

Short and long term burden of COVID-19 in substance abusers: A cohort study

Executive Summary

Background: Substance abuse can significantly increase the risk for infection and prognosis, potentially leading to more severe and longer lasting illnesses. Concurrently, the coronavirus disease 2019 (COVID-19) contributes to higher morbidity and mortality rates. Substance abusers may face heightened health risks due to compromised immune systems and co-occurring medical conditions. However, there is limited evidence on the interaction between substance abuse and COVID-19. Moreover, the evidence on the vaccine effectiveness against short- and long-term COVID-19 in substance abusers is lacking. Given the aforementioned higher risk of COVID-19 infection and related complications among individuals with substance abuse, understanding the impact of substance abuse on COVID-19 infection and its related outcomes and vaccination effectiveness is crucial to the health management, social care, and education of this population. Therefore, we conducted a population-based study that included patients with electronic health records stored in the Clinical Management System for Hospital Authority in Hong Kong to assess the magnitude of short- and long-term impact of COVID-19 on individuals with substance abuse.

Objectives: 1) to investigate the risk of COVID-19 infection in substance abusers; 2) to evaluate the short-term burden of COVID-19 in substance abusers; 3) to assess the long-term burden of COVID-19 in substance abusers; 4) to compare vaccine effectiveness among vaccinated individuals with or without substance abuse.

Method: A cohort study design was applied using three population-based databases for patient health information, COVID-19 infection information and vaccine records from the Department of Health and Hospital Authority. Patients who were not tested positive for COVID-19 on or before January 1, 2022 were identified. Two groups were then divided based on whether had a history of substance abuse for each objective to compare the risk of COVID-19 infection in the exposure group (i.e., with substance abuse) with control group (i.e., without substance abuse). Each patient in the exposure group was randomly matched to up to ten patients in the control group based on 5-year age, sex, and baseline comorbidities. Covariates between exposed groups and controls were adjusted using propensity score-based inverse probability treatment weighting. Cox proportional hazards regression was employed to estimate the hazard ratio (HR) of outcomes for each objective.

Results: For objective 1, no increased risk of COVID-19 infection was observed for individuals with substance use compared to those without substance use, but significantly increased risks of COVID-19-related hospitalisation and mortality were identified. For objectives 2 and 3, higher short- and long-term burdens of COVID-19 were found among individuals with substance abuse. Compared with uninfected individuals with substance abuse, individuals with both substance abuse and COVID-19 infection were consistently associated with higher risks of hospitalisation, A&E attendance and all-cause mortality during the acute phase of COVID-19. No significant difference was observed in the risk of these outcomes during the post-acute phase of COVID-19, except for pneumonia. For objective 4, significant risk reductions were observed in two exposures among fully-vaccinated individuals with substance abuse during acute phase of COVID-19,

including hospitalisation and A&E attendance. Similar risk reductions were observed but insignificant among fully-vaccinated individuals with substance abuse during post-acute phase of COVID-19.

Conclusion: This study found that patients with substance abuse had higher risk of COVID-19 related adverse outcomes compared to those without substance abuse and revealed the effectiveness of vaccination on reducing COVID-19 outcomes among this population. These findings highlight the important of COVID-19 vaccination among patients with substance abuse. Given the higher short-term and long-term burden of COVID-19 in patients with substance abuse, close monitoring of these patients is required after COVID-19 infection.

Implications: This is the first study to describe the COVID-19 related outcomes of individuals with substance abuse, evaluate the effectiveness of vaccination on COVID-19 related outcomes, and explore this effectiveness among substance abuse population. Findings in current study help to understand the situation of drug abusers in Hong Kong amid the COVID-19 pandemic, and the extent of health consequences and harms on infected patients. These findings can be applied to improve the health management of all individuals who may abuse substances. Evidence from this research can be used for future projects that inform the public of the health consequences of substance abuse, raising awareness of the importance of substance quitting, and can improve the well-being of this vulnerable group.