



Article

Substance Use Disorders and Other Addictions

Substance Use Disorders and Behavioral Addictions with Special Consideration of Psychiatric Comorbidity

Disorders due to substance use and addictive behaviors have a high burden of disease globally. Individuals with addictive disorders frequently have medical and (underlying) psychiatric comorbid conditions contributing to their high disease burden; i.e., their overall health, social relations, and professional life are impacted, with frequent additional problems such as accidents, injuries, and legal and financial issues. Thus, prevention, a diagnostic approach including underlying comorbidities, and early intervention measures are key to address addictive disorders and to mitigate the progression and sequelae of the condition. Particularly, strategies for early identification as well as for management of behavioral addictions, such as gambling/gaming disorders or problematic internet usage, need to be developed as an increasing number of young people are affected.

ADHD: Attention-Deficit Hyperactivity Disorder; AUD: Alcohol Use Disorder; DALY: Disability-Adjusted Life-Year; ICD: International Classification of Diseases; SMI: Serious Mental Illness; SDI: Socio-Demographic Index; SUD: Substance Use Disorder.

Substance Use Disorders and Behavioral Addictions with Special Consideration of Psychiatric Comorbidity

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Overview and Epidemiology

Chapter 6 in the International Classification of Diseases (11th edition; ICD-11)¹ describes “Mental, behavioral and neurodevelopmental disorders” and thus, includes disorders due to substance use and addictive behaviors.

According to the World Health Organization (WHO), these are “mental and behavioral disorders that develop as a result of the use of predominantly psychoactive substances, including medications, or specific repetitive rewarding and reinforcing behaviors”.¹ The ICD-11’s category “Disorders due to addictive behaviors” includes “Gambling disorder” and the new diagnostic category “Gaming disorder”.² Importantly, the ICD-11 is currently available in 7 languages (Arabic, Chinese, English, French, Portuguese, Russian, and Spanish), and thus, some countries may be slower to implement the new changes in diagnosing behavioral addiction.

A recent analysis of the global prevalence of mental health and substance use disorders (SUDs)³ yielded a worldwide prevalence of SUDs of 2.2%, with a higher prevalence of alcohol-use disorders (1.5%) compared to other

drug-use disorders (0.8% total, including cannabis 0.32%; opioid 0.29%, amphetamine 0.10%; cocaine 0.06%), with higher levels of SUDs in high-income countries than in lower-income countries.

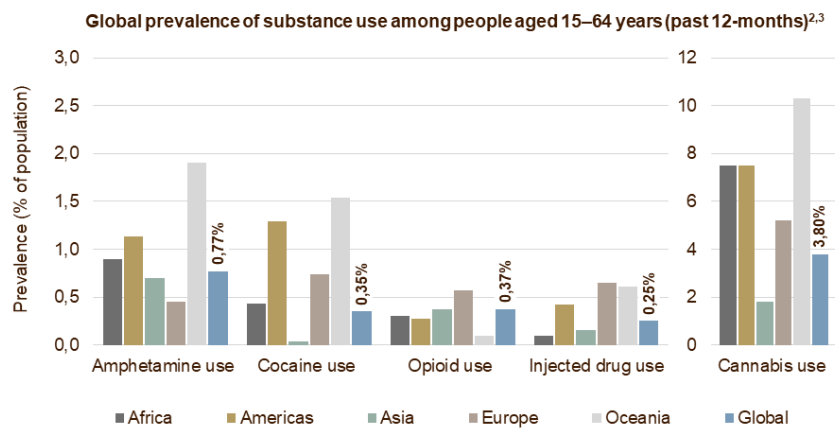
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Another recent meta-analysis⁴ estimated prevalence rates of behavioral addictions around:

- 10.6% for internet addiction,
- 30.7% for smartphone addiction,
- 5.3% for gaming addiction,
- 15.1% for social media addiction,
- 21% for food addiction,
- 9.4% for sex addiction,
- 7% for exercise addiction,
- 7.2% for gambling addiction,
- 7.2% for shopping addiction.

Prevalence of substance use

Across the European Union, approximately 96 million adults (29% of the population) are estimated to have had some exposure to an illicit substance during their lives¹



1. EU Monitoring Centre for Drugs and Drug Addiction. European Drug Report 2019; 2. Peacock et al. *Addiction* 2018;113(10):1905–1926; 3. UNODC. *World Drug Report 2017*. 2017

Slide 1. Global prevalence

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The European Union Monitoring Centre for Drugs and Drug Addiction maintains datasets estimating substance use, using a variety of methods including survey data and wastewater monitoring.¹ Whilst illicit substance use varies from country to country, across the whole of Europe an estimated 96 million adults (29% of the population) are estimated to have had some exposure to an illicit substance during their lives.¹ Cannabis is the most commonly used illicit substance.¹ Among substance users, use of more than one substance is common – so-called polydrug use, e.g., the use of MDMA with alcohol.¹

Global estimates of past 12-month substance use from United Nations data for 2015 are shown on the slide.^{1,3} There is considerable worldwide variation in rates of substance use, and in rates across different substances.² The highest prevalence was seen for cannabis use, which was reported to be 3.8% worldwide.²

References for slide 1:

1. European Monitoring Centre for Drugs and Drug Addiction. *European Drug Report Trends and Developments*. Publications Office of the European Union, Luxembourg, 2019.

2. Peacock A, Leung J, Larney S, et al. Global statistics on alcohol, tobacco and illicit drug use: 2017 status report. *Addiction* 2018; 113 (10): 1905–1926

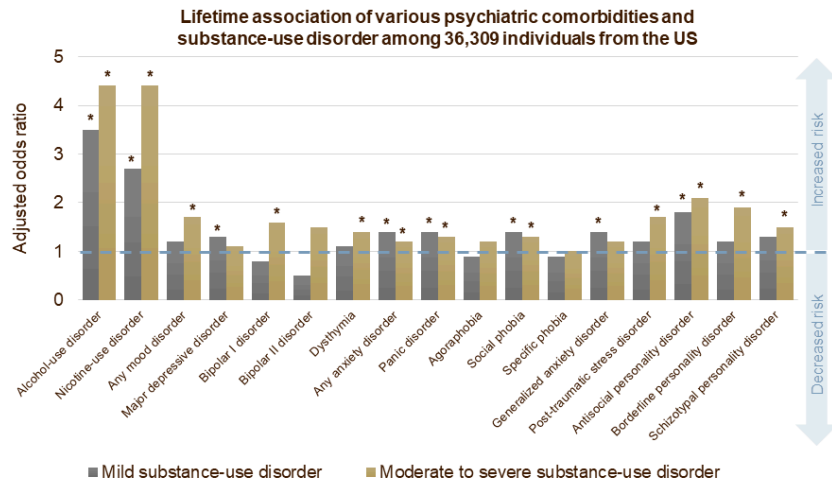
3. United Nations Office on Drugs and Crime (UNODC). *World Drug Report 2017*. UNODC: Vienna, 2017.

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The comorbidity burden associated with substance-use disorder

Substance-use disorder is highly comorbid with other psychiatric diagnoses



*p<0.05 versus odds ratio of 1.0 (i.e., no risk)

Grant et al. *JAMA Psychiatry* 2016;73(1):39–47

Slide 2: Lifetime psychiatric comorbidities

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This study used interview data from 36,309 individuals to estimate 12-month and lifetime prevalence of substance-use disorder.¹ The 12-month and lifetime prevalence of substance-use disorder was 3.9% and 9.9%, respectively.¹ A significantly greater proportion of individuals with substance-use disorder had other psychiatric comorbidities compared with individuals without substance-use disorder, including major depressive disorder, dysthymia, bipolar disorder, post-traumatic stress disorder, and various personality disorders.¹ The findings show the broader costs of substance-use disorder, and highlight the need to destigmatize the condition to enable people to

come forward for treatment.¹

References for slide 2:

1. Grant BF, Saha TD, Ruan WJ, et al. Epidemiology of DSM-5 drug use disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions – III. *JAMA Psychiatry* 2016; 73 (1): 39–47.

Since the period covered fell into the COVID-19 pandemic, the authors stated that during the lockdown periods, the prevalence of food addiction, gaming addiction, and social media addiction was higher compared to non-lockdown periods. A recent study⁵ across 15 countries from Europe, America, and Asia showed that problematic internet usage was slightly lower in European countries compared to Asia (rates ranged from 1.1% in Finland to 10.1% in the UK, compared to 2.9% in Canada and 10.4% in the US). There were differences in specific problematic internet usage rates, e.g., problematic gaming ranged from 0.4% in Poland to 4.7% in Indonesia

Another review⁶ on digital addiction estimated that up to ¼ of the population could be affected by at least one subtype of digital addiction; i.e., global pooled prevalence was 26.99% for smartphone addiction, 14.22% for Internet addiction, and 6.04% for game addiction. There was considerable geographical variation, with low/lower-middle income countries having a higher burden of digital addiction and higher prevalences among men than women regarding internet addiction and game addiction.

Psychiatric Comorbidities

People with SUDs frequently suffer from multiple conditions at a time, i.e., they might have mental or physical health comorbidities or both in addition to their addictive disorder.

Studies report a high prevalence (i.e., around at least 50%) of **psychiatric comorbidity** among people with SUDs.⁹⁻¹¹ The high prevalence of dual disorders may be attributed to common risk factors that can contribute to both mental illness and substance use and addiction, such as genetic factors, epigenetic influences, environmental factors, stress, trauma, and adverse childhood experiences, as well as the involvement of the same brain regions.¹¹

The high prevalence of dual disorders may be attributed to common risk factors that can contribute to both mental illness and substance use and addiction

Despite the fact that SUDs are mental health disorders (see ICD-11),¹ some authors view and treat them as completely separate conditions: Mental disorders may contribute to SUDs, and substance use, and addiction can contribute to the development of a variety of other mental disorders.¹¹ Very common are affective disorders (which include generalized anxiety disorder, panic disorder, and post-traumatic stress disorder, depression and bipolar disorder), attention-deficit hyperactivity disorder (ADHD), psychotic illness, borderline

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Economic costs of substance use

- Substance use and misuse cause a number of harms to the individual, and wider costs to society^{1,2}
- Harms translate into economic costs, arising from indirect costs (lost productivity, premature mortality), and direct costs from healthcare expenditure^{3,4}
- The UK is estimated to spend approximately £5 billion per year on smoking-related ill-health¹
- A systematic review and modelling analysis compared estimates of alcohol-attributed costs to society across several countries³
 - The total cost was **\$1,306 per adult** (2.6% of GDP)
 - Direct costs accounted for 38.8% of the total
 - Indirect costs from lost productivity accounted for 61.2% of the total

Estimated annual economic impact of substance misuse in the US (indirect and direct costs)⁴



GDP=gross domestic product

1. Jones et al. A Summary of the Health Harms of Drugs. 2011; 2. Nutt et al. Lancet 2010;376(9752):1558–1565; 3. Manthey et al. Pharmacoeconomics 2021;39(7):809–822; 4. US DHHS. Facing Addiction in America. The Surgeon General's Report on Alcohol, Drugs, and Health. 2016; 5. Sacks et al. Am J Prev Med 2015;49(5):e73–e79; 6. US DoJ. The Economic Impact of Illicit Drug Use on American Society. 2011

Slide 3. Annual economic impact of substance misuse

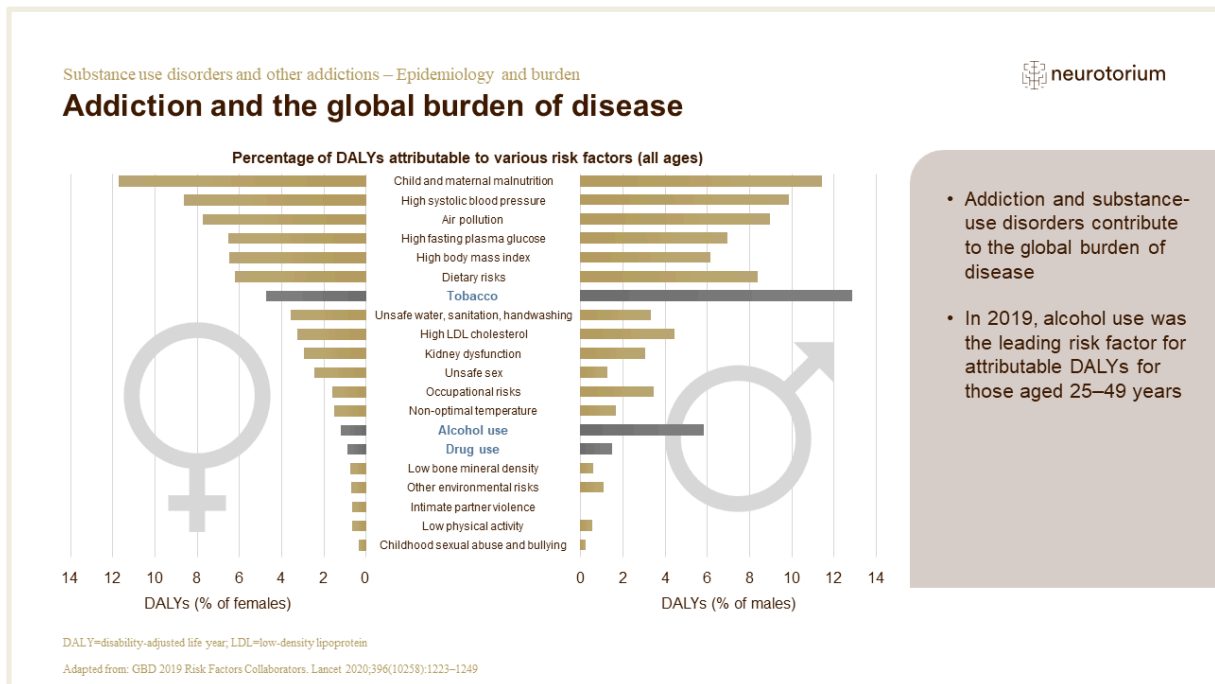
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Part of the complexity of studying substance-related harms is considering the balance between impact to an individual, and harm caused to those around them.² In a multicriteria decision analysis, alcohol was found to be the most harmful substance.²

References for slide 3:

1. Jones L, Bates G, Bellis M, et al. A Summary of the Health Harms of Drugs. United Kingdom Department of Health, 2011. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/215470/dh_129674.pdf. Accessed November 2021.
2. Nutt DJ, King LA, Phillips LD; Independent Scientific Committee on Drugs. Drug harms in the UK: a multicriteria decision analysis. Lancet 2010; 376 (9752): 1558–1565.
3. Manthey J, Hassan SA, Carr S, et al. What are the economic costs to society attributable to alcohol use? A systematic review and modelling study. Pharmacoeconomics 2021; 39 (7): 809–822.
4. United States Department of Health & Human Services. Facing Addiction in America. The Surgeon General's Report on Alcohol, Drugs, and Health. 2016.
5. Sacks JJ, Gonzales KR, Bouchery EE, et al. 2010 National and state costs of excessive alcohol consumption. Am J Prev Med 2015; 49 (5): e73–e79.
6. United States Department of Justice National Drug Intelligence Center. The Economic Impact of Illicit Drug

Use on American Society. United States Department of Justice, 2011. Available at: <https://www.justice.gov/archive/ndic/pubs44/44731/44731p.pdf>. Accessed November 2021.



Slide 4. Substance use and addiction contribute to global burden of disease

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As shown on the slide, using data from the 2019 GBD, substance use and addiction contribute to the global burden of disease.¹ Interesting changes to the contribution of risk factor-attributable burden have occurred over the last few decades.¹ However, one risk factor remained unchanged; among people aged 25–49 years, alcohol use was the leading risk factor, contributing to 6.79% of disability-adjusted life year (DALYs) burden in 1990, and 6.3% of DALYs in 2019.¹

References for slide 4:

1. GBD 2019 Risk Factors Collaborators. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet 2020; 396 (10258): 1223–1249.

personality disorder, antisocial personality disorder and other substance use disorders.¹¹ The overlap is especially pronounced with serious mental illness (SMI), i.e., a diagnosable mental, behavior, or emotional disorder that causes serious functional impairment that substantially interferes with or limits one or more major life activities (e.g., major depression, schizophrenia, or bipolar disorder); approximately 1 in 4 individuals with SMI also have an SUD.

Psychiatric comorbidity is frequent among patients with behavioral addictions as well. A meta-analysis¹³ found significant and positive associations between internet addiction and alcohol use disorder (AUD), ADHD, depression and anxiety. ADHD rates appear to be particularly high among people with behavioral addictions, with studies reporting rates up to over 88%.¹⁴

Burden of Disease

In a global burden of disease study from Australia that aimed at estimating global disease burden attributable to alcohol and drug use between 1990 and 2016 for 195 countries and territories, alcohol use disorders (AUDs) were the most prevalent of all SUDs, with over 100 million estimated cases, followed by cannabis dependence (22 million cases) and opioid dependence (27 million cases).¹⁵ In 2016, 99 million disability-adjusted life-years (DALYs) and 4.2% of all DALYs (3.7–4.6) were linked to alcohol use, and 32 million DALYs (27.4–36.6) and 1.3% of all DALYs (1.2–1.5) were to drug use as a risk factor.¹⁵

The burden of disease varied substantially across regions, whereas the impact of substance use on other health outcomes played a major role. Interestingly, alcohol-attributable burden was highest in countries with a low and high-middle socio-demographic

index (SDI), whereas the burden due to drugs increased with a higher SDI level. Notable were also the almost 21 million DALYs due to injuries attributable to alcohol use per year, with almost half of those related to self-harm and interpersonal violence, followed by transport injuries and unintentional injuries. Almost 2 million DALYs per year were attributable to drug use and self-harm.

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There is also a noteworthy sex difference regarding disease burden for most substances, with a sex ratio of up to 4 to 1 (men to women). Most likely, this difference is linked to regional variation in social acceptability and cultural norms and regulations of drug and alcohol use and its impact on lifetime exposure.¹⁷

Behavioral addictions also entail considerable disease burden:¹⁹ For example, “problematic usage of the internet”, i.e. addictive, hazardous, harmful and unsafe use, includes internet addiction (covering Gaming Disorder, Social Network Use Disorder, Online Shopping Disorder or Online Pornography Viewing Disorder), has been associated with mental health disorders (such as ADHD, other SUDs, social anxiety disorder, obsessive-compulsive symptoms, hostility/aggression and personality disorders), physical health consequences (e.g. back pain, sleep problems, or migraines), as well as reduced cognitive control and social



functioning poor school performance and lack of productivity.

Benefits of Preventing SUD

Prevention of SUDs is key to preventing considerable harm and the burden of disease to individuals, families, communities, and society. Prevention may be universal, i.e., offered to an entire population regardless of their level of risk; selective, i.e., targeting groups at risk; or indicated, i.e., offered to individuals already experiencing symptoms.²⁰

The 3 types of prevention thus can take place prior to substance use issues (**primary prevention**), when problems arise (**secondary prevention/early intervention and treatment**), or to mitigate harmful effects of substance use (**tertiary prevention/harm reduction**).²¹

Prevention may facilitate early diagnosis and treatment of underlying (co-)morbidity and subsequently help prevent development of a SUD, or yield initiation of evidence-based treatment of the disorders.

*Prevention may be universal, i.e., offered to an entire population regardless of their level of risk; selective, i.e., targeting groups at risk; or indicated, i.e., offered to individuals already experiencing symptoms.*²⁰

Conclusions

Given the current scope of SUDs, including behavioral addictions, which are of particular concern among young people,²² research and

funding of preventive and early intervention measures are essential. With new possibilities, new risks arise, and new skills need to be learnt. In this case, the reasonable and targeted use or self-management skills regarding internet usage for professional and private purposes need to be learnt and practiced.

Only 1 in 10 individuals with SUDs receive specialized treatment despite the known huge cost savings of treatment and prevention measures.²³ We know from the literature that early intervention pays off not only economically, but also regarding clinical outcomes as the progression of disease might be altered. For example, especially for ADHD, studies show that earlier intervention/treatment with stimulants in children might prevent future substance use problems.^{24,25}

*Only 1 in 10 individuals with SUDs receive specialized treatment despite the known huge cost savings of treatment and prevention measures*²³

Finally, addressing addiction falls into the realm of providing mental healthcare and promoting mental and overall health. Global mental health movements have been emphasizing the promotion of human rights in mental health care in accordance with the UN Convention on the Rights of Persons with Disabilities (CRPD) and the WHO Quality Rights Initiative.²⁶ Despite significant recent improvements in mental health service delivery, there is still -besides a general lack of treatment providers in some regions - substantial reporting of stigmatizing attitudes



and human rights violations and abuse in mental health settings. Thus, developing new and better prevention, diagnosis, and early intervention measures also encompasses the promotion of a different narrative around and de-stigmatization of mental health and addictive disorders.

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