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Alcohol Addiction Pathophysiology and Treatment

Overview

Alcohol and alcoholic beverages contain ethanol (ethyl alcohol), which is a psychoactive and toxic substance that can be highly addictive and can cause significant health risks (WHO, 2024). It is made after the yeast ferments sugar in grains, fruits, and vegetables. Alcohol is classified as a Central Nervous System (CNS) depressant. This signifies that drinking alcohol can slow down brain function, affecting the way a person thinks, feels, and behaves. It is caused by the increased production of Gamma-aminobutyric acid, or GABA, an inhibitory neurotransmitter (Cap, 2024). Alcohol is one of the most widely used drugs, and frequent consumption can lead to addiction.

Key Facts

- According to the data gathered by WHO (2024), approximately 2.6 million deaths were caused by alcohol consumption in 2019 globally, accounting for 2 million deaths among men and 600,000 deaths among women.
- People ages 20-39 had the highest proportion of 13% mortality rate due to alcohol consumption. In contrast, an estimated number of 400 million people ages 15 and above have developed alcohol use disorders (AUD).
- Low-level consumption of alcohol can lead to significant health risks. However, most of the alcohol-related harms come from excessive and continuous alcohol consumption.

Physiology of Alcohol Addiction

Alcohol produces chemical imbalances in specific neurocircuits (NIAAA, 2023) and can be physically and psychologically addictive, which not many individuals know about and are aware of. Alcohol stimulates the release of endorphins and dopamine, producing euphoric sensations, such as feelings of pleasure, that cause alcohol dependence among individuals. Consumption of alcohol overloads the reward and pleasure centers of the brain, which results in cravings for alcohol, leading to addiction.

Alcohol is commonly associated with stress and anxiety and is used as a coping mechanism that may become an unbreakable habit. Despite a person's desire to cut down or

quit drinking, it can still compromise one's ability to make sound decisions and impact one's impulse control since it has already affected the cognitive functions of the brain. A person may develop what is called alcohol use disorder (AUD) and may be difficult to stop drinking once it progresses.

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It is a common response of the brain to mediate one's motivation to repeat behaviors that seem pleasurable and rewarding. In the context of alcohol consumption, it is motivated by its ability to provide such a rewarding feeling which explains why people seek alcohol and use it excessively, leading to increased alcohol tolerance. When this happens, people become more complacent that they can handle more alcohol, which enables them to use it more often.

Alcohol Withdrawal

When individuals rapidly cut off or reduce their alcohol intake, they will experience alcohol withdrawal syndrome (AWS), which may vary from psychological to physical symptoms. These may include but are not limited to:

1. Hand tremors
2. Nausea

3. Vomiting
4. Anxiety
5. Insomnia
6. Seizures
7. Delirium Tremors

Attempting to quit drinking alcohol is strongly not advisable due to the severity of health risks that may arise. Thus, it is important to seek professional help in an inpatient detox facility that has 24/7 medical support and inpatient treatment for close monitoring.

Dangers of Alcohol

When used recreationally and in small amounts, alcohol has fewer negative consequences. However, in large quantities, particularly when consumed in short periods, one may experience an alcohol overdose, also known as alcohol poisoning. This may result in various side effects which include:

1. Unconsciousness
2. Toxicity
3. Vomiting
4. Inability to feel pain
5. Slow or irregular breathing
6. Respiratory depression
7. Death

In chronic, long-term alcohol consumption, one may develop health risks, such as:

1. Memory loss
2. Liver disease and fibrosis
3. Fatty liver
4. Hypertension (HTN)
5. Stroke
6. Throat, mouth, larynx, breast, liver, colorectal, or esophageal cancer
7. Alcoholic Hepatitis

Treatment

Treatment for alcohol addiction may vary depending on the situation and its severity. If the condition is severe, healthcare providers may recommend inpatient medical treatment for close monitoring or residential rehabilitation. Treatments may include:

- **Behavioral treatment:** This kind of treatment focuses on counseling with addiction counselors or psychologists that will help change an individual's drinking behavior or habits.

- **Medication:** The U.S. Food and Drug Administration has approved Naltrexone tablets as medication to treat alcohol addiction. This helps decrease alcohol dependence and blocks off the euphoric feeling of alcohol.

- **Mutual-Support Groups:** Programs that provide peer support for people with the same experiences with alcohol addiction can be an added layer of support. Mutual support groups will promote recovery through sharing and listening to other people's stories. This can assure them that anyone is capable of healing and recovering with willingness and determination.

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