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COMMENTARY

Substance Use Disorder in Young Adults Across the United States

Shreya Patel[1,2], Isabella Garcia[1,3], Anahi Bernal[1,3], Stephany Tapia[1,4], Daniel Martinez[1,4], Jocelin Hernandez[1,4], Eric Molina[1,4], Abril Acevedo[1,4], Gabriel Martinez[1,5], Christian Zuniga[1,6]

[1] 3rdAnnual Junior Clinical Research Internship, South Texas Academy for Education & Training in Research, DHR Health Institute for Research and Development
[2] South Texas ISD Health Professions, Mercedes, TX
[3] Academy of Health Science Professions & STEM, La Joya, Tx
[4] Juarez Lincoln High School, Mission, TX
[5] McAllen High School, McAllen, TX
[6] La Villa Early College High School, La Villa, TX

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Introduction

More than any other age group in the United States, 32% of young adults between the ages of 18-25 participate in frequent alcoholic misuse; with 22% further taking part in the abuse of illegal drugs.[1] Taking into consideration the rather vulnerable mind of young adults, they become more susceptible to risky behaviors that may lead to chronic long-term effects of irresponsible substance usage later on in their life.[2] Substance Abuse Disorder (SUD) is a neuropsychiatric disorder that is described by a continuing desire to take drugs or partake in alcohol consumption despite its potential harmful consumption.[3] Although the majority of youth who partake in the use of substances do not reach problematic usage levels, 15% of young adults meet the criteria for SUD.[4] Many young adults already have childhood risk factors, and the added stress from adulthood places these individuals at risk for misusing substances. Employment difficulties, lack of a positive parent role model, and academic stress can also increase the risk of young adults misusing substances.[5,6] SUD however is a mental illness, and should be treated as any other chronic physical illnesses would be treated.[7,8]

Alcohol Use Disorder

Alcohol Use Disorder is a chronic health condition where individuals struggle to manage their alcohol consumption, without considering the detrimental impact on their social, mental, and physiological health. If not treated it may lead to alcohol abuse, where serious consequences result from repeated excessive drinking, or alcohol dependence, where the individual has no control over their drinking behaviors. With over 100 million people suffering from alcohol use disorder (AUD) in 2016, AUD continues to be a global public health concern, in which there were over 15 million reported cases in the US since 2018 according to the National Survey on Drug Use and Health (NSDUH).[9] When compared to older individuals, young adults (ages 18 to 25) are more prone to engage in heavy episodic drinking and a variety of harmful alcohol-related activities, such as drunk driving. It is even estimated that excessive alcohol intake in the United States contributes to over 79,000 fatalities annually, *especially* among young adults.[10]

Effects of AUD on Mental and Social Health

The majority of substance use disorders have substantial correlations with separate mood and anxiety disorders. With depressive type disorders

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being the most common of the psychological symptoms to coexist with AUD, disruptive/irritable moods, feelings of worthlessness, and negative temperament are highly present amongst patients. These types of psychiatric disorders that affect the mood significantly have been 3.7 times more likely to be found as a result from extreme alcohol use and/or dependancy.[11] It should be noted, however, that these symptoms can also very well be the *causes* for AUD. Additionally, riskier, irritable, and impulsive behavior can result from alcohol misuse as one may become more careless from episodic drinking, even to go as far as inflicting self-harm.[12]

Alongside the mental effects that alcohol has on an individual, there are also social effects that affect both the individual and his/her relationships with others. Social interactions related to alcohol consumption often involve negative interpersonal exchanges and failure to meet commitments pertaining to relationships. Many alcohol related health problems affect others in addition to the drinker.[13] Harm to relatives, harm to family members, a negative impact on work and education, public order, and driving accidents are some of the many social effects that alcohol consumption has on the drinker's society.[14]

Effects of AUD on Physiological Health

The impact of alcohol use disorders (AUD) on the physiological well-being of individuals presents a need for understanding of its detrimental effects on many bodily systems. From the moment a user takes their first sip, their body, especially the bloodstream, is intoxicated leading to short and long-term failures throughout the physiological structure of the human body. The consequences of excessive consumption goes far beyond immediate effects such as to what is known as a mere hangover. Alcohol leads to life threatening health conditions including deficiency in all body systems.

The effects of alcohol to the body depends on the blood alcohol concentration (BAC). BAC is the percent of ethyl alcohol or ethanol in an individual's bloodstream.[15] The BAC levels will vary depending on the number of alcoholic drinks, the time in which drinks are consumed, body weight, water composition, enzyme production and levels, sex assigned at birth, medication influences, and whether any food has been consumed.[16] BAC can be measured by breath, blood, or urine tests. The percentages range from 0% (no alcohol) to over 0.4% (possibly fatal).[16] At 0.10% BAC, individuals may experience a further reduction in reaction time, along with slurred speech and slowed thinking, heightening the dangers of tasks like driving or operating machinery.[16] Within the range of 0.15% to 0.30% BAC, confusion, vomiting, and drowsiness become more pronounced, signaling a higher level of impairment and vulnerability. Beyond 0.30% to 0.40% BAC, the risk of alcohol poisoning escalates significantly, potentially leading to life-threatening conditions. Individuals may lose consciousness, calling for immediate medical attention.[17] When BAC surpasses 0.40%, it reaches a potentially fatal level, putting individuals at risk of coma and respiratory arrest, a critical situation where breathing stops.[17]

Aside from these short term effects, alcohol use disorders in young adults aging 18 to 25 leads to long-term impairments since their bodies are still in crucial stages of development and maturation. However, the progression of most effects are diagnosed either months or years of misusing alcohol. An AUD significantly impacts the cardiovascular system which can include hypertension, tachycardia, and increasing the risk of heart disease, and stroke.[18] It has been found that excessive alcohol consumption raises the blood pressure in several ways. It can directly stimulate the nervous system, increasing the sympathetic nervous system activity, which causes blood vessels to constrict or to become narrow.[19] This narrowing causes a resistance to blood flow, consequently increasing blood pressure. In addition, it can also reduce the veins and arteries elasticity leading to hypertension.[20] This is known as atherosclerosis. A risk of stroke is highered when the heart is exposed to blood clots; these clots are formed by excessive alcohol intake. Ethanol is rapidly and almost completely absorbed in the digestive tract, mainly the small intestine, and then metabolized in the liver, primarily converting into acetaldehyde, a toxic compound responsible for some of the detrimental effects of alcohol on the body, including steatosis, or fatty liver, alcoholic hepatitis, and liver cirrhosis, which can further complicate into liver cancer.[21] Moreover, alcohol has the ability to disturb the natural hormonal regulation responsible for controlling kidney function. Continuous and excessive alcohol consumption can lead to liver disease, which compounds the negative impact on the kidneys, causing problems in managing sodium and fluids and potentially leading to acute kidney failure.[22] Pancreatitis occurs from excessive alcohol consumption due to alcohol-induced inflammation and damage to the pancreas. Chronic alcohol use can lead to the activation of digestive enzymes within the pancreas, causing inflammation and potentially leading to pancreatitis. Alcohol use disorder can negatively impact brain development in young adults aged 18-25 due to the ongoing maturation of the brain

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during this stage. Excessive alcohol consumption disrupts the normal processes of brain development, affecting crucial functions such as learning, memory, decision-making, and emotional regulation. Understanding the physiological impacts of alcohol use disorder in young adults in the US is crucial for developing targeted interventions and fostering a healthier future for this vulnerable population.

Prevalence of AUD

With regard to mental health and alcohol use problems, a significant amount of evidence exists which indicates that outcomes differ by both sex and race/ethnicity. Approximately 21% of males and 13% of women experience binge drinking.[23] Men have been proven to consume more alcohol than women, drinking at least five times each month on average with 25% of them having at least nine drinks each time.[23] Overall, 9% of adult women and 13% of adult men reported having an alcohol drinking disorder in 2020.[23] The prevalence of alcohol use disorders (AUD) varies across racial/ethnic groups, however, it is suggested that ethnic minorities may face higher rates of addiction than national averages due to poor living conditions; limited access to specialized care; and elevated social, economic, emotional, and environmental risk factors.[24] It has often been shown that Native Americans are especially vulnerable to the negative health consequences of alcohol. However, given their small size in relation to other racial groups (2.9% of the total U.S. population), Native Americans' influence on alcohol-related health effects on the U.S. population as a whole is less clear.[25] In addition, it is important to take into consideration other contexts of alcohol use, such as, social, political, and economic variables.

Race/Ethnicity	Alcoholism/ AUD	Race/ Ethnicity
American Indians and Alaska Natives	14.9%	27.6%
Caucasian	11.3%	17.0%
Asian American, Native Hawaiian, and Other Pacific Islander	4.6%	8.0%
Hispanic or Latino	8.4%	15.7%
African American	7.4%	17.2%

Figure 1. The average percentage of alcoholism/AUD compared to overall substance abuse among various racial and ethnic groups from the years 2016-2021[26,27]

Marijuana Use Disorder

The prevalence of marijuana has increased substantially in the United States over the past decade, making cannabis one of the most used illicit drugs in the US.[28] Furthermore, this increase was aided dramatically due to the recent legalization of weed in various states across the US. The effects of cannabis on American society become more prevalent year after year; these effects include a drastic change in mental and social health among users.

Effects of Marijuana Use on Mental and Social Health

Marijuana Use Disorder takes a huge toll on one's mental and social health. Marijuana use can significantly affect social interactions and behavior towards others due to various factors. The drug's influence on verbal and nonverbal communication skills can result in difficulties expressing oneself clearly and accurately interpreting others' cues, leading to misunderstandings and reduced empathy.[29] Excessive marijuana use may lead to social withdrawal, as individuals prioritize drug use over engaging in social activities, straining relationships and limiting opportunities for interaction.[29] The altered perception and behavior induced by marijuana can make users appear emotionally detached, impacting the dynamics of interpersonal relationships.[29] Frequent use of marijuana on young adults causes mental health effects, most of them being mood disorders, respiratory, depression, and anxiety.[30] Marijuana use disorder in young adults can have significant effects on the developing brain, as their brains are still undergoing crucial neurodevelopmental processes.[31] The active compound in marijuana, tetrahydrocannabinol (THC), binds to cannabinoid receptors in the brain, disrupting the endocannabinoid system's normal functioning.[31] This leads to an altered brain structure, impaired brain maturation, and dependency on marijuana.[31]

Effects of Marijuana Use on Physiological Health

The excessive use of marjuana can have notable effects on the physiological well-being. Smoking marijuana can harm lung tissues, leading to potential scarring and respiratory problems, such as lung cancer. Furthermore, marijuana use can cause rapid changes in heart rate and diastolic blood pressure, as well as physical effects like red eyes, dry mouth and throat, increased appetite, and widening of blood vessels.[32] While some users may experience

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feelings of relaxation and euphoria, others may encounter negative psychological effects. Marijuana use can lead to disorientation, anxiety, and paranoia, particularly in individuals who may be more susceptible to these reactions. In more severe cases, marijuana use has been linked to temporary psychosis, characterized by losing touch with reality, experiencing hallucinations, and having paranoid thoughts.[33] Long-term use may contribute to the development of disorders like schizophrenia, a serious mental illness characterized by distorted thoughts, emotions, and perceptions.[34] Intoxication from high doses of cannabis can induce temporary psychotic symptoms in most individuals, heightening the risk of psychological distress associated with heavy use. Approximately 26% of Americans aged 18 to 26, roughly 1 in 4 young adults, experience diagnosable mental disorders in any given year.[35] Depressive illnesses and anxiety disorders have a complex relationship with substance use, including marijuana.[36]

Prevalence of MUD

The consumption of marijuana has been the most common illegal drug in the United States; 48.2 million people, or about 18% of Americans, consume it.[37] From 2000 through 2008, there was no significant change in the annual number of rate ingestions of marijuana in young adults across the United States. There has been a very increasing amount of young adults consuming marijuana. The proportion of young adults that reported marijuana use reached 43% in 2021,, a significant increase from 34%, five years ago (2016) and 29%, ten years ago (2011).[38] According to another study, an estimated 3 in 10 young adults use marijuana.[39] The National Epidemiologic Survey on Alcohol and Related Conditions conducted a survey in 2012 and 2013 on Marijuana use and DSM-IV marijuana use disorder. This survey interviewed 36,309 adults over the age of 18. Results concluded that 9.52% of U.S. adults have used marijuana in the past year with a 2.9% of people having a diagnosis of DSM-IV marijuana use disorder. Age examinations had shown young adults to be highest at risk for MUD and males with the greater number of marijuana use and use disorder. The number of individuals using marijuana is predicted to continue to grow as well as the number of people being affected by the usage.[40]

Race/Ethnicity	Past-year Marijuana Use	Past-year Marijuana Use Disorder
Caucasian	9.4%	2.7%
African American	12.7%	4.6%
Native American	17.1%	5.5%
Asian	5.0%	1.3%
Hispanic	8.4%	2.8%

Figure 2. Marijuana Use and MUD in different races/ethnicities in young adults in the United States.

Sex	Past-year Marijuana Use	Past-year Marijuana Use Disorder
Male	12.3%	4.2%
Female	6.9%	1.7%

Figure 3. Marijuana Use and MUD varied percentages in sex in young adults in the United States.

Opioid Use Disorder

Opioid Use Disorder is another growing health concern among young adults. OUD is a chronic relapse disorder that can lead to significant life-threatening effects on people worldwide, especially in the U.S.[41,42] Opioids represent a large class of drugs that derive from the opium poppy plant. Heroin, fentanyl, pain relievers, and prescriptions such as oxycodone and morphine are all considered opioids and are frequently abused by millions around the world.[43] These substances are highly addictive and contribute to a variety of mental health, social, and physiological disorders. The increasing popularity these drugs have been receiving causes young adults who are introduced to them more prone to being affected. Even though it is medically used for pain relief and initially blocks the pain signals between the brain and the body, some may use it for the euphoric effect produced. The more it is abused over time, tolerance begins to develop in the individual which leads to continuous use risking overdose and death.[43] Between 2005 to 2006, the rate of opioid abuse in the United States increased 64% and experienced the emergence of a nationwide public health crisis . Death rates increased in 2016 by 27% from 2015.[44] The rate of opioid misuse is high in the U.S. and increasingly prevalent among young adults.

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Effects of OUD on Mental and Social Health

OUD has substantial mental effects on young adults, leading to cognitive impairments such as deficiencies in attention and judgment, as well as emotion dysregulation characterized by increased depression, anxiety, and suicide rates.[45] The prefrontal cortex in the brain is responsible for executive functions such as judgment and planning. Individuals with addictive disorders such as OUD have abnormalities in that area of the brain which causes a decrease in their judgment to control the amount of drugs consumed.[45] The more drugs consumed, the more dependent the brain gets resulting in more problems related to attention and regular executive functions. Many people who have opioid use disorder either have a co-existing mental health condition or develop one due to their OUD.[46] In some cases, opioids are used to cope with the symptoms of their mental illness leading to OUD. Depression and anxiety disorders are commonly found in OUD patients who try to use the euphoric effects to relieve their symptoms.[47] Opioids are highly addictive by creating artificial endorphins. Repeated usage alters the brain and causes the body to believe it is an essential component.[45] The difficulty to break free from the addiction often leads to feelings of hopelessness and the belief that suicide is the only option. In 2017, more than 40% of suicide and overdose deaths involved opioids.[48]

Mental abnormalities caused by OUD lead to drastic changes of social patterns within the individual. Increased habits of hermit-like state continue to arise due to higher rates of depressive and anxiety induced symptoms.[47, 49] Seclusion is often associated with lack of normal accountability found in regular social interactions.[50] Vital support from friends and family are omitted in times of hardship. A meta-analysis study conducted in the U.S. shows only 3 in5 of those with OUD seek relief treatment (1 in5 in the first 12 months and 2 in5 during their lifetime).[51] In scenarios of a user experiencing withdrawal, irritation and emotional irregularities prove evident with significant rates of self harm notable in OUD patients (around 10/100).[52, 53]

Effects of OUD on Physiological Health

Analgesic opioids are notorious for being abused and may lead to vast amounts of physiological damage in the user. Short-term effects immediately after ingestion include nausea, changes in heart rate and breathing, euphoric like feelings, and a sedated state.[54] These are in response to an opioid connecting and inhibiting receptors relating to feeling pain.[55] Long term effects of abnormal opioid use include the aforementioned symptoms as well as hypogonadism, decreased bone health, decreased pain tolerance, nervous/ gastrointestinal discrepancies and in extreme cases, death. More than 47,000 individuals in the U.S. die annually).[56-60] An individual with an OUD can experience withdrawal when they try to stop their addiction and can experience increased sensations of muscle/skeletal ache, muscular spasms, cravings, skin irritation and constipation.[61, 62] These symptoms are an important factor for the continued use of opioids.

Prevalence of OUD

In the US, the prevalence of OUD in young adults continues to increase. The more accessible and popular the drugs become, the greater the rates of OUD in young adults become. In order to monitor the prevalence of opioid misuse and use disorder, a national survey study was done in 2015 and 2016.[63] This survey included 28,213 young adults which corresponded to an estimate of 69.5 million young adults. From a total number of 56,070 individuals, 32.2% of those were young adults who reportedly used prescription opioids, with an additional 7.8% reporting a misuse of prescription opioids or use disorder.[63] Along with age groups, this survey also obtained results on the prevalence of prescription opioid misuse in different races/ethnicities which is displayed on the table below. It can be seen that Caucasians have the greatest percentage of reported OUD followed by Hispanics.

Race/Ethnicity	Prescription Opioid Use Disorder Percentage	Prescription Opioid Misuse Without Disorder
Caucasian	3.2%	20.2%
African American	1.9%	17.6%
Hispanic	3.0%	18.2%
Others	2.6%	17.8%

Figure 4. Opioid use disorder and opioid misuse in young adults from different races/ethnicities in the United States from 2015 to 2016.

Conclusion

The US Food and Drugs Administration (FDA) approved drugs for treatments of substance use disorder such as (buprenorphine,methadone, and naltrexone) to help people with their addiction.[64] These relieve the withdrawal symptoms and

psychological craving that causes Chemical imbalances in the body.[65] However, treatments should be obligated for better improvements on mental health, such as counseling and behavioral therapies, and medications for these SUD. Acamprosate, naltrexone, and disulfiram, medications used by people in recovery, are proven to be very effective for preventing addiction and maintaining sobriety.[65] There are no current medications approved by the FDA for MUD treatment.[66]

Education about the usage, prevalence, as well as awareness of the biological effects of substance use were some of the most favored and promising strategies to reduce substance abuse in young adults.[67] Risk reduction techniques were also successful at changing behavior, in addition to hearing testimonies. Other methods that have been beneficial in modifying behavior include taking part in programs that address sexual assault prevention, or learning about safety issues like drunk driving.[67] Although preventative initiatives have shown to be successful, families and other significant adults continue to have the greatest influence over how young adults handle drugs. It is essential to become involved early, before high school, to educate the next generation about addiction and substance use disorders. Among the youth-focused preventive measures are programs that instruct parents on how to properly watch over, communicate with, and set and enforce family rules surrounding substance use.[68, 69]

Since drug and alcohol abuse is a widespread issue that frequently begins among high school and college students, a variety of protective factors should be taken into account. The effective way for prevention of adolescent alcohol and other drugs is through a risk-focused approach, a prevention to know what decision has to be made.[70] Having strong beliefs against substance abuse, the desire to maintain one's health, high paternal awareness of drugs, school connectedness, structured activity and having strong religious beliefs.[71] Any positive change is progress to prevent substances from destroying someone's future.

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