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Coexisting Substance Use Disorder and Chronic Pain During COVID-19

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Introduction

The culminative impact that COVID-19 has had on our nation has resulted in a trifecta of complex and interrelated conditions: COVID-19, substance use disorders (SUD), and chronic pain. The potential for the almost 33 million Americans (New York Times, 2021) infected with COVID-19 to develop or suffer from these three conditions remains to be seen, however, the conditions for these are present. The purpose of this article is to describe the symptoms of COVID-19 as currently understood in the literature, the effects of COVID-related stress and social isolation on problematic substance use, and the potential for central sensitization processes that can be triggered by COVID-19 infection and debilitation, worsening the experience of chronic pain.

Symptoms of COVID-19

Based upon ongoing and developing understanding of the virus and highly publicized death rates, people infected with COVID-19 face tremendous uncertainty and are confronted with their own mortality. Qualitative studies from around the world depict experiences of people with COVID-19 (Missel et al., 2021; Liu & Liu, 2021; Sahoo et al., 2020). Study participants described feeling overwhelming fatigue, loss of taste and smell, neuromuscular symptoms of body aches and headaches, loss of control, isolation, anger, shame and embarrassment, and anxiety (Roberts et al., 2021; Sahoo et al., 2020). There was tremendous impact on social relationships (Missel, 2020), switching their belief from COVID-19 being

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global mass hysteria to activating considerable concern, and then fear of infecting those around them (Missel et al., 2020), and fear of death (Liu & Liu, 2021). People infected with COVID-19 were faced with inability to perform family responsibilities. Furthermore, they reported facing widespread prejudice and rejection following infection that took an emotional and physical toll on their well-being (Liu & Liu, 2021). The required isolation in hospital settings created distressing mental health symptoms that continued beyond survival and discharge to another healthcare setting or home (Liu & Liu, 2021). Living through and surviving an intensive care hospitalization can produce stress and feeling of traumatization in patients without a pandemic; hospitalization and becoming severely ill from a pandemic only exacerbates those traumatic stressors. Sahoo and colleagues (2020) found that survivors continued to have sleep disturbances and severe anxiety which was accentuated with news reports of the death toll. Understanding the experiences of surviving COVID-19 and the experiences of severe illness set the stage for this paper in anticipating the care needed when one suffers from COVID, and pain and SUD.

COVID-19 and Substance Use Disorders

Vulnerability to severe COVID-19 infection.

SUD and the COVID-19 pandemic intersect in several ways that result in poorer outcomes for persons suffering from both (Wang et al., 2021). Persons with SUDs are at increased risk for COVID-19 virus infection related to lifestyle and the direct physiological effects of abused substances on respiratory and immune health. Risk for severe COVID-19 disease and death is increased among persons who are immunocompromised or have underlying health conditions, especially heart and respiratory diseases (Becker & Fiellin, 2020; Spagnolo et al., 2020; Volkow, 2020). Not only is nicotine dependence highly prevalent in persons with SUD (Kalman et al., 2005; Weinberger et al., 2016), but smoking of other abused substances (cannabis, cocaine) can result in respiratory disease or compromise, thereby increasing the risk for death and illness among persons who abuse substances by this route of administration. Vaping, another method of substance inhalation, is similarly linked to lung illness and injury, and appears to diminish the lung's ability to respond to infection (Madison et al, 2019), making persons more vulnerable to COVID-19 infection.

Abuse of specific substances can also present unique risks for COVID-19 infection (Volkow, 2020). For example, methamphetamine abuse, which is currently on the rise in the US (Han et al., 2021; Jones et al., 2020), has been demonstrated to cause pulmonary damage, pulmonary hypertension, and cardiomyopathy (Zhao et al., 2018), all underlying health conditions associated with poor COVID-19 outcomes. Patients with opioid use disorder have high rates of chronic obstructive pulmonary disease, respiratory depression and hypoxia associated with opioid misuse, and development of aspiration- or community-acquired pneumonia (Edelman et al., 2019; Marsden et al., 2020), putting persons at risk for poor COVID-19 outcomes. Alcohol use disorder is associated with comorbidities such as liver disease, diabetes mellitus and chronic kidney disease, which also increase the risk for COVID-19 complications (Kushner & Cafardi, 2020). Further, active SUD brings with it disruptions to sleep and nutrition, which can result in immunocompromise, another risk factor for infection and more severe disease.

Persons with SUD are also more likely than the general public to be housed in close quarters, where the risk of virus transmission is great (Marsden et al., 2020). Notable percentages of persons with SUD experience unstable housing or homelessness (National Alliance to End Homelessness, 2014; Schütz, 2016), and homeless shelters have been identified as settings where virus transmission is exacerbated (Kuehn, 2020; Ralli et al., 2021). Others experiencing homelessness may live in congregate living settings such as encampments or abandoned buildings, without regular access to basic hygiene and hand washing facilities (Tsai & Wilson, 2020). Finally, according to the National Institute on Drug Abuse, an estimated 65% of incarcerated individuals have an active SUD (National Institute on Drug Abuse, 2020), and prisoners in the US have been shown to be four times more likely to be infected with COVID-19 than the general population (Schwartzapfel et al., 2020). Thus, in addition to physiologic vulnerabilities associated with SUD, social determinants of health such as housing can put persons with SUD at risk for infection and disease.

Impact of COVID-19 and SUD treatment.

While SUDs make individuals more vulnerable to COVID-19 infection and severe disease, the related lockdowns and need for social isolation have had negative effects on both SUD treatment and outcomes. Specifically, social support is a critical component of SUD treatment, often operationalized as support group meetings, whereas social isolation is a known risk factor for poor treatment outcomes and relapse (Barrick & Connors, 2002; Johnson et al., 2018; Pettersen et al., 2019; Spagnolo et al., 2020). In an effort to reduce disease transmission, access to in-person peer-support group meetings has been limited; although Alcoholics Anonymous (Alcoholics Anonymous, 2020) and other support groups (Substance Abuse and Mental Health Services Administration, SAMHSA, 2021a) have moved their meetings to virtual platforms, evidence for the efficacy of these online meetings in comparison to face-to-face interaction has not been established.

In addition, effective treatment for SUDs often includes comprehensive services, including housing and social services; however, due to the pandemic and financial concerns, many treatment centers have had to close or scale back their services (Alexander et al., 2020). Data collected from focus groups of veterans in a residential treatment program that instituted COVID-19 related restrictions highlighted concerns associated with inconsistent communication about residential policies, interruptions to medical and addiction services, and feelings of confinement and social isolation (Clair et al., 2021). Attempts to deliver safe care with respect to the virus has undoubtedly led to disruptions of and less effective treatment services.

Provision of medications for opioid use disorder (MOUD) has been a particular challenge during the pandemic (Alexander et al., 2020; Becker & Fiellin, 2020; Volkow, 2020). Medications, such as buprenorphine and methadone, are the cornerstone of evidence-based treatment for opioid use disorder, however their dispensing is highly controlled. Federal regulations have required that most patients on methadone therapy come into a licensed opioid treatment program on a daily basis, and although buprenorphine can be prescribed for up to 30 days, patients must be seen in person prior to initiating therapy. To reduce

COVID-19 infection risk and avoid disruptions in patient care, early in the pandemic the US Substance Abuse and Mental Health Services Administration (SAMHSA) provided guidance allowing stable methadone patients to receive 28 days of take-home doses, and less stable patients, 14 days of take-home doses of methadone (SAMHSA, 2020b). Responding to the declaration that COVID-19 constituted a public health emergency, the Drug Enforcement Agency (DEA) further provided guidance that audiovisual telemedicine approaches could be used to initiate buprenorphine therapy, and that clinicians could provide doses in parking lots or outside space adjacent to the clinic (DEA, 2020). Despite these reduced restrictions in MOUD delivery, treatment was undoubtedly disrupted for some and greater feelings of isolation experienced, especially for those without telehealth capability (Becker & Fiellin, 2020; Marsden et al, 2020; Spagnolo et al., 2020).

Finally, as health resources were increasingly directed to treating patients with COVID-19, services to this already marginalized patient population may be considered less of a priority. SUD treatment was difficult to access even prior to COVID-19, particularly in rural communities and communities of color (Banks et al., 2021); underlying SUD-related stigma may make it even more difficult to gain access to treatment in the context of a global pandemic (Spagnolo et al., 2020; Volkow, 2020)

Impact of COVID-19 on SUD outcomes.

The consequences of SUD, and primarily overdoses, have increased dramatically during the pandemic. In December 2020, the Centers for Disease Control and Prevention (CDC, 2020) reported that over 81,000 drug overdose deaths occurred in the United States in the 12 months ending in May 2020, which is the highest number of overdose deaths ever recorded in a 12-month period and an increase of almost 40% from the previous year. Illicitly manufactured fentanyl appears to be the primary driver of the sharp rise in overdose deaths (CDC, 2020). Overdose deaths involving psychostimulants, such as methamphetamine, increased by 34.8% and those involving cocaine increased by 26.5%; with both stimulants, these deaths are likely linked to co-use of, or contamination with illicitly manufactured fentanyl or heroin (CDC, 2020).

Multiple factors related to the pandemic have been identified as contributing to this acceleration of overdose deaths. Social distancing has led to a disruption of usual drug supply chains, making substance procurement unreliable, and in the case of opioids, resulting in decreased tolerance and increased likelihood for overdose (Roe et al., 2021). Due to emergency rooms being overwhelmed with COVID-19 patients, persons with SUD are less likely to access urgent care, including treatment for overdose (Murphy et al., 2021). To avoid withdrawal, patients may engage in higher-risk behaviors to alleviate withdrawal such as increased use of alcohol and benzodiazepines, both of which potentiate overdose risk, or violating quarantine to seek drugs, which can further expose them to COVID-19 infection (Spagnolo et al., 2020; Wakeman et al., 2020). Social distancing also increases the likelihood of opioid overdoses occurring with no one available to administer the reversal agent, naloxone, and thus overdoses are more likely to result in fatalities (Roe et al., 2021; Volkow, 2020).

Not to minimize the role of social isolation in overdose deaths during the pandemic, it was also a precipitator of relapse. Prolonged isolation is a significant stressor, as are the disruptions COVID-19 has had on daily lives, uncertainty about the future, and grief from the illness or death of loved ones (Marsden et al., 2020). Due to neuroadaptations involved in the development of SUDs, persons with SUD are uniquely at risk to use substances to cope with distressing feeling states (Koob et al., 2020). Individuals actively misusing substances typically have extensive and rich social networks of other substance users, and the loss of these bonds can be distressing (Roe et al., 2020). Finally, social isolation and quarantine can lead to boredom which has also been identified as a precipitator of substance use and relapse (Harris et al., 2005; Marshall et al., 2019; McEwen et al., 2008; Sarvey & Welsh, 2021).

COVID-19 and Chronic Pain

Vulnerability to severe to COVID-19 infection.

The COVID-19 pandemic created vulnerabilities in populations of older adult, racial/ethnic minority, those with lower income, and those with chronic co-morbidities, such as persistent pain, resulting in more severe COVID-19 infection (Eccleston et al., 2020; Alonso-Matielo et al., 2021). Increasingly appreciated are how the social determinants of health and stress of social injustice may also play a role in vulnerabilities.

Factors common in chronic pain populations are older age, lower socioeconomic status, smoking status, co-occurring chronic diseases, residence in nursing facilities, and limited access to care (Manchikanti et al., 2021). These factors overlap with the risks associated with COVID-19 infection and poorer outcomes, and pain morbidity can be amplified during COVID-19 infections (Eccleston et al., 2020; Mun et al., 2021). Currently, the CDC has not listed chronic pain as a co-morbidity for risk of severe symptoms, however, the co-morbidities such as substance use disorder, asthma, HIV infection, cystic fibrosis, smoking (current or former), overweight/obesity, cerebrovascular disease, and type 1 diabetes are listed (CDC, 2021a) and these often co-occur in many patients with chronic pain. Clauw and colleagues (2020) suggest that the immunosuppression that accompanies depression, poor sleep, and opioid use in patients with chronic pain further increase their susceptibility to SARS-CoV2. Pain cannot be ignored as a potential complication in those who are currently infected or have survived COVID-19. Escalated pain can be a result of social lockdown for those already with chronic pain, a result of the COVID-19 illness while hospitalized, or a result of the neuromechanistic processes of inflammation and immunity from the SARS-CoV-2 infection itself.

Impact of COVID-19 on Chronic Pain.

There are negative consequences on the physical and psychological health of patients with chronic pain who have COVID-19. A scoping review by Carrillo-dela-Peña and colleagues (2021) disseminated through online and social media, found that patients with chronic pain and rheumatic pain reported exacerbation in symptoms of pain, fatigue, stiffness, distress, as well as worsening of mood and sleep during the COVID-19 pandemic. Survey participants reported their pain was triggered by poor sleep, sedentary lifestyle, and

psychological concerns. Furthermore, they coped with increase in pain through medication use and increased rest time (Carrillo-de-la-Peña et al., 2021). Similarly, Mun and colleagues (2021) found, via an online survey data for 1,453 adults with chronic pain that 25–30% of individuals reported an exacerbation of pain severity and interference early in the pandemic. Data also showed individuals identifying as Black and of non-Hispanic origin experienced greater disruptions in their mood and sleep quality, and were more likely to report worsened pain interference. Additionally, lockdowns implemented by local and state governments created a disconnection from others, augmenting depression, anxiety, and poor sleep, and exacerbating the distress experienced by patients with chronic pain who often already suffer pain-associated loss of roles and relationships (Clauw et al., 2020; Karos et al., 2020). Examining the effect of social distancing on pain symptoms, Hruschak and colleagues (2021) found that patients with fibromyalgia, chronic spine, and postsurgical pain reported a significant increase in pain severity and pain interference, compared with those experienced prior to social distancing. In this sample, greater pain severity was associated with female sex, nonwhite race, lower education, disability, fibromyalgia, and higher pain catastrophizing. Overall, COVID-19 and the resultant isolation negatively impacted people with chronic pain.

COVID-related hospitalization and chronic pain.—Fortunately, hospitalization rates have decreased since the initiation of vaccination programs (Pawlowski et al., 2021); however subsequent waves of infection cannot be ruled out as virus variants continue to arise (CDC, 2021a). When patients are hospitalized with COVID-19 infection, the distress suffered from hospitalization without the support and care of family increases feelings of isolation, fear, and suffering (Drozdal et al., 2020). Further, to save lives, some patients are admitted to intensive care environments with intermittent or continuous procedures that may cause or worsen pain. These procedures may include prone positioning, mechanical ventilation, and placement of extracorporeal membrane oxygenation (ECMO), to name a few. In these settings, sedating medications or neuromuscular blockade agents are often administered to maintain mechanical ventilation, limiting the patient’s ability to self-report pain. When patients cannot self-report, they are vulnerable to having their pain under-recognized and untreated (Herr et al., 2019). Using behavioral pain assessment tools, for example the Behavioral Pain Scale (BPS) or the Critical-Care Pain Observation Tool (CPOT) that are specific for populations and settings can assist in recognizing pain in patients infected with COVID-19 (Herr et al., 2019). Using these tools will strengthen the assessment of patients unable to report pain.

COVID-related pain can worsen chronic pain.—Pain can result from COVID-19 illness. The most common pain symptoms associated with COVID-19 infection are myalgias, arthralgias, and headache. In fact, 90.5% of patients complain of headache, and 36% of patients complain of myalgias. These pain conditions appear to originate from inflammatory mechanisms or from immune-mediated processes in the central nervous system and the peripheral nervous system, respectively (Drozdal et al., 2020; Alonso-Matielo et al., 2021). Specific to headache, the effects of the viral infection on pulmonary tissue activates an immune cell and pro-inflammatory response creating central cytokine overexpression. Resultant increases in cerebral spinal fluid cytokine levels produce central

sensitization, stimulation of trigeminal ganglia, and over production of calcitonin gene-related peptide, which is known to play a role in migraine. With respect to myalgias, viral infections are known to induce an upregulation of the proinflammatory cytokine IL-6. Following COVID infections and pulmonary tissue damage, the immune cell activation and cytokine overexpression damages muscle tissue, resulting in muscle protein breakdown and increased nociceptive signaling. Further, the spike protein on the COVID-19 virus binds to the angiotensin II receptor to enter human cells, and there is evidence that angiotensin receptor signaling is involved in the transmission of pain signals, especially neuropathic pain (Shepherd et al., 2018). More research is needed to determine if activity at this G-protein linked receptor contributes to the pain syndromes associated with COVID-19 infection (Drozdal et al., 2020).

A specific pain syndrome associated with acute or post COVID-19 illness is acute transverse myelitis (ATM). ATM typically presents as a postinfectious complication with rapid onset of pain location in the lower back, with pain that radiates to extremities or thoracoabdominal areas, depending on the dermatomal levels affected. Other ATM symptoms include global weakness, hyperreflexia with increased muscle tone, bowel or bladder dysfunction, and patchy paresthesia to lower limbs (Chow et al., 2020). This specific pain syndrome has received a great deal of attention due to the level of debilitation that can occur, however, there are other pain conditions that result.

Clauw and colleagues (2020) note that chronic pain is not an uncommon outcome of viral infection in the case of the SARS and Epstein–Barr viruses, thus the same may develop in those infected with COVID-19. In fact, in a sample of 100 COVID-19 “long hauler” patients, 68% reported persistent headache and 55% persistent myalgias following resolution of acute infection (Graham et al., 2021). A worthy area of research is determining risk factors for the SARS-CoV-2 virus to induce chronic pain syndromes amongst survivors.

It is clear that pain is a complication of COVID-19 and it can compound the experience of pre-existing chronic pain. So, while discoveries of painful conditions post-COVID-19 infections continue to occur, the pain management nurse must remain vigilant to symptoms and advocate for thorough workup so that diagnosis and timely treatment can be appreciated (Chow et al., 2020; Asadi-Pooya & Simani, 2020).

Restricted access to chronic pain services during pandemic.—The management of chronic pain has been challenging during the COVID-19 pandemic for patients with chronic pain and their healthcare team. The challenges are due to the degree of burden placed on healthcare systems needing to urgently care for patients infected with the virus. There have been significant decreases in access of non-urgent yet vital healthcare services (Clauw et al., 2020; Karos et al., 2020; Frost, 2020). Elective surgeries and outpatient procedures which could relieve chronic pain, such as epidural steroid injections (ESI) or facet joint injection, have been reduced (Carrillo-de-la Pena et al., 2021; Eccleston et al., 2020). Acute pain management service teams have been diverted into the intensive care units, and available chronic pain services have decreased (Alonso-Matielo et al., 2021). During the peak of pandemic, there were medication shortages and a scarcity of resources such as ventilators or ECMO, with only emergency services available (Eccleston et al.,

2020; Manchikanti et al., 2021). Patients were instructed to either stay away from health care or to socially distance (Eccleston et al., 2020), and if health care appointments were made, limitations of public transportation created barriers to getting to clinical setting (Frost, 2020). Additionally, during lockdown, there were only emergency services available in many healthcare systems, creating near impossible circumstances for managing chronic pain by performing simple procedures, such as epidural injections, facet joint injections, and radiofrequency neurotomy (Manchikanti et al., 2021). In their survey early in the pandemic, Mun and colleagues (2021) found that most persons with chronic pain either postponed or canceled pain therapy appointments, often with no future session scheduled. Further, of those patients receiving opioid therapy, 21.4% of patients had concerns about, and 19.7% had difficulty accessing prescription opioids due to COVID-19 (Mun et al., 2021). The use of nonpharmacologic approaches decreased during the pandemic, including engagement of exercise therapy, massage therapy, and spinal manipulation among patients with chronic low back pain (Licciardone, 2021).

Past studies have shown when there are reductions in services or long waiting periods for pain evaluations, there were increases in pain interference with decrease in function, more severe depression (50%), and increased depression and suicidal thinking (34.6%) (Eccleston et al., 2020). When patients experience delays in pain care, they may self-medicate with over-the-counter medications such as non-steroidal anti-inflammatory drugs resulting in gastrointestinal bleeding, acetaminophen overuse resulting in hepatic injury, or opioid overuse or misuse (Manchikanti et al., 2021). The effects of not treating people with chronic pain results in an increase in severity and complexity of their care.

Caring for Patients with COVID-19 and Coexisting Substance Use Disorder and Pain

Approaches to care of persons suffering from the three conditions of COVID-19, SUD and pain must be integrated through a patient-centered approach to achieve optimal outcomes. The guiding principles of care that is unique to a pandemic include, (1) keeping patient and provider safe from exposure; (2) directed nursing assessment; (3) risk mitigation; and (4) support of individualized self-care options.

Keeping the Patient and Provider Safe from COVID-19 Exposure.

Patients with co-morbid SUD and ongoing pain face significant health challenges without a pandemic. During the pandemic, efforts have focused on the use of virtual technologies to support patients while minimizing exposure to the virus. Virtual innovations have evolved overnight to include telemedicine and other means of remote delivery of virtual face-to-face services. Care delivery via virtual visits is a means to provide patient-centered care during a pandemic for treatment specific for those with chronic pain and SUD. The pivot to virtual visits has allowed for provider interaction and group support interventions (SAMHSA, 2021a) providing support for people with chronic pain and SUD safely without risk of virus exposure (Drozdal et al., 2020; Eccleston et al., 2020; Manchikanti et al., 2021).

Novel telemedicine solutions for pain management require integration of seamless application and diagnostic tests that can be performed at home yet with the ability to incorporate the information into electronic health record (Carrillo de la Pena et al., 2021). Recent findings from the *Health Care Consumer Response to COVID-19* survey of 1,510 patients 18 years and older found that patients' expectations have changed as they look for technology to improve their care experience (Betts et al., 2021). The survey data showed from 2019 to early 2020, virtual visits rose from 15% to 19%, then in April 2020 increased to 28%. Furthermore, 80% of those surveyed reported that they'd be willing to have another virtual visit even after the COVID-19 crisis subsides (Betts et al., 2021). From 2018 to 2020, 42% respondents steadily reported using technology and apps to measure fitness, monitor their health goals, and order prescription-drug refills, and in 2020 respondents reported they were more likely to share their data with health care providers (Betts et al., 2021). Use of technology and telemedicine solutions have had favorable results on healthcare during a pandemic. Studies are needed to determine the mechanism by which patient satisfaction occurs.

Directed nursing assessment.

Beyond key assessment elements for individuals with co-occurring pain and SUD (Oliver et al., 2012), during the pandemic special assessment components are needed on the level of disruption the patient is experiencing, evidence of stress and social support, and worsening of symptoms as a side-effect of COVID-19. These assessment components can be obtained virtually and documented in EHR.

Disruption.—Efforts to continue care for those with chronic pain and SUD have been vigorous, yet despite these attempts it is likely that patients have experienced some type of disruption during the pandemic. As noted, social isolation, stress and anxiety associated with the pandemic have potential to exacerbate pain states and substance use. Disruption of activity and sleep routines could also worsen pain. Nursing assessment should evaluate how the pandemic has affected the patient's experience of pain and ability to meet SUD treatment goals. This assessment will guide the nurse in partnering with the patient to problem solve ways of accessing the care they need.

Stress and social support.—As reviewed, the stress related to disease uncertainty, social isolation, COVID-19 illness in the family, and financial insecurity can contribute to the pain experience and precipitate substance craving or increased substance use in those with SUD. Assessment of social support can occur through the use of an assessment tool specific to support domains such as social support, companionship, and social distress (Cyranowski et al., 2013). These assessment findings may change over time. Even so, guidance of appropriate interventions, such as mindfulness activities, acceptance and commitment therapy, or peer support are warranted.

Worsening of symptoms.—As noted, there is evidence that viral-related pathophysiology of COVID-19 can directly worsen the experience of pain. Assessment tools can be used to evaluate for increased pain, decreased function, and substance misuse. These screening tools include the PEG (i.e. pain intensity [P], enjoyment of life [E], and

interference with general activity [G]) to assess pain intensity and interference (Krebs et al., 2009), and the Drug Abuse Screening Test (DAST) or Alcohol Use Disorder Identification Test (AUDIT) to evaluate substance use or misuse (Yudko et al., 2007; Daepfen et al., 2000). If symptoms appear clinically significant or to have worsened, referral to a pain or SUD consult should be initiated. Many pain management nurses are front-line healthcare clinicians, and have and will continue to play a role as a trusted clinician who listens and clearly communicates treatment plans developed in partnership with the patient.

Risk mitigation.

During the COVID-19 pandemic, epidemiologic and world-wide population studies have shown increases in depression, anxiety, risk for suicide, and risk for opioid overdose (Smith & Langen, 2020). This highlights the need for screening for mental health and risk factors that could lead to intentional harm.

Mental health.—Critical to assessment during the pandemic is a thorough evaluation of the patient’s mental health. Symptoms of depression and anxiety are common in persons with persistent pain and SUD (Barry et al., 2017; Bilevicius et al., 2019; Crofford, 2015; Feingold et al., 2017; Søndergård et al., 2018), and can produce substantial barriers to successful treatment of these condition (Oliveira et al., 2019; Worley et al., 2015). Since the beginning of the pandemic, within clinical and general population samples, reported symptoms of anxiety and depression have increased across age and gender, and data continues to accumulate (Cooke et al., 2020; Hawes et al., 2021; Peterson et al., 2021; Salari et al., 2020). Thus, it is highly likely that these are similarly increased in persons with comorbid chronic pain and SUD.

Risk for suicide.—Persistent pain (Elman et al., 2013; Cheatle, 2011) and a SUD diagnosis (Bohnert et al., 2017; Smith et al., 2004) are independent predictors of suicide risk in non-pandemic times. Since the beginning of the pandemic, emerging data suggest increased rates of suicide in community populations world-wide. In fact, Canadian epidemiologists projected 2,114 excess suicides in 2020–2021 related to unemployment due to COVID-19 (McIntyre & Lee, 2020). In an emergency room in Austria, the rates of suicide-related admissions tripled between 2019 and 2020 during COVID-19, and attributed to lockdowns (Carlin et al., 2021). These data highlight the need for depression assessment as well as an evaluation of risk for suicide.

Opioid overdoses may be a result of suicide attempt or may be accidental (Cheatle, 2014; Oquendo & Volkow, 2018; Smith et al., 2004), and as described, the increasing rates of opioid overdoses during COVID-19 has been concerning. Nurses and pharmacists can ensure that patients who abuse opioids, are receiving MOUD, or receiving opioid therapy for the treatment of chronic pain also receive naloxone, and that members of the household are trained on its administration. Naloxone is now available without a prescription at most major pharmacy chains (CDC, 2019; Collins, 2019), and the cost is covered by most insurance companies, Medicaid and Medicare. In fact, during the pandemic, many pharmacies have been able to deliver naloxone to the homes of those who are socially isolating or in quarantine. The pandemic has been a time of stress and despair for patients and their

families. As front-line healthcare workers, nurses can be present for early identification of risk so that help and treatment can be received to restore health.

Self-care during a pandemic.

Escalation of pain symptoms and SUD during the pandemic are often the result of stress and social isolation, and nurses are well positioned to make recommendations to mitigate each. Partnering with patient enables determination of what they would find helpful and could fit into their lifestyle. Self-care includes exercise, mindfulness, outdoor socialization, over-the-counter analgesic agents, and online pain and SUD management activities (Du et al., 2017).

Exercise.—Outdoor exercise is a particularly potent stress reliever (Calogiuri & Chroni, 2014) and need not be strenuous to provide benefit (Kondo et al., 2018), thus patients with pain and mobility limitations can appreciate improvements in pain and function (Borisovskaya et al., 2020; Wun et al., 2021). Regular exercise also appears to improve sleep quality and duration in patients with chronic pain (Estévez-López et al., 2021), and sleep disturbances are common in patients with pain (Haack et al., 2020; Saconi et al., 2021) and SUD (Conroy & Arnedt, 2014; Roehrs & Roth, 2015; Roehrs et al., 2021).

Mindfulness.—Recommendation of other stress-relieving activities, including mindfulness practices have been demonstrated to be effective in patients with chronic pain (Anheyer et al., 2017; Cramer et al., 2012; Smith & Langen, 2020) and SUD (Priddy et al., 2018; Zgierska et al., 2009). It may also be helpful to elicit from the patients what they find to be stress-relieving; for some it might be a warm shower, completing a crossword puzzle or engaging in craft or art-work (Kim, et al., 2020). By encouraging patients to identify these mindful methods to reduce stress, they may be more likely to employ them.

Outdoor socialization.—During the pandemic, being outdoors can provide the opportunity for socialization as long as social distance is maintained, masks are worn, and crowds are avoided. More recent CDC guidelines (2021b) have lifted restrictive recommendations for those who have been vaccinated and are supportive of non-infected individuals meeting in person. However, healthcare professionals must remain abreast of infection incidence rates in their community. Social isolation can also be eased via the use of video chats, computer meetings and phone calls; a quick google search can identify multiple online support groups for patients with chronic pain and SUD for additional social support.

Over-the-counter analgesics.—Over-the-counter analgesia interventions are available to people in pain without a prescription. Common over-the-counter products used for chronic pain include topical anesthetics, salicylates, counterirritants, capsaicin, and also transcutaneous electrical stimulation (TENS) units. Topical agents are applied to the closed skin, and TENS units can be applied over the area of pain but not limited to that location.

Topical medications have the same mechanism of action as when medications are administered through oral or injectable routes. When applied topically, the local drug delivery may potentially avoid systemic adverse effects. Topical anesthetic products include Lidocaine 0.5% spray gel cream, ointment (e.g. Solarcaine), Lidocaine 2.5% spray (e.g.

Bactine), Benzocaine 6.3% liquid or gel (e.g. Anbesol), or Pramoxine 1% cream ointment, aerosol, or pads (e.g. Tucks, ProctoFoam). These can be applied over the area that is painful if the skin is intact. Local anesthetics can prevent or treat pain at the axon in neurons by preventing entry of sodium, thus blocking the action potential (Heavner, 2007).

Topical salicylates include methyl salicylate 30% cream (e.g. Icy Hot, Bengay Ultra Strength) and trolamine salicylate 10% cream (e.g. Aspercreme, Sportscreme). Methyl salicylate produces localized vasodilatation, increases local circulation and tissue temperature, and is used for musculoskeletal pain (Higashi et al., 2010). The analgesic mechanism of action is an inhibition of cyclooxygenase causing a reduction of prostaglandins. Using topical methyl salicylate rather than an oral salicylate is thought to be safe, however there have been reports of unintentional poisoning. Therefore, recommendations for use should involve a healthcare clinician knowledgeable in pain management (Anderson et al., 2017).

Counterirritants can be applied to the skin and include menthol 16% ointment (e.g. Maximum Strength Flexall), Menthol 5% transdermal (Icy Hot Back Pain Relief), and Menthol 1.3% with Camphor 1.3% ointment (e.g. Mentholatum). Menthol creates a cool sensation through activation of thermoreceptors and is used for mild to moderate aches of muscles and joints (Higashi et al., 2010). The hypothesized mechanisms of action include activation of the transient receptor potential melastatin-8 or TRPM8 receptor; cutaneous vasodilation; and weak sodium channel blocker (Pergolizzi et al., 2018). At low concentration it creates analgesia by depressing cutaneous nociception and desensitizing nociceptive C-afferent fibers. High concentrations of menthol are irritating (Pergolizzi et al., 2018).

TENS units are available over-the-counter for approximately \$30 and reduce pain by activating descending inhibitory paths in the midbrain and brainstem by releasing serotonin, endogenous opioids, and GABA (Maeda et al., 2007; Sluka et al., 1999; Vance et al., 2014). Further, high and low frequency TENS produces anti-hyperalgesia by activating delta and mu opioid receptors respectively (Kalra et al., 2001; Pantaleao et al., 2011). More recently, TENS has been shown to be a feasible and efficacious intervention in fibromyalgia pain (Dailey et al., 2019). Nurses can educate patients and their families on accessing TENS units and provide instructions on their use.

Online and virtual pain and SUD interventions.—Use of online pain management and SUD interventions can target cognitive, emotional, behavioral, and social aspects of the concurrent disorders (Wilson et al., 2015). This method of delivery can also increase self-efficacy and has shown sustainability at follow up (Marsch et al., 2007; Smith et al., 2019). Online pain management has been successfully used in temporomandibular disorder pain (Lam et al., 2020), in veteran population (Higgins et al., 2020), for people with low back pain (Du et al., 2017). Although newer and less well-studied, an online relapse prevention program for adolescents was deemed to be both feasible and acceptable (Sanchez & Bartel, 2015), and efficacy was demonstrated for a computer-based SUD intervention (Marsch et al., 2007). As previously noted, many SUD support groups are now meeting online (SAMHSA, 2021a). Though worthy of further study, these online or virtual SUD

and chronic pain resources can be recommended as viable alternatives for those needing to continue quarantine because of COVID-19.

Role of Health Disparities

Not only has the pandemic worsened the morbidity associated with SUD and chronic pain and dramatically changed treatment approaches, it has exposed clear health disparities among the US population. Infection and mortality rates are higher for those living in lower income communities, and among racial and ethnic minority populations (CDC, 2021c). Investigations have demonstrated that pandemic effects on chronic pain were worse in Black patients than in white patients (Hruschak et al., 2021; Licciardone, 2021; Mun et al., 2021). Racial disparities in health outcomes have been attributed to chronic inflammatory processes arising from chronic stress associated with experiences of racial discrimination (Thames et al., 2019). Although yet to be tested, it is likely that the distinct stigma and discrimination experienced by persons with chronic pain (De Ruddere & Craig, 2016) and SUD (Barry et al., 2014; Rey et al., 2019) could create similar vulnerabilities to becoming infected with and sickened by COVID-19.

Conclusion

Clearly, SUD and chronic pain put individuals at unique risk for COVID-19 infection and more severe disease. The associated stress and social isolation can worsen pain symptoms and increase substance use behaviors, including relapse and overdose. Pain syndromes associated with the virus as well as painful stressors associated with hospitalization only exacerbate underlying chronic pain. Although adaptations have rapidly been made, systems and delivery of treatment for each disorder have been disrupted which can allow symptom escalation to occur. The stigma experienced by persons with chronic pain and SUD further puts them at risk for infection and poor health outcomes. It is incumbent on pain management nurses to employ a patient-centered approach in providing care to these vulnerable individuals, with an emphasis on keeping them safe from virus exposure, directed nursing assessment, risk mitigation, and support of individualized self-care options. These self-care interventions have demonstrated efficacy for both the management of chronic pain and SUD, therefore, helping the patient utilize these skills brings benefits beyond treating COVID-19 consequences.

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