


Effects of COVID-19 on Substance Use in Singapore

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ABSTRACT: This review examines the impact of COVID-19 on the substance-abuse landscape and climate with particular attention on Singapore's. Substance-abuse has received the least attention during the COVID-19 outbreak and this pandemic has further sheared the problem's visibility and the provision of care for this population of sufferers. The authors examine the current literature to look at the access and utility of street drugs due to border closure, the influence of the pandemic on prevailing drug behaviours as well as the effect of social distancing on drug-users. Two case studies are described. The paper serves to illuminate the ever-present problem of substance-abuse even during a viral pandemic and to remind the local government and healthcare system to continue efforts in caring for this group of patients.

KEYWORDS: COVID-19, Substance Abuse, Singapore, Mental Health, Tobacco Use

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A Brief Look at Substance Abuse Worldwide

Two hundred and sixty-nine million people between the ages of 15 to 64 years, approximating 5.3% of the global population, had used drugs at least once in 2018. 35.6 million of them went on to suffer from a drug-use disorder according to the World Drug report in 2020.¹ The Global Burden of Disease Study estimated that 585 000 people succumbed to drug-related mortality in 2017, and 167 000 of the cases were due to overdoses closely related to drug-use disorders. Other drug-related mortalities were attributable to deaths from transmission of infectious diseases during unsafe drug-use practices. One hundred ninety-two million people used cannabis; 58 million people used opioids (that refer to all natural and synthetic morphine-like drugs); 27 million people used amphetamines including prescription stimulants; 30 million people used opiates (ie, opioids directly derived from the natural opium poppy plant); and 19 million people used cocaine in 2018.¹

Illicit fentanyl and its analogues reportedly were mixed with heroin and other drugs such as cocaine and MDMA (methylenedioxymethamphetamine and commonly known as 'Ecstasy') to be sold as counterfeit prescription opioid painkillers. The users were unaware of the contents of these products they were taking, and this inevitably led to an 8-fold increase in number of deaths from 2008 to 2018.² For the plant kratom, its products were not only used in South-East Asia as a traditional remedy for minor ailments, but the drug derivative was used for non-medicinal reasons such as heightened sensation of pleasure.³ Opioid-users in the United-States (US) used kratom products to manage their withdrawal symptoms. For marijuana, Pacula and Smart⁴ described an increase in non-medical use of cannabis increased after a law change in 8 state-level jurisdictions in the US at the beginning of 2017. This socio-political change resulted in significantly increased cannabis consumption in those states, causing the ensuing rise in cannabis-related ER (emergency room) visits, hospital

admissions and deaths from traffic accident (while operating vehicles under influence of cannabis).⁵ In a separate 2016 report, the harmful use of alcohol resulted in 3 million deaths which accounted for 5.3% of all deaths worldwide. The harmful effects of alcohol also accounted for 132.6 million disability-adjusted life years (DALYs) which was 5.1% of all DALYs in that year alone.⁶ The mortality rate arising from alcohol consumption alone was higher than that from diseases for example tuberculosis, HIV/AIDS and diabetes. The harmful use of alcohol was responsible for 1.7 million deaths among the non-communicable diseases in 2016, 6 including an estimated 0.6 million deaths each from digestive and cardiovascular diseases and 0.4 million deaths from cancers. Globally an estimated 0.9 million injury deaths were also attributable to alcohol-use, including around 370 000 deaths due to road injuries, 150 000 due to self-harm and around 90 000 due to interpersonal violence.

Substance-use was directly and indirectly responsible for 11.8 million deaths globally according to a 2017 study.⁷ Direct death from substance-use disorder resulted from drug overdoses. Indirect death from substance-use included premature death from diseases and injury such as suicide, liver disease, hepatitis and HIV. Tobacco-smoking is a risk factor for lung and other cancers, heart disease, stroke and diabetes. Tobacco-smoking contributed to the majority of premature deaths from substance-use. Notably premature deaths constituted 11.4 million deaths.⁸ As of May 2021, COVID-19 had claimed more than 3.2 million lives worldwide. Guidelines from both the United Kingdom (UK) and the US stated if a medical practitioner suspected that COVID-19 had played a role in an individual's death, this diagnosis should be specified on the death certificate. In some cases, COVID-19 would have been the underlying cause of death, if the victim developed complications such as pneumonia or acute respiratory distress syndrome (ARDS). Whether this was the underlying cause or indirect



reason, COVID-19 was listed regardless. In other words, a positive COVID-19 test result was not required for a death's aetiology to be registered as COVID-19.⁹ This explained the rapidly escalating number of deaths globally resulting from COVID-19 much greater than that from substance-use within a period of time. Over-diagnosis for death certification based on clinical judgement first before serological confirmation may be justified from a public health point of view to heighten surveillance and allocate resources to handle any surge. However, this method had also been criticised to create undue public pandemonium and draw excessive resource from other social and healthcare sectors which were just as important if not more, such as tackling substance use.

Impact of COVID-19 on Use of Smoking Tobacco

Tobacco claims 8 million deaths every year from cardiovascular diseases, lung disorders including respiratory infections, cancers, diabetes and hypertension.¹⁰ Observational studies found that smokers constituted 1.4% to 18.5% of hospitalised adults.¹¹ Some peer-reviewed studies emerged during the pandemic that evaluated the risk of SARS-CoV-2 infection among smokers. Emerging evidence also suggested that smokers who were hospitalised for COVID-19 infection and complications were at risk of more severe outcomes than non-smokers.¹² Zheng et al¹³ analysed data from 5 studies totalling 1980 patients and found a statistically significant association between smoking and COVID-19 severity when using a fixed effects model: OR: 2.0 (95% CI 1.3-3.2). A study of 323 hospitalised patients in Wuhan, China, reported a statistically significant association between smoking and severity of disease with odds ratio (OR) 3.5 (95% CI 1.2-10.2).¹⁴ Kozak et al¹⁵ found a statistically significant association between smoking and intensive care unit (ICU) admission and mortality amongst 226 patients in Toronto, Canada. Chronic smoking has demonstrably induced epigenetic modifications of the victim's bronchial epithelium and caused mucous cells' metaplasia. As these mucous cells or goblet cells are linked to angiotensin-converting enzyme II (ACE-2), the higher level of ACE-2 in smokers' lungs has been associated with greater likelihood of SARS-CoV-2 infection as the virus has been purported to enter host cells via ACE-2.¹⁶

For smokers, the evolving modification of their social circumstances could provide opportunities to quit smoking.¹⁷ However, in some European countries, tobacconists were recognised as essential retailers and excluded from shutdowns. Yach¹⁸ surveyed 6800 combustible and e-cigarette users under a variety of lockdown measures across 5 countries: Italy, India, South Africa, the UK and the US (California and New York), to find out if usage behaviours changed, and whether altered usage patterns affected others. It was noted that e-cigarette consumption marginally increased during lockdown. However, the types of products used, and the frequency of that use remained virtually unchanged. In India, a large part of the surveyed population believed that smoking and vaping increased

the risk of contracting COVID-19. In Italy, more than half believed that there was no relation between COVID-19 risk and smoking or vaping. Results from the other countries were less stark, although vaping was usually considered less of a risk than smoking combustible cigarettes. In the UK and the US, the proportion of users who desired to quit smoking or vaping was twice as high among participants living in a household where someone had tested positive for the virus. Survey respondents were concerned about becoming ill with the virus, losing their jobs and dealing with stress. Smoking in the home increased in Italy and India among exclusive combustible cigarette smokers, which could increase second-hand smoke exposure for non-smoking family members.¹⁸

Impact of Measures Designed to Prevent COVID-19 Transmission on Illicit Drug Trafficking

Drug abuse is contributing to 1.5% of Global Burden of Disease. In a report published by the United Nations Office on Drugs and Crime (UNODC) Research and Trend Analysis Branch¹⁹ on the routes of illicit drug flows during COVID-19, border closure was implemented in multiple countries to curb COVID-19 pandemic. This led to disruption of drug trafficking routes by air and land. Consequently, drug traffickers started looking for alternative routes such as maritime ones. Synthetic drugs like amphetamines which used to be transported by air were likely to use maritime travel. Heroin which was mostly trafficked by land had seen an increase in maritime travel, as evidenced by seizures of opiates in the Indian Ocean. Trafficking in cannabis was less affected by COVID-19 pandemic as its production often took place near consumer markets. In Singapore, drug traffickers turned to novel ways to exploit the COVID-19 travel restrictions, including the use of drones to import drugs from Malaysia and to hide drugs inside fruits like papaya and coconuts.²⁰ Reduction in drug-supply also saw an increase in the use of pharmaceutical products such as benzodiazepines and use of injectable drugs with sharing of needles, which led to transmissible diseases including COVID-19. European Drug Report 2020²¹ examined how organised crime groups had adapted their modus operandi at the drug retail level. There had been more laboratories (or facilities) nearer to the consumers which assembled the precursor products for ease of access to the market. Traffickers and consumers alike also turned to online platforms like Dark-Web and even social media applications to surreptitiously transact and skirt around the physical restrictions due to the pandemic. Additionally, the pandemic and its prolonged negative effects on economy and employment ignited the global drug market to escalated production and trafficking for income to ease the poverty.

Singapore's COVID-19 Experience

As early as the second day of the new year in 2020 (2nd January), the Ministry of Health (MOH) in Singapore became aware of reports about atypically-severe pneumonia cases from Wuhan, China. This prompted Changi International Airport

to implement temperature-screening for arriving passengers and travellers from Wuhan beginning 3rd January. The first confirmed case of COVID-19 was an imported case from Wuhan, China who arrived in Singapore with his family on 20th January and was tested positive on 23rd January.²² On 30th January, the Director-General of the World Health Organization (WHO) declared China's COVID-19 outbreak a public health emergency of international concern. All new visitors with recent travel history to mainland China within the last 14 days were not permitted to enter or transit through Singapore from 1st February 2020. Following new occurrence of locally-transmitted cases of COVID-19 without any links to travel history to China, MOH of Singapore stepped up its risk assessment from DORSCON (Disease Outbreak Response System Condition) Yellow to Orange on 7th February. The MOH also advised Singaporeans to defer all travel abroad from 18th March 2020 onwards. With the escalating COVID-19 situation, MOH of Singapore announced a stricter safe-distancing measure by closing all public entertainment outlets such as bars, pubs, nightclub, discotheque, computer games centres from 26th March.²³ On 3rd April 2020, Singapore government announced Circuit Breaker to commence on 7th April as a heightened safe-distancing measure against COVID-19. It is an elevated set of safe-distancing measures to pre-empt the trend of local transmission of COVID-19, allowing only essential services defined as healthcare, social services, financial services, cleaning services, and water, energy and environmental related services to operate, and borders were closed. The historical Circuit Breaker in Singapore lasted for 56 days and ended on 1st June 2020, with a graded 3-phased approach to resume activities post circuit breaker. To tackle the COVID-19 situation, many countries had imposed early restrictions and border closures.²⁴ Since 21st March 2020, all incoming travellers (Inclusive of Singapore citizens, permanent residents, long-term pass holders or foreign visitors allowed entry) to Singapore had been required to serve the Stay-Home Notice (SHN) and undergo a COVID-19 swab test.²⁵

As of May 2021, the total number of cases of COVID-19 in the world has exceeded 158 million. While Singapore's total cases stood around 62 000, the majority of Singapore's cases were work permit holders staying in migrant workers' dormitories.²⁶ This jarring piece of statistic highlighted the dangers of neglecting this group of marginalised community in Singapore who were more prone to forms of substance abuse like alcohol and smoking.²⁷ In addition, the prolonged quarantine of the migrant workers residing the dormitories to contain the spread of COVID-19 had affected their mental health adversely.²⁸ As a result, a new task force consisting of representatives from the Ministry of Manpower, Migrant Workers' advocates and the mental health professionals was set up to boost mental health care and support for migrant workers in Singapore.²⁹

Singapore adheres to one of the strictest drug control laws in the world. Drugs such as cannabis, cocaine, opium, heroin (diamorphine), 'Ice' (methamphetamine), ketamine and Ecstasy

(methylenedioxymethamphetamine or MDMA) are all prohibited in Singapore and categorised as Class A substances. The categorisation of Class A, B or C refers to the grouping of the substances and products as specified by Parts I, II or III within the First Schedule in the legal provision. Under the Misuse of Drugs Act (MDA), a person who is found guilty of drug possession, consumption and drug trafficking can face sentencing, ranging from prison term (up to 10 years maximum) to a monetary penalty (up to 20 000 dollars) and even be served the capital punishment (death by judicial hanging).³⁰ With regards to the legal substance alcohol, liquor sales and consumption in public places such as bars and restaurants were bound by law to cease by 10:30 pm. Following easing of the circuit breaker measures, liquor sales and consumption in eateries resuming businesses, were allowed to do so until 10:00 pm. It might appear to be the case that the government was using this situation to curb alcohol use in the community and tackle the rise in binge drinking and underaged drinking. Lottery venues and casinos were closed during the first phase of the circuit breaker which led those battling with gambling addiction to resort to underground gambling dens and online gambling sites.³¹

The Global COVID-19 Situation

Globally, it was known that the severity of substance use disorder was associated with various clinical and psychological conditions.³² COVID-19 situation forced most countries to close their borders in collective efforts to curb the spread of the virus. This in turn increased the complexity of maintaining illegal drug supply chain. The continuous delivery of opioid agonist maintenance treatment for dependent patients could be problematic in many countries in the face of the COVID-19 pandemic.³³

As more people who used drugs (PWUDs) sought help for substance withdrawal or substitute opioid therapy due to the global shortage in drug supply, access to drug services was also being disrupted by quarantine and social distancing measures.³⁴ In Singapore, the National Addiction Management Services (NAMS) was also closed during the circuit breaker in 2020 in lieu of public health measures. In late April 2021, Singapore was affected with a new outbreak of local community COVID-19 cases. NAMS ward which is meant for inpatient detoxification had to be closed down in May 2021 in order to serve as quarantine ward for patients who are at higher risk of transmitting COVID-19. This is disrupting access to PWUDs who need help with their addiction. Disruption in the access to opioid agonist treatment caused an emergence of and increasing rates of anxiety disorder and post-traumatic stress disorder, in addition to unintended dropout from treatment programmes and relapse to illicit opiate use.³⁵ In Singapore, the methadone substitution programme is only available for a small number of elderly opium users, and the failure of the buprenorphine therapy programme meant a lack of substitution or harm reduction therapies for opioid

dependence.³⁶ In Malaysia, the guidelines for methadone dispensing were relaxed and urine testing was suspended when a nationwide movement control order (MCO) was imposed to control the spread of COVID-19.³⁷ The local non-government organisations (NGO) in Malaysia also provided face masks and hand sanitisers in addition to supplying more needle and syringe packages to PWUDs.³⁷ Telemedicine was utilised to provide medication management and counselling services for patients in opioid treatment programs in the U.S., in addition to allowing up to 4 weeks supply methadone to be dispensed as well as easing urine toxicology screening protocols.³⁸

In terms of drug consumption trends, heroin shortages led to users switching to Fentanyl and its derivatives.^{39,40} PWUDs were also forced into switching to alternatives synthetic or counterfeit drugs bought online which posed serious health threats. A study by Catalani et al⁴¹ identified 18 new psychoactive substances (NPS) in the first 8 months of 2020 after traditional drug supply routes became restricted. Prescription medications such as Benzodiazepines, Z-drugs and even over the counter products like codeine and ephedrine also have abuse potential.⁴² The burden on medical services would inevitably increase when abuse of high dose prescription opioids and benzodiazepines lead to respiratory depression and hypoxaemia amongst PWUDs.⁴³ There were also reported cases of people breaking quarantine in search of drugs or engaging in unsafe practices such as chemsex. (Reeves, Ladner, Perry, Burke and Laizer, 2015) In view of restrictions from COVID-19, social media became a popular platform for interaction between drug users and suppliers, to communicate freely about price, purity, toxicological effects and way of administration, especially with regards to newly introduced/synthesised drugs.⁴¹

Following lockdown with alcohol ban in Bangalore, the Emergency Departments in various tertiary hospitals within the country had to cope with twice the usual number of severe alcohol withdrawal syndrome for up to 10 days.⁴⁴ Methamphetamines are the most commonly abused drugs in Singapore; accounting for up to 69% in 2020.⁴⁵ Methamphetamines are known to cause lung injury, pulmonary hypertension and cardiomyopathy.⁴⁶ Experts had advised prevailing methamphetamine abusers to be vigilant towards the possibility of increased risk for worse COVID-19 outcomes should they become infected.⁴⁷

Lockdown and social isolation meant longer time spent at home and this gave rise to addictive behaviours such as gaming, pornography and online shopping. Verizon, a US-based telecommunications provider reported a 75% increase in online gaming activity coinciding with the initial stay-at-home directives.⁴⁸ Steam, a leading gaming distributor, also reported more than 20 million concurrent active users, the highest in its 16-year history of business. Live-streaming platforms YouTube Gaming and Twitch reported 10% increase in viewership.⁴⁹

COVID-19 and a Lost Generation?

As of May 2021, only about 3.2% of the world population had been fully vaccinated against COVID-19.⁵⁰ The risk of getting sick from COVID-19 and the possibility of infecting others remained high, as does the worry about loved ones dying from COVID-19. Lack of access to limited healthcare services, loss of finances, food, shelter and rise of racial discrimination/stigma from being blamed for spreading COVID-19 were amongst some of the socio-economic implications which has detrimental effects on one's mental health.⁵¹ The minority ethnic and racial groups were also at higher risk of turning to substance use or increase their substance usage to cope with their anxiety and depression during this pandemic.⁵¹ According to a study done by McKnight-Eily et al,⁵¹ this is evident in Hispanic/Latino adults who reported a higher prevalence of psychosocial stress related to not having enough food or stable housing compared to adults in other racial and ethnic groups.

The rise of the digital age has increased ease of communication through various web-based platforms and social media. However the lack of face-to-face social interactions could lead to loneliness due to continued social isolation and solitude. Loneliness has been associated with mental illness like mood disorders and substance use disorders.⁵² A study conducted by Horigian et al⁵³ found that young adults in the United States reported elevated levels of loneliness, depression, anxiety, alcohol and drug use during COVID-19. Telehealth has been effectively utilised to provide psychological support while minimising the risk of COVID-19 transmission through physical contact.

Mental Health and Working from Home

The presence of COVID-19 perpetuated the practice of working from home to reduce chances of exposure to COVID-19. A Workplace Resilience survey done by National University Health System's (NUHS) Mind Science Centre in May 2020⁵⁴ found that 61% of those working from home reported feeling stressed, compared to front liners in which 53% felt stressed. A greater proportion of women (61.3%) compared to men (45.5%) reported feeling stressed at work. It could be attributed to the additional responsibility of women at home, having to straddle between caring for children and working from home, which added to their stress and anxiety. Another separate mental health resilience survey done concurrently by NUHS Mind Science Centre in June 2020 found that younger people (<45 years old) were more likely to report feeling stressed and less mentally resilient than those who were older.³³ The uncertainty over the duration of the pandemic and whether the people could outlast the resultant economic crisis also made them more anxious.⁵⁵ Experiencing uncurbed prolonged period of working from home meant fewer opportunities for interaction with colleagues. This resulted in a sense of isolation and disconnection. Having to get used to a new mode of working

remotely via online teleconferencing platforms (eg, Slack, Zoom) placed a strain on those who were not used to it. Moreover, working from home blurred the line between work and home, and this could result in constant pressure to be switched on when someone should be switched off.⁵⁶ Losing this boundary between corporate zone and personal space added to the performance pressure and stress to multi-task.

In Singapore, there were noticeable effects unique social distancing measures due to COVID-19 had exerted on the substance users in the clinical setting. A Chinese male patient in his mid-twenties had been struggling with co-occurring anxiety disorder (recurrent panic attacks with agoraphobic features and anxious personality) and alcohol use disorder. Previously he would resort to recurrent online bulk ordering to sustain his binge-drinking habits to evade his family's attempts to curtail his habit. Since the onset of Circuit Breaker, there was reduced need to socialise and diminished requirement to head to workplace. The patient substantially reduced his alcohol use to once weekly and had not required any online purchases to relieve any craving.

Another Chinese male patient in his mid-30s was a person living with HIV (PLHIV) and a member of the LGBTQ community who had been adequately well on antiretroviral therapy. His methamphetamine addiction was discovered following an episode of drug-induced delirium and psychotic state with severe cardiomyopathy of impaired ejection fraction 20%. Despite an extensive work-up by his treating infectious disease team, it was his own disclosure that he had been relying on methamphetamine to manage his undiagnosed depression. He had since been treated with medications sertraline and received outpatient counselling. During the assessment, it was unravelled that his source and provider had not been able to obtain any product during Circuit Breaker due to border closure. He had turned to unknown street sources and possibly novel psychoactive substances (NPS) which had contained other mind-altering and harmful contaminants. On the same note, Circuit Breaker with the social distancing rules had also served as a deterrence in succumbing to the craving.

Conclusion

COVID-19 resulted in severe disruption to the drug supply among the substance abusers. The abusers suffered withdrawal consequences and sustained increased financial burden to procure these drugs which became less accessible. The pandemic served as an opportune timing for abstinence attempts as a result. During Circuit Breaker period to minimise viral spread within the community, there was a move towards use of telemedicine in Singapore's healthcare scene. Public and private hospitals' ambulatory services and outpatient clinics turned to telephone and video consultations for the elderly and immunocompromised patients who were more vulnerable to COVID-19, as well as ensuring prompt and timely medication delivery to their homes. COVID-19 also caused disruption to people

relying on community addiction services to provide a structured environment and routine activities to recover from their addictions, as they learnt to switch over to online platforms such as Zoom to do so.⁵⁷ With the easing of social distancing measures in Phase II following the containment of the viral situation, Singapore government continued to limit the maximum number of people gathering to 5 at any one time and continued restricting border movement.

Drug withdrawal became a more pressing issue in the face of COVID-19 crisis. In addition, the pandemic changed how illicit substances made their way into the consumers' market via online platforms despite terrestrial restriction to curb further viral outbreak. The type of substances preferred altered as consumers would assemble chemical synthetics rather than procure naturally derived compounds. Moving into remote connecting also escalated social isolation, disconnection from social services and pushed online community users into more immersive gaming, addictive gambling and excessive shopping.

With concerted efforts by the government, hospitals and non-government organisations, addiction to class A drugs as well as addictive behaviours can be put under control. Tertiary centre and restructured hospitals should prioritise the need of this group of patients, by offering admission for detoxification as well as close follow up in outpatient clinic, if needed, as well as being more proactive in asking for substance use history. In addition, these group of patients in having to spend more money to obtain the limited supply of drugs from black market will suffer from severe financial strains. Financial assistance and residential rehabilitation are therefore paramount to ensure their well-being. Dual diagnosis is common among substance users, hence it should always be at the back of clinician's mind to enquire their emotional states during consult. Healthcare professionals should also be familiar with various helplines that can assist patients with substance use disorder in times of distress.

Author Contributions

All authors planned and wrote the manuscript. All authors read and approved the final manuscript.

Ethical Approval

This study was conducted in compliance with the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals formulated by the International Committee of Medical Journal Editors (ICMJE).

Ethical Approval Statement

This is to confirm that this manuscript is an original work examining the impact of COVID-19 including precautionary policies to curb the pandemic towards substance use in Singapore with a message to convey that there is a need for continuous recognition and intervention for such patients.

This also confirms that all co-authors have read, approve of, and concur with the submitted manuscript.

That all authors have made substantial contributions that meet the stated requirement for authorship.

That due care has been exercised by the authors to ensure the integrity of the work.

That none of the original material contained in the manuscript has been previously published (except in abstract form as part of scientific meetings) nor is currently under review for publication elsewhere.

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