socially [1]. An individual who was healthy before the substance abuse began will typically begin to experience serious health problems over time, but extensive damage may be avoided or reversed if effective substance abuse treatment is received.

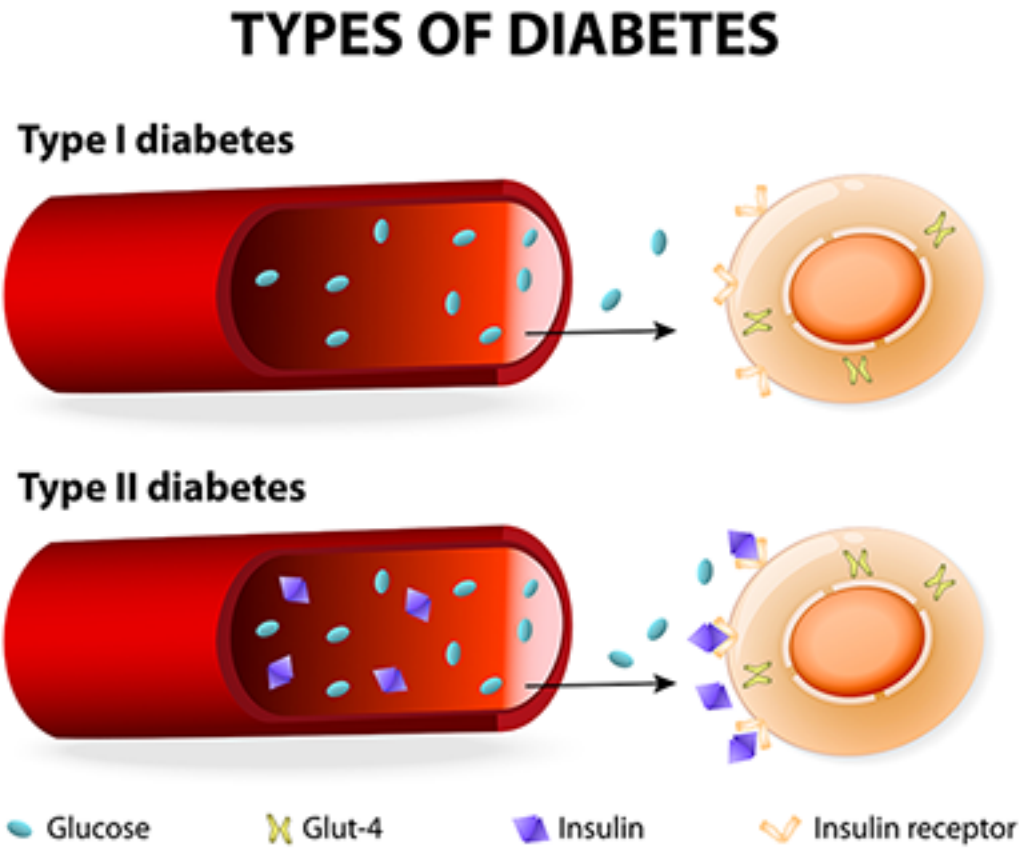
This is not the case, however, for individuals who have been diagnosed with diabetes, and although this is a manageable disease with proper treatment, substance abuse may cause it to become life-threatening. This guide will discuss, in detail, how substance abuse can negatively impact the life and health of a person with diabetes.





Types of diabetes

Diabetes, also referred to as diabetes mellitus, is a condition in which the body is unable to properly regulate blood sugar levels. There are two forms known as type 1 and type 2 diabetes, but in order to better understand the difference between the two types, the role that insulin plays in the regulation of healthy blood sugar levels will be briefly described. During the digestive process, carbohydrates are broken down into glucose, which is a form of sugar that easily enters the bloodstream and is used by the body for energy.



The pancreas normally responds to increasing blood sugar levels by initiating the production of the hormone known as insulin. As insulin levels increase, it signals the transfer of glucose into cells throughout the body and it also ensures that excess glucose will be stored in the liver in order to prevent high blood sugar levels.

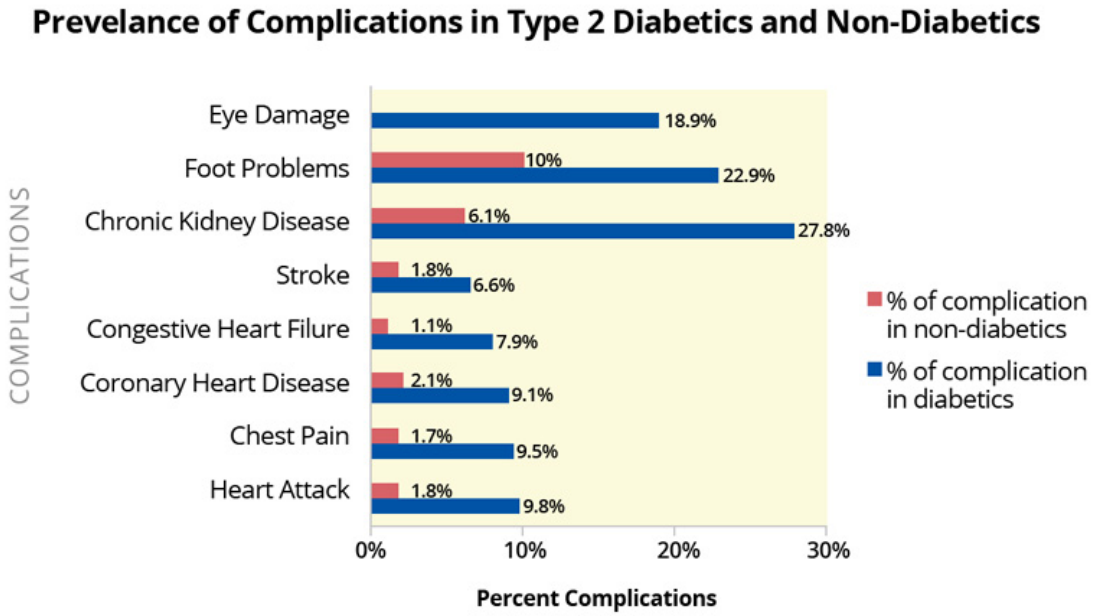
Type 1 diabetes, which is also called juvenile or insulin dependent diabetes, develops due to the loss of cells in the pancreas that are responsible for producing insulin. This causes either no insulin or miniscule amounts to be produced. Type 1 diabetes is also commonly referred to as juvenile diabetes because it is often diagnosed during childhood [2].

"Hyperglycemia refers to abnormally high blood sugar levels and this occurs when there is not enough insulin in the body."

Type 2 diabetes, which is the most common form, develops as a result of the body's inability to properly use insulin. This inappropriate response is referred to as insulin resistance. Initially the pancreas begins to produce extra insulin in order to counteract the body's resistance, but eventually the pancreas cannot produce the amount of insulin that is needed to maintain normal blood sugar levels [3].

Although the mechanisms are different, both of these types of diabetes prevent sugar that is in the form of glucose from entering the body's cells and if the condition is not properly treated, blood sugar levels become dangerously high.

Health problems caused by uncontrolled diabetes



Uncontrolled diabetes may result in serious medical problems such as hyperglycemia or hypoglycemia [4, 5]. Hyperglycemia refers to abnormally high blood sugar levels and this occurs when there is not enough insulin in the body. Hypoglycemia, or abnormally low blood sugar levels, occurs when there is too much insulin in the body and not enough sugar in the blood in the form of glucose. Both of these complications can cause a number of dangerous health problems that include [4, 5]:

- Organ damage (e.g., kidneys) if hyperglycemia develops
- Damage to the small blood vessels in the eyes, which may lead to blindness
- Nerve damage, called diabetic neuropathy, which may lead to skin ulcers and other injuries that heal poorly
- Paralysis and limb amputations due to nerve damage and cumulative injury
- Blood vessel damage in the heart, which increases the risk of atherosclerosis, heart attacks and strokes
- An increased susceptibility to high blood pressure
- A coma or even death due to hyper- or hypoglycemia

In addition, when insulin levels are too low, the body may also begin to break down fat and use it as an energy source, but this causes toxic acids called ketones to build up in the bloodstream. This phenomenon is known as diabetic ketoacidosis and it is a medical emergency [6]. These types of complications are intensified by alcohol and drug abuse. Furthermore, alcohol abuse as well as a poor diet throughout childhood or adulthood have been labeled as possible causes for type 2 diabetes [3].

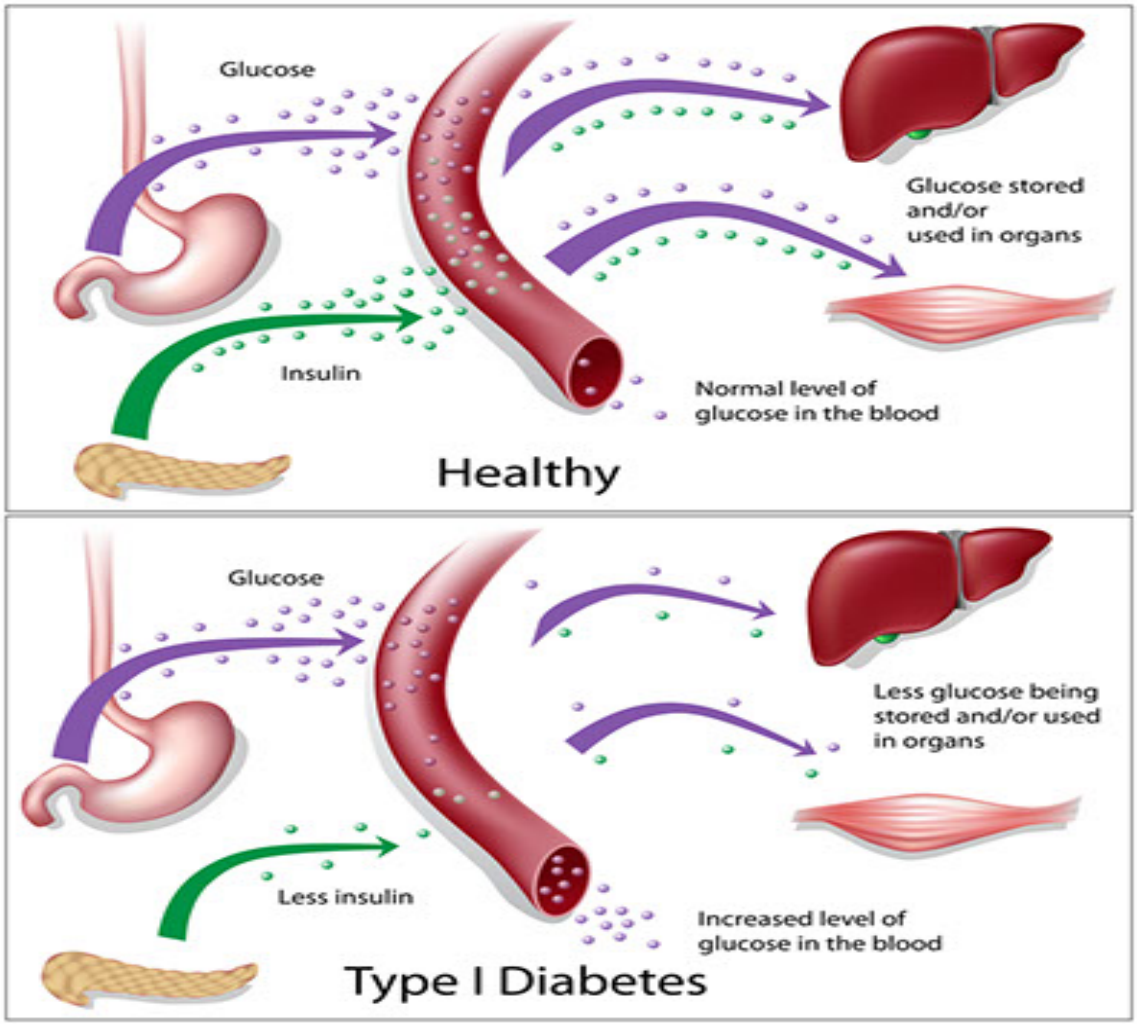
The negative impact of alcohol abuse on diabetes

Individuals who have been diagnosed with diabetes have to be especially careful when consuming alcohol. Typically, women who have diabetes are advised to consume only one drink a day and only two drinks are advised for men with diabetes.

However, if a person with diabetes already has hypertension, nerve damage, or eye problems, the consumption of alcohol is usually not recommended at all. This is because drinks such as wine and beer contain carbohydrates that can be broken down into glucose (sugar) and consuming more than the recommended amount of alcohol may cause blood sugar levels to rapidly increase.

Alcohol slows down the liver

Drinking alcohol also hinders the liver from releasing stored glucose; this can lead to dangerously low blood sugar levels. It takes about two hours for the liver to break down the alcohol that is contained in one drink. The energy spent in doing so would otherwise be utilized for a healthy release of stored glucose. All told, alcohol slows down the body's reaction time, disrupts the liver's ability to release glucose, and may cause individuals with type 1 or 2 diabetes to slowly develop hypoglycemia [7, 8].



For individuals who have type 1 diabetes, even drinking small amounts of alcohol along with a meal in the evening may result in the onset of hypoglycemia up to 24 hours later [7, 9]. This is believed to be due to the delay in the regulatory processes of the liver as well as the impaired ability of the individual to detect a drop in blood sugar early enough to improve the condition by eating, for example [9]. These types of health problems worsen dramatically in individuals with diabetes who not only drink, but abuse alcohol.

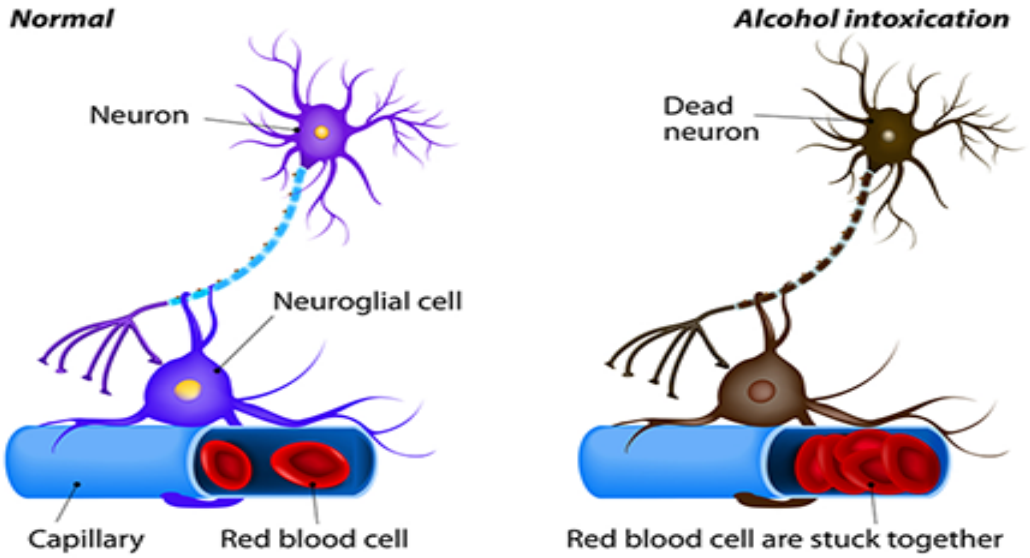
Furthermore, the symptoms of hypoglycemia and alcohol intoxication are quite

similar sometimes. Failure to discern a hypoglycemic episode from acute intoxication can easily result with the person with diabetes not receiving the proper care. If the person with diabetes is not wearing an I.D. bracelet, hypoglycemia may not be suspected right away, even when evaluated in an emergency room. The resultant delay of care can put the individual at further risk of suffering from more serious complications.

Alcohol worsens nerve damage

One of the complications of uncontrolled diabetes is nerve damage, and excessive alcohol consumption or alcohol abuse can worsen the symptoms. If diabetic nerve damage develops it can affect both sensory (e.g., sensitivity to touch and temperature) and motor function.

Alcohol abuse causes a condition known as hyperalgesia in which the already damaged nerves become even more sensitive to pain [10, 11]. In other words, if an individual with diabetes is already suffering from pain due to nerve damage, alcohol abuse can dramatically increase the amount of pain that is felt.



In addition, alcohol abuse leads to a continuous release of certain hormones that are meant to control pain and prevent further damage to the body. What results, however, is a sustained increase in activity of the nervous system, which will actually further intensify pain signaling [12, 13].

Therefore, alcohol abuse makes it much harder for the body to control the pain that may have already developed due to diabetic nerve damage and in doing so makes the individual's condition dramatically worse.

Alcohol abuse makes eye problems worse

An occasional drink may cause temporary double vision or blurry vision, but alcohol abuse can worsen any type of eye disease that has been caused by an individual's diabetes [14]. Alcohol slows down brain activity, which causes the pupils to react more slowly and this alters their ability to widen or constrict properly.

Over time, this also permanently weakens the muscles in the eyes. As a result, alcohol abuse can lead to blurred vision or double vision that is permanent,

especially in diabetics who may have already had existing vision problems.

Alcohol abuse also causes blood vessels in the eyes to swell and this produces a red, bloodshot appearance. Rapid eye movement, in which the eyes involuntarily move back and forth, may develop over time as well in the individual abusing alcohol.

If a person with diabetes begins to develop eye problems, the right form of treatment may help slow or prevent further vision loss. However, individuals with diabetes who also drink excessive amounts of alcohol will experience unchecked deterioration of their vision.

The vision loss that occurs from alcohol abuse is somewhat gradual and for some individuals, alcohol abuse is even linked to the onset of type 2 diabetes [3]. The effects of alcohol abuse on vision are more prominent in individuals with type 2 diabetes [14]. This is mainly because type 1 diabetes is often diagnosed during childhood and adolescence, while type 2 diabetes is typically diagnosed during adulthood.

Alcohol reduces the effectiveness of diabetes medication

Alcohol reduces the effectiveness of insulin injections or pumps that most type 1 diabetics use and certain medications that promote insulin activity in type 2 diabetics, such as Prandin (meglitinides) and sulfonylureas (glyburide, glipizide) [15, 16].

Insulin injections and pumps provide specific quantities of insulin to type 1 diabetics. Pumps, in particular, are programmed to deliver a small amount of insulin continuously throughout the day and a larger amount during mealtime. Drinking large amounts of alcohol alters blood sugar levels and makes it difficult for an individual to properly program the insulin pump. In other words, the pump cannot automatically adjust the insulin dosage to accommodate the rapidly changing blood sugar levels after alcohol consumption. In addition, drinking excessive amounts of alcohol decreases the body's ability to respond to injected insulin. This is because the body begins to focus much of its metabolic energy on removing the alcohol from the system, which prevents proper blood sugar regulation. This situation can become especially dangerous for type 1 diabetics.

In addition, certain medications for type 2 diabetics stimulate the pancreas in order for more insulin to be produced after a meal. Alcohol, however, prevents the body from responding to the diabetes pills in a timely manner, thereby hindering the ability of the body to work in conjunction with the medication to regulate blood sugar levels.

Drinking excessive amounts of alcohol even makes some individuals more hungry than usual. Additionally, an intoxicated individual is more apt to make poor food choices, and have more difficulty gauging the amount eaten. The combination of eating too much along with the alcohol's potential to lower the effectiveness of medication can result in high blood sugar levels (hyperglycemia).

Drug use and diabetes

Substance abuse isn't limited to just alcohol. Substance abuse can also include the excessive use of recreational or illegal drugs, which are defined as chemical agents that change the way the brain and body normally function [1]. Recreational and illegal drugs are those that have not been approved by a physician for medical

purposes. This guide will focus on those drugs that are used by people with diabetes that can negatively impact their health.

Although drugs tend to affect people in different ways, the harmful side effects of most recreational and illegal drugs make them especially dangerous for individuals who have diabetes. Drug abuse may result in both physical and mental problems (e.g., organ or brain damage) that can alter an individual's ability to properly use diabetes medication.

Taking drugs can also lead to an addiction, depression, or an unexpected overdose. Moreover, many illegal drugs may counteract or reduce the effectiveness of medication that people with diabetes use to maintain healthy blood sugar levels. Complications due to drug use that lead to hyper- or hypoglycemia can result in coma, or death for a person who is diabetic. Understanding the health risks that are associated with diabetes and drug abuse is an important way to stay safe and healthy.

The effects of smoking on diabetes

Compared to the general population, the rates of cigarette smoking are much higher in alcohol and substance abusers. No guide would be complete without inclusion of the harmful effects of smoking in individuals with diabetes who may or may not also be concurrent substance abusers.

On its own, uncontrolled diabetes may result in damage to the blood vessels of the heart, which increases the risk of heart diseases (e.g., atherosclerosis), heart attack and strokes [4]. Smoking is harmful for people who do not have diabetes because it reduces blood circulation throughout the entire body, increases the risk of heart disease, and speeds up the progression of heart disease [17].

Consequently, individuals who have diabetes are at an even greater risk of suffering from heart problems if they smoke. Individuals with diabetes who smoke also tend to die more often from heart disease than individuals with diabetes who do not smoke [18]. This is because diabetic complications may have already started to damage blood vessels in the heart and smoking further compounds this circulatory deterioration.

People with diabetes who smoke also tend to suffer from vision problems, lung disease, cancer and reduced blood sugar control; the latter of which is especially a problem for type 1 diabetics [19-21]. Moreover, smoking in combination with heavy drinking increases the risk of developing kidney disease [22], and individuals with diabetes who do not smoke are already susceptible to kidney damage. If an individual's diabetes is being properly controlled through medication, refraining from smoking altogether or quitting is essential toward maintaining good health.

The effects of illicit drugs on diabetes

One of the main problems that can occur from taking illicit drugs is that often individuals with type 1 diabetes forget to eat properly, which can lead to alarmingly low blood sugar. However, diabetic individuals may also forget to administer their regularly scheduled insulin injection or set their pump properly and failing to do so can lead to dangerously high blood sugars levels.

Forgetting to eat is especially dangerous for type 1 diabetics because low blood sugar levels may cause the body to begin to break down fats and release toxic acids, called ketones, into the bloodstream. This condition is known as ketoacidosis and the

symptoms that it causes—dehydration, vomiting, abdominal pain and a sweet acetone-like smell on the breath—indicate that immediate medical attention has become necessary.

Although type 1 diabetics are highly susceptible to this condition, individuals who have type 2 diabetes rarely suffer from it.

Many individuals with type 2 diabetes do not usually need insulin injections and instead manage their condition with different types of prescribed medication that include:

- Pills that help stimulate the pancreas to create more insulin during specific times of the day (e.g., mealtime).
- Pills that reduce the production of glucose (sugar) in the liver or cause excess amounts of glucose to be excreted through urine.
- Pills that slow the breakdown of starches into glucose by preventing the digestion of certain foods in the intestine.

Similar to the problems that occur for type 1 diabetics, taking illicit drugs can cause individuals with type 2 diabetes to forget to take their medication at appropriate times and this results in high blood sugar levels.

Commonly taken illicit drugs
There are three common types of illicit drugs that may be taken by individuals with and without diabetes. These include: stimulants, depressants and hallucinogens.

Although there is not a lot of information available regarding how illicit drugs affect people with type 1 and type 2 diabetes, the side effects that certain substances are known to cause put individuals with diabetes at an increased risk of suffering from serious health problems.

Stimulants

Stimulants are substances that speed up processes in the body such as blood pressure and heart rate, but also have the ability to increase body temperature. Nicotine, caffeine, methamphetamine (e.g., speed or crystal meth), ecstasy (MDMA) and cocaine all have stimulant effects.

Individuals with diabetes who take stimulants often suffer from low blood sugar (hypoglycemia) because the body breaks down carbohydrates faster than usual. If this begins to happen, a source of carbohydrates such as a glass of juice or a few pieces of candy have to be quickly consumed to avoid the symptoms of hypoglycemia, such as shaking, dizziness and even fainting. However, the stimulant may alter mental processes, decrease a person's ability to recognize the symptoms of low blood sugar or cause a person to forget to eat altogether.

Ecstasy (MDMA)

One commonly taken illicit drug with stimulant effects is ecstasy (MDMA). Ecstasy is usually purchased on the street, meaning that the actual contents of the drug are unknown. In other words, it is hard to know whether the drug contains just ecstasy or additional harmful substances.

Individuals with diabetes often think that ecstasy is safer than other drugs such as crystal meth or speed [23], but it contains many of the same poisonous ingredients as other stimulants. Harmful side effects that are extremely dangerous for individuals already managing diabetes include:

- Emotional problems such as depression, anxiety or paranoia
- Memory and sleep problems
- The breakdown of muscle tissue, which leads to the release of muscle enzymes into the bloodstream that may cause kidney damage or kidney failure
- A rapid decrease of sodium (salt) in the blood, which leads to a loss of normal functions in the body
- An irregular, rapid or slow heartbeat, which can be fatal

These types of complications can hinder an individual's decision to take their scheduled medication or, if taken, render the medication ineffective.

After a stimulant is taken, there frequently may also be a loss of appetite. This can be quite dangerous when it occurs, since an individual who has diabetes may begin to experience low blood sugar but not the usual queues to start eating. Another short-term effect of stimulants is that they can make one feel as if they are able to engage in physical activity for prolonged periods without taking a break. This is particularly problematic for type 1 diabetics who forget to eat or become dehydrated as they may develop the aforementioned condition of ketoacidosis, which is a medical emergency.

Dizziness, nausea and vomiting may also develop shortly after taking stimulants such as ecstasy and this, in turn, influences the amount of food consumed and the resultant changes in blood sugar levels.

Stimulants, in general, cause various changes in the body that make it hard for blood sugar levels to be regulated properly. Moreover, the emotional and physical side effects can influence the way an individual with diabetes takes medication, putting them at further risk of suffering from fatal complications.

Cocaine

Cocaine is a highly addictive stimulant that causes blood vessels to constrict and subsequently increases blood pressure. This side effect increases the risk of heart attacks and strokes in individuals with diabetes who are already predisposed to these health problems due to their condition.

Cocaine use also causes appetite suppression. Regular cocaine users tend to eat fewer balanced meals than those who do not use cocaine [24]. Cocaine abuse is also associated with the increased consumption of fatty foods [24].

This type of irregular eating pattern can become quite harmful for diabetics. Forgetting to eat properly due to a reduced appetite will eventually lead to dangerously low blood sugar levels (hypoglycemia); an especially problematic health issue for type 1 diabetics. However, having difficulty gauging the amount fatty foods that are eaten when feelings of hunger or hypoglycemia eventually prompt an individual with diabetes to eat may hinder the effectiveness of medication such as insulin injections or diabetes pills and cause hyperglycemia.

Methamphetamine

Methamphetamines are very dangerous for people who have diabetes because this drug alters insulin activity and hormone production, which leads to the release of too much glucose (sugar) and results in high blood sugar levels [25].

Methamphetamine use can also lead to a loss of appetite, memory loss and depression, especially if it is taken regularly. All of which may result in unhealthy blood sugar levels for diabetics.

Depressants

Depressants refer to substances that slow down normal processes in the body and physical activity by altering the manner in which the brain sends and receives signals. Alcohol, marijuana (cannabis) and benzodiazepines (BZD), as well as opioids such as methadone, codeine, morphine and heroin can be loosely categorized in this group based on their depressant effects.

Marijuana
Marijuana, most frequently used as a recreational drug, is one of the most commonly used substances by adolescents who have type 1 diabetes [26]. Most people with diabetes who take marijuana assume that it is less harmful than heroin or cocaine, but the effects that marijuana has on mental processes can lead to serious problems such as:

- Increased hunger (typically referred to as having the munchies) – this may result in overeating that, in turn, leads to high blood sugar levels (hyperglycemia).
- Low blood sugar (hypoglycemia) if the intoxication of the drug causes an individual with diabetes to forget to eat.
- Short-term memory problems, which may cause people to take their insulin injections or diabetes medications incorrectly or eat foods that negatively alter their blood sugar levels without realizing it.
- Concentration, cognition, as well as hand-eye coordination may be impaired by marijuana, resulting in forgotten or improper administration of diabetes meds.
- Depressive symptoms and an altered state of mind may develop if marijuana is taken regularly and substance abuse develops.
- Serious damage to different organs such as the kidneys and heart if marijuana is combined with alcohol.

Heroin

Heroin, in particular, is a highly dangerous and addictive depressant that is typically bought on the streets. Similar to other depressants, it alters eating habits and hormone production, making it harder for the body to maintain healthy blood sugar levels even when a diabetic is taking insulin or diabetes pills [27]. Additional harmful effects include:

- A brief sense of euphoria followed by a state of drowsiness and confusion that can make an individual forget to take an insulin shot or diabetes pill.
- Slowed breathing, which may lead to death.
- Liver, brain, and lung damage
- Blood vessel damage, bruising, and poor circulation

People who have diabetes are already highly susceptible to blood vessel and organ damage, ulcers and amputations due to circulation problems. Taking drugs such as heroin causes extensive damage to the body that a diabetic would struggle to recover from without intensive substance abuse treatment.

Other opioids such as morphine also increase the concentration of several hormones

including glucagon, which is a hormone produced in the pancreas that leads to higher levels of glucose (sugar) in the bloodstream [27]. Tight control of blood sugar levels becomes difficult with these effects. Opioids, in this way, counteract the effects of some diabetes medication and should be avoided by diabetics.

Hallucinogens

Hallucinogens, as the name sounds, are substances that may cause hallucinations by affecting the mind and the senses. If hallucinations occur, an individual may see objects that are distorted or not really there and this may cause paranoia, abnormal behavior and panic attacks.

PCP, LSD, ketamine, mescaline and magic mushrooms are all classified as hallucinogens. Ecstasy and large amounts of marijuana may also elicit effects similar to the hallucinogens,

Ketamine

Ketamine is a dissociative drug with some hallucinogenic properties that is often used for medical purposes as a general anesthetic. It prevents sensory information such as pain signals from being sent and received by the brain. The effects that ketamine can have on a person depends of different factors such as weight, height, and health status. For most people, it causes distorted hearing, vision, thinking, and emotional changes.

Serious complications and bodily injury may occur for people with diabetes who use this drug mainly due to side effects such as feeling detached from the body or not being able to move at all. Ketamine also causes confusion, concentration problems and memory loss, which leads to changes in eating patterns and forgetfulness.

As mentioned in conjunction with other substances, type 1 diabetics who forget to take their insulin or forget to eat often develop ketoacidosis and this is a medical emergency due to the toxic buildup of acid in the blood. Type 2 diabetics are not as susceptible to ketoacidosis, but those who forget to take their medication risk suffering from dangerously high blood sugar or low blood sugar if they forget to eat. These types of complications can also lead to a coma and become fatal.

Moreover, chronic ketamine abuse has been linked to damage of the gastrointestinal and urinary tract, the brain, heart and liver [28]. These types of health problems are extremely dangerous for type 1 and type 2 diabetics.

Additional side effects that may occur after taking ketamine include:

- Panic and anxiety attacks, paranoia, dangerous and abnormal behavior
- Blurred vision, slurred speech and slower than normal hand and eye coordination
- Increased heart rate, blood pressure and breathing
- Sweating, drowsiness, nausea and vomiting

Unless a licensed physician is administering this drug under close supervision, it should not be taken by people who have diabetes.

The dangers of mixing drugs

People who are struggling with substance abuse may also mix different drugs or

combine them with alcohol. These combinations can increase the risk of fainting, vomiting, breathing abnormalities, impulsive or dangerous behavior, accidents, as well as overdose and death. Diabetes can quickly become a deadly condition if medication is not taken or if its effects are reduced due to illicit drugs and alcohol that may be circulating in the body. Furthermore, if a person is not quickly identified as having diabetes (by medical chart notation, or detection of diabetic I.D. bracelet), and he or she presents as a patient to an emergency room with symptoms of a combination drug overdose or alcohol intoxication, diabetic specific treatment may be delayed or overlooked altogether.

Reducing harm for those with diabetes
Taking any type of drug other than what has been prescribed to treat diabetes may alter blood sugar levels as well as the body's ability to use diabetes medication. The following are important steps that should be taken to avoid serious health complications:

- Ask questions and do research about the side effects of a new medication before deciding if it should be taken. Doctors can usually answer questions about possible drug interactions and side effects; reputable internet sources often provide useful information as well.
- Ill advised as it may be to do so; individuals with diabetes who decide to take an illicit or new drug should always do so in the presence of another person who knows what type of drug it is. This helps ensure that the appropriate care will be provided if serious complications arise.
- Never stop taking diabetes medication as this often results in high blood sugar levels and other serious health problems (e.g., organ damage, coma).
- Always wear a diabetic medical I.D. bracelet as this helps individuals quickly identify this condition and often saves lives when an emergency arises.
- Find ways to avoid peer pressure and stand up to people who initiate it. True friends do not pressure each other to put their health at risk.

Seek professional treatment for substance abuse

Type 1 diabetes is diagnosed in children and adolescents more often than in adults, and substance abuse—particularly the use of recreational drugs—is becoming increasingly popular among adolescents [29]. Alcohol use and cigarette smoking are more prevalent among adults with type 2 diabetes, although the use of illicit drugs is also a common problem among diabetics [30].

Substance abuse is one of the leading preventable causes of death and emergency room visits even though a number of effective treatments have been established, apparently due to people failing to seek treatment for at least 10 years after the substance abuse started [30]. As a result, substance abuse is currently a major health concern.

Serious damage can occur in most major organs in the body, including the heart and kidneys, due to substance abuse [31]. People with diabetes are already highly susceptible to organ damage and heart disease. Mortality rates for diabetics who abuse drugs are much higher than for those who do not.

Drug dependent diabetics can experience painful and debilitating withdrawal symptoms upon stopping the consumption of alcohol or taking illicit drugs. Depending on substance type, a range of withdrawal symptoms exist, and may include: hyperhidrosis (heavy sweating), myalgia (pain throughout the body), fever,

nausea, vomiting, diarrhea and intense cravings. When faced with symptoms such as these, it can become impossible for people with diabetes to properly control their condition – all the more reason to remain abstinent from using drugs in the first place.

Substance abuse is no easy issue, and is made even more complicated alongside chronic conditions such as type 1 and 2 diabetes. As illustrated, the combination of both can lead to serious complications and death. Avoiding drug use altogether or seeking treatment at the first sign of substance abuse is the best way to stay healthy. Management of diabetes and substance abuse can be aided by seeking the help of qualified professionals – anyone struggling with both is strongly urged to do so.

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