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# Opioid Misuse Prior to Incarceration Among Incarcerated Men Nearing Release from Prison

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One hundred and seventy-five male inmates with a history of opioid misuse participated in Wisconsin's residential substance abuse treatment programs. Nearing release, inmates completed surveys to report demographics, three life stressors (health, money, family), and two forms of opioid misuse (prescription opioid/opiate pain medications and heroin) during the year before incarceration. ANCOVAs illustrated that age and education were not associated with either prescription pain medication misuse or heroin use, but ethnicity was associated with heroin use, with Black inmates reporting less than White or other ethnicities. Multiple regression analyses comparing the three life stressors found that only money stressors were significantly associated with both forms of opioid misuse.

*Keywords:* Opioid misuse, male inmates, life stressors, earned release program, substance use disorder treatment program

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## **Opioid Misuse Prior to Incarceration Among Incarcerated Men Nearing Release from Prison**

The relationship between stress and substance use among incarcerated people in United States prisons has been well established. However, little is known about the factors associated with two forms of opioid misuse (prescription opioid/opiate pain medications and heroin) among inmates nearing their release from state prisons. Also, it is a well-known fact that for many American adults, prescription opioid misuse begins with a legitimate doctor's prescription to deal with acute or postsurgical pain (Brady et al., 2016). Nevertheless, some adults may continue to misuse prescription opioids to deal with other life stressors, such as health problems (Collins et al., 2020; Ford, 2014; Pearlin, 1989), monetary problems (Jonas et al., 2012; Krause et al., 2017; Nagelhout et al., 2017), parental divorce, the death of one or both parents, other family problems (Hendy et al., 2018; Wheeler et al., 2018), or intimate partner conflict (Hendy et al., 2018; Moore et al., 2008). One recent study compared such life stressors as predictors of reported opioid misuse by a nationwide sample of adults and found that opioid misuse was most associated with health, family, and romance stressors in the United States (Hendy et al., 2018). However, the specific life stressors most predictive of opioid misuse may vary according to demographic factors such as gender, age, ethnicity, and education. For example, opioid misuse tended to be higher for men than women (Chamberlain et al., 2019; Cicero et al., 2014; UNODC, 2017), for younger adults (Chamberlain et al., 2019; Cicero et al., 2014; DEA, 2018), for Whites (Clark et al., 2012; Winkelman et al., 2018), and for those with poor education (Nicholson & Ford, 2018; Winkelman et al., 2018).

On the other hand, substance abuse rates were disproportionately higher among incarcerated individuals than in the general population (Belenko et al., 2013). For example, a systematic review found that drug use ranged from 10-50% in male inmates during the month before incarceration (Fazel et al., 2006). Additionally, 16-19% of incarcerated individuals specifically reported regular use of heroin (13.1%) and prescription opioid pain medications (9.9%) prior to incarceration (Bronson et al., 2017; CASA; 2010; Mumola & Karberg, 2006, Winter et al., 2015). Due to the prevalence of opioid use being overrepresented in incarcerated populations, it is essential to examine the factors associated with opioid misuse among these individuals in response to the various life stressors they experienced prior to incarceration. However, scant recent data in the literature addressed the life stressors associated with two forms of opioid misuse (prescription opioid/opiate pain medications and heroin) among prison inmates prior to their incarceration. Thus, to fill this gap in the literature, the current study asked inmates nearing release from state prisons to report demographics, three life stressors (health, money, family), and their experience with two forms of opioid misuse (prescription pain medication and heroin) during the year before their incarceration.

### **Literature Review**

The United States is currently facing an epidemic of opioid misuse and abuse (DEA, 2018; Wilson et al., 2020). According to the Centers for Disease Control and Prevention (CDC), an opioid is a

natural, synthetic, or semi-synthetic chemicals that interact with opioid receptors on nerve cells in the body and brain and reduce the intensity of pain signals and feelings of pain. This class of drugs includes the illegal drug heroin, synthetic opioids such as

fentanyl, and pain medications available legally by prescription, such as oxycodone, hydrocodone, codeine, morphine, and many others (2021).

Opiates are defined as any natural opioids derived from the opium plant, such as heroin (Jones & Arms, 2018). Additionally, opioid analgesics are commonly referred to as prescription opioids, such as prescription pain medications (e.g., oxycodone, hydrocodone, hydromorphone, oxymorphone, tramadol, and fentanyl) and opiate medications (e.g., morphine and codeine). Although opioid and opiate are different terms, these terms appear to be used interchangeably. Therefore, conceptual confusion and inconsistency in using these terms exist in the literature. In this study, to prevent this confusion, one form of opioid was referred to as prescription opioids and opiate pain medications. The other form of opioid was referred to as heroin.

### **Inmate Opioid Misuse and Heroin Use Prior to Incarceration**

Inmate studies conducted in the United States showed that substance use among prisoners before their incarceration was prevalent. The primary reason for drug use was to cope with personal problems or life stressors (Bronson et al., 2017; Garrity et al., 2006; Plourde & Brochu, 2002). Mumola and Karberg (2006) prepared a report on substance use among state and federal prisoners and found that 56% of state prisoners and 50% of federal prisoners reported drug use in the month before their offense. They also found that in 2004, approximately 642,000 incarcerated individuals in state prisons had a history of substance abuse in the year prior to their incarceration (Mumola & Karberg, 2006). Moreover, an estimated 9-15% of all inmates in state prisons often engaged in heroin use in the month before incarceration (Mumola & Karberg, 2006; Smith-Rohrberg et al., 2004). Another study found that approximately 24-36% of state prison inmates had a history of heroin addiction in the year before incarceration (Nunn, 2009). Additionally, arrest data regarding opioid use was collected through the Arrestee Drug Abuse Monitoring (ADAM) Program, and it was found that between 12-25% of arrested individuals tested positive for opioid use at the time of their arrest (Zhang, 2004). Furthermore, international studies found the prevalence of opioid use in the incarcerated population between 6-12% for heroin and 15-35% for prescription opioids in the year before their current incarceration (Calzavara et al., 2003; Kouyoumdjian et al., 2014).

However, there were mixed findings in the literature regarding prescription opioid and opiate pain medication misuse among prisoners and prisoner demographics. Mumola and Karberg (2006) stated that 10% of inmates reported regular prescription opioid and opiate pain medication misuse prior to their admission to prison. An analysis of the National Survey on Drug Use and Health (NSDUH) data displayed that more than half of individuals reported nonmedical opioid use in the 12 months before their involvement in the criminal justice system (Winkelman et al., 2018). Winkelman et al. (2018) found that misuse of prescription opioids and opiates was consistently observed among incarcerated individuals who were White, with lower income levels, and less education. Contrary to Winkelman and his colleagues' findings (2018), Clark et al. (2012) found that prescription opioid and opiate pain medication misuse was associated with higher educational attainment among participants under community corrections supervision.

Furthermore, one cross-sectional study reported that more than 20% of Black inmates in a state prison misused prescription opioids a year prior to incarceration (Knighton et al., 2018). On average, participants were 36 years old, completed 13 years of education, and were mainly unemployed before incarceration. Knighton and colleagues (2018) also found that nonmedical opioid use among Black inmates increased from 18% in 2010 to 23% in 2014.

### **Life Stressors, Maladaptive Coping, and Substance Use**

According to the Threat Appraisal and Coping Theory (Lazarus & Folkman, 1984), individuals exposed to various life stressors may respond with maladaptive coping behaviors that temporarily distract and empower them, even while increasing the risk for later problems. Prescription opioid misuse or heroin use may be examples of such maladaptive coping. Recent research has shown that individuals with limited resources and a sense of powerlessness may be at particular risk (Black & Hendy, 2019). Moreover, after releasing from prison, continued life stressors, such as money, health, and lack of adaptive coping mechanisms, can be direct facilitators of heroin use and reincarceration (Haney, 2003; Marlow, 2009). Also, Abadinsky's (2001) study showed that substance abusers were more vulnerable to life stressors than nonabusers. In an earlier study with an opioid abusing general population, Chaney and Roszell (1985) examined maladaptive coping behaviors and the relationship between life stressors and opiate misuse. The authors found that 78% of the study subjects used opiates to cope with stressful life events.

The use of ineffective coping strategies may lead to substance use because maladaptive coping can be perceived as the most effective method to relieve the strain. Past research predicted that life stressors, such as financial hardship, a lack of family support, and poor health conditions were associated with various maladaptive behaviors, such as substance abuse (Abadinsky, 2001; Aneshensel et al., 1991; Hendy et al., 2018; Meyers & Hasin, 2017; Weaver et al., 2000). For example, Folkman and colleagues (1987) found that older adults' poor health conditions were associated with their reported drug abuse as indicators of life stressors. There were mixed findings with respect to the impact of stress, social support, and coping behavior among heroin users. Tucker (1982) found that social support from family was associated with lower heroin use for women but did not find evidence for adult males. On the other hand, Klingemann (1992) could not find any association between social support and heroin use. Moreover, Weaver et al. (2000) documented the most prevalent sources of psychological and social stressors were money, health, family, and parenting among women recovering from various types of drug addictions. A national survey on prescription opioid misuse found that family problems were associated with more opioid misuse among Black prison inmates (Nicholson & Ford, 2018).

Also, past research focused on the association between substance abuse and financial hardship. Researchers found that money stressors and low income were associated with increased consumption of illicit opioids and alcohol (Moos et al., 1989; Wadsworth et al., 2004; Williams & Latkin, 2007). Moreover, prior research demonstrated inconsistent associations between socioeconomic status and substance use. For example, individuals with lower socioeconomic status and financial hardship may experience more substance abuse problems than individuals with higher socioeconomic status and higher economic power (Belle & Doucet, 2003; Buka, 2002). However, Cole et al. (2011) found no association between individuals' economic status and perceived stress (63.2% of subjects were male; 41.4% of them used opiates; e.g., heroin, opiate pain relievers). They found that financial hardship was significantly associated with perceived stress among individuals who could not buy their basic needs and participated in substance abuse treatment (Cole et al., 2011).

Moreover, past research documented that the maladaptive coping behavior of opioid misuse tends to be more prevalent among individuals with male gender, younger age, and poor education (Clark et al., 2012; Frank, 2000; Nicholson & Ford, 2018; Peavy et al., 2012; Rigg & Ibañez, 2010; UNODC, 2017; White et al., 2005; Winkelman et al., 2018). Because many prison inmates have these demographic characteristics prior to their incarceration, they might be

expected to be especially vulnerable to opioid misuse when experiencing life stressors. In contrast, other studies reported that age and level of education were not significantly associated with either form of opioid misuse or abuse (Eiroa-Orosa et al., 2010; Mateu-Gelabert et al., 2017; McHugh et al., 2017; Mooney et al., 2008; Nielsen et al., 2013; Stein et al., 2014). Research also focused on demographic and financial determinants of substance use and addressed several different responses to stressful life events through adaptive or maladaptive behaviors (Aneshensel et al., 1991; Hoffmann & Su, 1997; Weaver et al., 2000). Aneshensel et al. (1991) suggested that males were more vulnerable to developing maladaptive coping behaviors (e.g., substance abuse) to stressful life events than women. These authors also found an inverse relationship between a substance use disorder diagnosis and increasing age and income. However, they did not find a significant relationship between financial strain and substance use (Aneshensel et al., 1991).

### **Purpose of the Present Study**

The primary purpose of the present study was to extend the current literature on the misuse of opioids by examining life stressors (health, money, family) associated with opioid use (prescription pain medication and heroin) among soon to be released male inmates who participated in the Wisconsin Department of Corrections' (WIDOC) earned release program (ERP) and substance use disorder (SUD) treatment program. While the past research showed mixed findings regarding the relationship between stress and substance use during incarceration or after release from prison (Calcaterra et al., 2014; Capuzzi et al., 2020; Winkelman et al., 2018), none of them, to our knowledge, have specifically examined the reasons for two forms of opioid misuse (prescription opioid/opiate pain medications and heroin) prior to incarceration among soon to be released adult male prison population.

Wisconsin ERP and SUD are residential substance misuse and abuse treatment programs release to reduce criminal thinking and substance use disorders offering the incentive of early release. These treatment programs target to reduce inmates' risk of relapse with substance use following release to the community. In the last 6-9 months prior to an inmate's release to the community, DOC experts and social workers plan for social services based on the needs of each inmate, including safe housing and healthcare needs (WIDOC, 2021). The WIDOC considers any SUD treatment program an earned release program, and it has aligned all ERP and SUD treatment program curricula to be the same across the Wisconsin correctional system. Inmates who have an identified substance abuse treatment need; are convicted of nonviolent, non-assaultive offenses; have a bifurcated sentence (e.g., part of their sentence in confinement and later on supervision); and have no previous adult prison time for a violent/assaultive crime may be eligible for ERP and SUD treatment program in Wisconsin. These treatment programs' suitability is assessed by SUD treatment experts at intake when inmates are identified as having a substance use disorder.

Finally, the judge determines eligibility for the program during sentencing (WIDOC, 2021). Addressing the stress management skills of inmates enrolled in the ERP and SUD treatment program would most likely reduce their risk of relapse with opioids once they are in the community. ERP and SUD treatment programs are facilitated by certified substance abuse counselors and overseen by a clinical supervisor. However, much less research has examined life stressors associated with substance abuse, specifically opioid misuse (prescription pain medication and heroin), among male inmates who participated in the ERP and SUD treatment programs. Thus, the present study also intended to contribute to the success of substance abuse

treatment programs at the DOC by identifying inmates' specific life stressors most commonly associated with opioid misuse and heroin use. Once these life stressors are identified, the DOC can effectively develop adaptive coping mechanisms to manage stressful situations.

Moreover, because the United States' prison population is comprised of a high percentage of male, young, ethnic minority, and poorly educated (Calcaterra et al., 2014; Nicholson & Ford, 2018; Wheeler et al., 2019), they may be at particular risk for opioid misuse. Consequently, by examining soon to be released inmate demographics (age, ethnicity, education) associated with two forms of opioid misuse among inmates, this study also aimed to support the WIDOC's ERP and SUD treatment programs to protect future prisoners at risk of relapse after their release. In this sense, the present study has provided the first available comparison of various life stressors (health, money, family) for their associations with two forms of opioid misuse (prescription opioid/opiate pain medications and heroin) reported by male inmates who participated in ERP and SUD treatment programs in two different Wisconsin state prisons.

## Methods

### Participants and Procedures

A convenience sample of 175 male prison inmates were directly recruited from ERP and SUD treatment program of two adult male-only prisons in Northeast and West Wisconsin who were nearing release and reported a history of opioid use during the year before their incarceration (mean age = 33.7 years; 66.3% White, 15.4% Black, 18.3% other ethnicities including 2.3% Hispanic and .6% Asian; 58.6% high school or less education, 41.4% some college). These prisons were classified as minimum security, and both of them provided the ERP and SUD treatment programs pursuant to Wisconsin State Statutes, Sec 302.05. The study procedures were approved by the Wisconsin Department of Corrections and the Institutional Review Boards of Penn State University and University of Wisconsin, Oshkosh. Inmates were selected for participation in the study in the spring of 2018. Participation was limited to incarcerated men 18 years and older who had a history of opioid misuse and could speak and comprehend English. Inmates were not compensated in any way for completing an anonymous survey.

A memo describing the purpose of the survey collection was posted to the announcement boards of each prison. Inmates who volunteered to complete the survey signed up for a 10–15-minute questionnaire time a week before the researcher's visit to the prisons. During survey data collection, the researcher described the purpose of the study to participants as an examination of life stressors associated with opioid use. Additionally, inmates received a consent letter, a three-page survey inside open (self-sealed) envelopes, and a pencil in the visiting room of the prisons. Before the survey completion, inmates were asked not to put their names, inmate numbers, or any other identifiers on the surveys to ensure anonymity. Inmates who completed the surveys placed them in the envelopes, sealed them, and submitted them directly to the researcher.

In our analysis, the demographics section for ethnicity was collapsed into three categories (White, Black, and other), merging small numbers of Hispanic and Asian into the "Other" section. In addition, the education variable was also collapsed into two sections (high school or less and some college). The questionnaire asked inmates to report demographics, three life stressors (health, money, family) they had experienced during the year before incarceration, and their opioid use measures with prescription pain medication and heroin. Table 1 shows descriptive statistics for demographic and study variables. Table 2 shows bivariate correlations for study variables.

## Measurement

Health stressors were measured with the 16-item unnamed but psychometrically tested scale developed by Chen et al. (1996). Participants were asked to use a five-point rating (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always) to report how often they were bothered by each symptom during the past year. Scale items included a number of physical problems for which pain medication may be prescribed: 'pain in muscles or back,' 'numbness or tingling in parts of the body,' 'feeling weak in parts of the body,' 'headaches,' 'pains in the heart or chest,' 'heavy feeling in arms or legs.' The score for health stressors was calculated as the mean rating for the 16 items, with higher scores indicating more health stressors. Cronbach's  $\alpha = .90$  for the participants of the present study.

Money stressors were measured with 14 items derived from the Financial Stress Questionnaire (1994) and a publication by Breunig and Cobb-Clark (2006). Participants used a five-point rating (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always) to report how often they had experienced each money stressor during the past year: 'cannot afford the kind of home I want,' 'cannot afford the kind of clothing I want,' 'unable to pay the rent or mortgage on time,' 'need to ask for financial help from family or friends,' 'cannot afford the kind of medical care I want.' The score for money stressors was calculated as the mean rating for the 14 items, with higher scores indicating more money stressors. Cronbach's  $\alpha = .92$  for the participants.

Family stressors were measured with five of the 'reversed' items from the 23-item Social Support from Family and Friends Scale (Procidano & Heller, 1983), meaning they indicate poor social support. Participants used a five-point rating (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always) to report how often they agreed with each description of their family during the past year: 'when they are nice to me, I wonder what they want,' 'they are rude to me unless I insist on respect,' 'when I confide in them, it makes me uncomfortable,' 'they seem to like to make me mad,' 'I wish they were much different.' The score for family stressors was calculated as the mean rating for the five items, with higher scores indicating more family stressors. Cronbach's  $\alpha = .78$  for the participants.

Prescription opioid/opiate pain medication misuse was measured with the seven items of the Prescription Drug Subscale of the Shorter PROMIS Questionnaire (Christo et al., 2003). Participants used a five-point rating (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always) to report how often each description applied to them during the year before their incarceration. Examples of prescription pain medications listed were hydrocodone (Vicodin), oxycodone (OxyContin), morphine, fentanyl, tramadol, and codeine. Descriptions of pain medication misuse included: 'I have taken more than the prescribed dose of painkiller when I felt it was necessary,' 'my previous doses of painkillers are no longer effective in controlling my symptoms,' 'other people have expressed repeated concern about my use of painkillers,' 'I continue to take painkillers though the original medical problems are now gone.' The score for pain medication misuse was calculated as the mean rating for the seven items, with higher scores indicating more misuse. Cronbach's  $\alpha = .84$  for the participants.

Heroin use was measured with the 10 items of the Recreational Drug Subscale of the Shorter PROMIS Questionnaire (Christo et al., 2003). Participants used a five-point rating (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always) to report how often each description applied to them during the past year for heroin use. Descriptions of heroin use were included: 'I have enjoyed getting a really strong effect from heroin,' 'I have found that getting high tends to make me want to take more heroin,' 'I have used heroin as a comfort,' 'I have made sure that I have money for heroin before concentrating on other things,' 'other people have expressed



repeated serious concern about my use of heroin.' The score for heroin use was calculated as the mean rating for the 10 items, with higher scores indicating more use. Cronbach's  $\alpha = .98$  for the participants.

### **Data Analysis**

Initial bivariate analysis revealed that health stressors interacted with money stressors and family stressors. Money stressors interacted with family stressors and heroin use, and finally, medication misuse interacted with heroin use ( $p < .001$ ). Based on these results, a preliminary data analysis was conducted (see Table 2).

A preliminary goal for data analysis was to examine inmate demographics (age, ethnicity, education) associated with their reports of prescription medication misuse and heroin use so that these demographics could be controlled in later analyses comparing life stressors associated with opioid misuse. Separately for the two measures of opioid misuse (medication, heroin), SPSS 24 software was used to conduct 3 X 2 ANCOVAs that compared the measure of opioid misuse across three ethnic groups (chosen to include adequate sample sizes for each – White, Black, other), and across two educational status groups (high school or less, some college), with age as a covariate (see Table 3).

Another aim for data analysis was to compare three life stressors (health, money, family) for their associations with prescription medication misuse and heroin use reported by inmates, controlling for any demographic variables found significant in the above preliminary analyses. Separately for the two measures of opioid misuse (prescription pain medication and heroin), SPSS 24 software was used to conduct hierarchical multiple regression analysis with the measure of opioid misuse serving as the criterion variable, with any significant demographic variables entered first into the regression equation (using effect coding with 1 = yes, 0 = no), and with the three measures of life stressors entered second into the regression equation as possible predictors of opioid misuse (see Table 4).

## **Results**

### **Inmate Demographics and Opioid Misuse**

In the preliminary analyses to examine how inmate demographics were associated with each form of opioid misuse (prescription pain medication and heroin), the ANCOVAs found that age and education were not significantly associated with either form of opioid misuse. Also, while the three ethnic groups (White, Black, other) did not differ significantly in misuse of prescription pain medication, they did show significant differences in heroin use (see Table 3). The mean heroin rating for Black inmates was 2.17 (S.D. = 1.56); for White inmates, it was 3.82 (S.D. = 1.35), and for other ethnicities, it was 4.06 (S.D. = .98). Follow-up analyses revealed that Black inmates reported significantly less heroin use than White inmates or inmates with other ethnic identities ( $t_{(141)} = 5.58, p = .000$ ;  $t_{(57)} = 5.62, p = .000$ ; respectively), with no difference in heroin use between White inmates and other ethnicities ( $t_{(146)} = .91, p = .367$ ).

### **Inmate Life Stressors and Opioid Misuse**

In the primary analyses to compare three life stressors (health, money, family) for their association with reported opioid misuse by inmates, the multiple regression analysis for prescription medication misuse revealed that only money stressors were significantly associated with more misuse. Controlling for significant ethnic differences found in the above analyses for heroin use (with Black ethnicity effect coded as 1 = yes, 0 = no), the multiple regression analysis

for heroin also revealed that only money stressors were significantly associated with more use (see Table 4).

As this study predicted that money stressors were significantly associated with more opioid misuse, unpredictably, we found that family and health stressors were not associated with more prescription medication misuse and heroin use. We have contemplated that economically disadvantaged inmates might not prioritize their family relationships and health because of more pressing concerns related to financial hardship. Additionally, money stressors could create a snowball effect where additional life stressors could be accumulated in other life events. As mentioned in the literature review, money stressors might negatively affect inmates' family relationships and health before imprisonment (Cole et al., 2011; McCoy et al., 2001; Wu et al., 2003).

## **Discussion**

Published findings on the associations of gender, age, and education with opioid misuse in American adults have varied (Frank, 2000; Mateu-Gelabert et al., 2017; McHugh et al., 2017; Mooney et al., 2008; Peavy et al., 2012; Rigg & Ibañez, 2010; Stein et al., 2014; Winkelman et al., 2018). Given these inconsistencies in the literature, the current study examined how inmate demographics were correlated with each form of opioid misuse (prescription opioid/opiate pain medications and heroin). Our preliminary analysis found that age and education were not significantly associated with either form of opioid misuse.

The present study provides the first available comparison of various life stressors (health, money, family) for their associations with two forms of opioid misuse (prescription opioid/opiate pain medications and heroin) reported by soon to be released, male prison inmates. In this current study, only money stressors were significantly associated with both forms of opioid misuse by inmates. Mainly, this was consistent with previous findings that financial problems might increase psychological stress, which, in turn, could increase either form of opioid misuse to cope with this stress (Moos et al., 1989; Wadsworth et al., 2004).

Prior to the current study, it could be hypothesized that a decrease in economic resources can lead to a decrease in heroin use because users save little money for their vital needs such as food and medical care, and they possibly cannot afford to buy heroin (Bretteville-Jensen, 2011; Ritter & Chalmers, 2011). However, our findings supported previous literature suggesting that money is one of the primary sources of pre-incarceration life stressors which can contribute to opioid misuse for inmates who are nearing release (Arkes, 2011; Belle & Doucet, 2003; Buka, 2002; Carpenter et al., 2017; Weaver et al., 2000). Williams & Latkin (2007) also found that since heroin users usually reside in low-income neighborhoods, neighborhood poverty is significantly associated with current heroin use.

Additionally, we found that money stressors were significantly associated with more opioid misuse, but family and health stressors were not associated with more prescription medication misuse and heroin use. Krause et al. (2017) argued that money stressors could be chronic for many prison inmates. It may not be easy to overcome persistent financial problems in a short time. As a result, prison inmates use more opioids to cope with money stressors that cannot be eradicated easily.

In contrast, recent research with non-incarcerated American adults recruited in a nationwide quota sample by SurveyMonkey found that health, romance, and family stressors were associated with their reported opioid misuse, while money stressors were not significant (Hendy et al., 2018). However, in the current study, comparing inmates' health, money, and

family stressors, it was found that only money stressors were significantly associated with both prescription opioid/opiate pain medication misuse and heroin use.

As for ethnicity, past national research also supported our findings and documented that White and Black ethnic groups enrolled in an opioid treatment program had a similar trend in the misuse of prescription opioids (Maust et al., 2019; Pouget et al., 2018). Recent studies also showed that misuse of prescription opioids was not significantly different in different age groups between Blacks and Whites in the United States (Nicholson & Ford, 2018; Nicholson & Vincent, 2019; Salas et al., 2016).

In addition to this trend, analysis of prison and national data suggested that heroin use was significantly higher among Whites than Blacks (Alexander et al., 2018; Jackson, 1997; Jones, 2013; Martins et al., 2015; Nielsen et al., 2013; Pouget et al., 2018). Our findings supported the literature that describes these relationships. Mars and colleagues (2014) conducted qualitative interviews in Philadelphia and San Francisco to identify ethnic differences regarding heroin initiation. These ethnographic interviews found that most heroin users who had transitioned from prescription opioids such as oxycodone to heroin injection were White (Mars et al., 2014). In the current study, Black inmates reported significantly less heroin use than White inmates. Therefore, we speculated that major shifts in the demand from prescription opioids to heroin might explain this significant difference in the demographics of heroin users. Although there were inconsistent findings regarding the rates of heroin use among Black, White, and other ethnicities, recent studies illustrated the new trends in heroin user demographics (Cicero et al., 2014; Kuehn, 2014; Martins et al., 2017). Cicero et al. (2014) asserted that heroin use has become prevalent and socially acceptable among suburban Whites who previously abused prescription opioids.

Another explanation for the high rates of heroin use among White inmates may be that increased opium availability was associated with increased heroin use. Especially in recent years, opium poppy cultivations have reached record levels in Afghanistan (an estimated 328,000 hectares in 2017) and Mexico (an estimated 44,100 hectares in 2017), and low-cost and high purity heroin has been supplied to the world drug markets (DEA, 2021; UNODC, 2018). Parallel to these factors, because the availability of heroin has increased on the streets, demand for prescription opioids may have shifted to heroin, as people could buy the more potent and less expensive drug (DEA, 2021; Mars et al.; ONDCP, 2015). All these changing dynamics could contribute to the increased use of heroin among Whites in the United States. Another reason for the shift in the demand from prescription opioids to heroin could be that some physicians were reluctant to prescribe opioid painkillers (e.g., hydrocodone or Vicodin®). Some physicians' with this attitude could be explained probably due to fear of prosecution or license revocation, which possibly reduced opioid prescription pain medication supply at the local level (Inciardi et al., 2009; Mateu-Gelabert et al., 2015).

### **Study Limitations, Implications, and Directions for Future Research**

There are a few limitations to this study. First, opioid misuse and the severity of life stressors for the inmates were measured with self-reports. The researchers were unable to collect long-term follow-up data because of prison and IRB regulations. Even though entirely anonymous surveys were used in the present study, individuals may show social desirability distortions in their descriptions of life stressors or maladaptive coping behaviors because they were associated with shame and a sense of powerlessness, perhaps especially in male study

participants. Alternatively, some individuals may have exaggerated descriptions of their life stressors to give themselves excuses for their opioid misuse.

Second, the present study evaluated only the inmate's perceived intensity of opioid misuse (such as excitement associated with its use, needing larger doses) without consideration of actual amounts consumed or perceived reasons for misuse (such as chronic pain relief, managing opioid craving, and withdrawal symptoms, wanting to get high, social/interpersonal reasons, alleviating stress). The present study also did not focus on a particular stage in the sequence that led inmates to opioid misuse (such as heroin use begins with pain medication use or originates from other drugs). Moreover, the present study did not consider whether the inmate had received treatment for substance abuse before the ERP and SUD treatment programs or at what stage the inmate was in the recovery process. Another avenue for future research would be to explore how these opioid-use-related variables moderate relations between life stressors and opioid misuse for inmates.

Furthermore, the present study's survey methodology allowed only conclusions about correlations among variables (life stressors and opioid misuse) without clarifying the cause-effect direction of these variable relationships. For example, it may be that money stressors for a young man with less education cause an increased risk of using opioids to ease his frustrations and sense of powerlessness (Black & Hendy, 2019). Alternatively, it could be that a habit of using opioids that originated from some other sequence of events (such as an expansion of other drug use) now causes an increase in money stressors because it harms his ability to remain employed. Only future longitudinal research can untangle the temporal sequence and causal direction of life stressors and opioid misuse among adults in the United States. Finally, the participants in this study consisted of a relatively limited sample of male inmates from two Wisconsin prisons with a comprehensive drug treatment program. Therefore, the results should be evaluated with caution.

Despite these limitations, the present findings may have important implications for future research and practice. Particularly immediately after being released from prison, inmates represent a very susceptible population to opioid misuse compared to people outside the correctional system (Fazel et al., 2006; Mumola & Karberg, 2006; Ranapurwala et al., 2018). Mainly, preventing opioid overdose deaths soon after prison release became a significant concern for many researchers and correctional institutions. Notably, researchers identified that opioid-related overdose mortality rates were relatively high during the first month of prison release (Ranapurwala et al., 2018).

In 2018, more than 6.4 million individuals in the United States were either incarcerated or placed on probation or parole, and many others were released each year (Maruschak & Minton, 2020). Notably, about 8,000 to 10,000 incarcerated individuals in Wisconsin have been released from prison annually (WIDOC, 2020). The research found that as many as 80% of newly released prison inmates return to opioid use (49% heroin, 31% prescription opioids) and overdose (Winter et al., 2015) within one to three months of release (Binswanger et al., 2013; Kinlock et al., 2008; Fox et al., 2015).

Additionally, the WIDOC reported that young (ages 20-39) and White inmates were overrepresented in opioid overdose deaths after being released from Wisconsin prisons between 2013 and 2017 (WIDOC, 2020). Furthermore, most prison inmates with a prior history of opioid use often remained ill-equipped to cope with the life stressors after released from prison (Binswanger et al., 2012). Reentry could be a stressful process for most inmates because of poor social support from family, inadequate money resources to support integration into the community, and poor health due to barriers to addiction treatment (Binswanger et al., 2012; Fox

et al., 2015; Van Olphen et al., 2006). These factors may contribute to the relapse use of opioids. The correctional institutions could use this study's findings to understand risk factors associated with substance use, specifically opioid misuse among former inmates, and develop programs and policies to protect recovering prisoners at risk of relapse following prison release.

Finally, Agnew (1992) noted that the inability to achieve positively valued goals, such as money and status, may provoke deviant behavior (e.g., opioid misuse and heroin use). Hence, immediately after prison release, economic problems and poor social support may trigger many inmates' opioid misuse relapse to cope with the money stressor and related issues such as poor health or inability to purchase affordable health insurance.

As guided by the Threat Appraisal and Coping Theory (Lazarus & Folkman, 1984), present results also suggest that young White male inmates with a history of opioid misuse may be at high risk for opioid relapse following release from prison when experiencing money stressors. According to the Wisconsin Department of Corrections (WIDOC) Opioid Overdose Deaths and Hospitalizations report (WIDOC, 2020), opioid deaths were common among young (between the ages of 20 and 39) and White offenders who were released from prison in Wisconsin. Additionally, between 2013 and 2017, after placement on probation, there was a 109.2% (from 955 to 1,998) increase in opioid overdose hospitalizations. After release from prison, there was a 160.8% (from 301 to 785) increase in opioid overdose hospitalizations in Wisconsin (WIDOC, 2020). It was also reported that deaths from opioid overdoses have increased among WIDOC prisoners between 2012 and 2017, and 34.6% of all deaths among prisoners under WIDOC supervision could be associated with opioid overdose (WIDOC, 2020).

## Conclusion

The present study's findings suggest that interventions to prevent relapse of opioid use disorder should address how to alleviate inmates' money stressors upon prison release. Similarly, North American studies found that the lack of financial sources contributes to high recidivism rates, such as violating parole terms (e.g., failed drug tests) which occur shortly after release (Binswanger et al., 2012; National Research Council, 2007; Van Olphen et al., 2006). Previous research also reported that about 30% of state prison inmates committed their drug offenses to get money for drugs (Bradford & Payne, 2012; Bronson et al., 2017).

Providing effective coping strategies and identifying life stressors associated with more opioid misuse before incarceration is vital in preventing relapse to opioid misuse for individuals with limited coping resources. Incarcerated men nearing release may encounter severe challenges finding a house, obtaining employment, obtaining a high school diploma, and paying debt upon release. Released opioid-using inmates usually have little in savings, and are unlikely to save money while working in the prison because many of them earn less than \$1 per hour. Although the Northeast and West Wisconsin prisons allow inmates to learn different education skills, career technical education skills, obtain a high school equivalency diploma and GED, and receive substance use disorder services, the simple provision of these programs is unlikely to alleviate the money stressors of prison inmates. Thus, many inmates need bachelor's degrees to obtain quality jobs and competitive salaries. Pre-release programs such as Second Chance Pell Grant, College Programs, and Financial Literacy are only available in a couple of Wisconsin prisons. These programs help inmates find a good-paying job before release and teach them to manage money post release. Therefore, these programs should also be made available in other prisons in Wisconsin. Being unemployed can cause anxiety over money. Especially, psychological support should be given to inmates who lost their job before incarceration. Hence,

while still incarcerated, these prerelease programs could smooth their pathway into employment upon release.

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**Table 1***Descriptive Statistics for Demographics and Study Variables for 175 Male Inmates.*

VARIABLE	%		%
<b>ETHNICITY</b>			
White	66.3%		66.3%
Black	15.4%		15.4%
Hispanic	2.3%		
Asian	.6%		18.3%
Other	15.4%		
<b>EDUCATION</b>			
No high school degree	13.8%		58.6%
High school degree	44.8%		
Some college	40.8%		41.4%
4-year college degree	.6%		
VARIABLE	<i>M</i>	<i>(S.D.)</i>	<i>(range)</i>
<b>AGE</b>	33.67	(8.54)	(21 – 64)
<b>PRESCRIPTION MED. MISUSE</b>	3.63	(.96)	(1.00 – 5.00)
<b>HEROIN USE</b>	3.61	(1.45)	(1.00 – 5.00)
<b>HEALTH STRESSORS</b>	2.22	(.69)	(1.00 – 5.00)
<b>MONEY STRESSORS</b>	3.02	(.90)	(1.00 – 5.00)
<b>FAMILY STRESSORS</b>	2.09	(.89)	(1.00 – 5.00)

**Table 2**

*Bivariate Correlations of Study Variables for 175 Male Inmates.*

	<b>HEALTH STRESSORS</b>	<b>MONEY STRESSORS</b>	<b>FAMILY STRESSORS</b>	<b>MEDICATION MISUSE</b>	<b>HEROIN USE</b>
<b>HEALTH STRESSORS</b>		.392***	.309***	.098	.164*
<b>MONEY STRESSORS</b>			.216**	.248**	.353***
<b>FAMILY STRESSORS</b>				.114	-.014
<b>MEDICATION MISUSE</b>					.462***
<b>HEROIN USE</b>					

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Table 3**

*Results from 3 X 2 ANCOVAs to Compare Two Forms of Inmate Opioid Misuse Across Three Ethnicities (White, Black, other), Across Two Educational Statuses (High School or Less, Some College), with Age as a Covariate.*

**PRESCRIPTION MEDICATION MISUSE:**

<b>Effect</b>	<b><i>F</i> (df, df)</b>	<b><i>p</i></b>	<b>partial <i>eta</i><sup>2</sup> effect size</b>
Age	.18 (1, 166)	.671	.001
Ethnicity	.62 (2, 166)	.538	.007
Education	.89 (1, 166)	.348	.005
Ethnicity X Education	2.16 (2, 166)	.119	.025

**HEROIN USE:**

<b>Effect</b>	<b><i>F</i> (df, df)</b>	<b><i>p</i></b>	<b>partial <i>eta</i><sup>2</sup> effect size</b>
Age	2.52 (1, 166)	.115	.015
Ethnicity	16.79 (2, 166)	.000	.168
Education	1.96 (1, 166)	.163	.012
Ethnicity X Education	.78 (2, 166)	.461	.009

**Table 4**

*Results from Multiple Regression Analyses to Compare Three Life Stressors (Health, Money, Family) as Predictors of Two Forms of Opioid Abuse Reported by 175 Male Inmates, Controlling for Significant Demographics.*

	MEDICATION MISUSE			HEROIN USE		
	<i>beta</i>	<i>t</i>	<i>p</i>	<i>beta</i>	<i>t</i>	<i>p</i>
<b>Entered first:</b>						
Black ethnicity (1 = yes, 0 = no)				-.422	6.16	.001
<b>Life stressors entered:</b>						
Health stressors	-.016	.20	.844	.132	1.77	.078
Money stressors	.240	2.98	.003	.244	3.30	.001
Family stressors	.067	.86	.393	-.093	1.34	.181
	$R^2 = .066$			$R^2 = .151$		
	$F(3, 172) = 4.02$			$F(4, 148) = 6.58$		
	$p = .009$			$p = .001$		