Dusunen Adam The Journal of Psychiatry and Neurological Sciences 2017;30:75-78
DOI: 10.5350/DAJPN20173002001

Editorial / Editoryal

Impulsivity and Opioid Use Disorder

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How to cite this article: Evren C, Bozkurt M. Impulsivity and opioid use disorder. Dusunen Adam The Journal of Psychiatry and Neurological Sciences 2017;30:75-78. https://doi.org/10.5350/DAJPN20173002001

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INTRODUCTION

Impulsivity is a multifaceted construct that can be defined as a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individual or to others (1). A growing number of studies have confirmed a strong association between impulsivity and substance use disorder (SUDs); i.e., the level of impulsivity has been reported to be higher in SUDs, including alcohol (2) and heroin (3) use disorders, than in non-substance-using populations.

SUDs are frequently associated with impulsivity that may underlie elevated levels of life-threatening behavior, including aggression. Impulsive aggression is characterized by an inability to regulate affect as well as aggressive impulses and is highly comorbid with other mental disorders, including substance abuse (4). There is a general consensus that impulsivity and aggression are closely related constructs but the nature of their relationship remains unclear (5).

Individuals who have high levels of impulsivity are at increased risk for substance experimentation, problematic substance use, and inability to abstain from substance use. Additionally, impulsive individuals tend to begin using alcohol and other substances at earlier ages and illicit drug use is more common among them (6). It has also been suggested that substance use might facilitate impulsivity by interfering with normal inhibitory controls (7). Impulsivity has also been found to be related to craving, which is suggested as a risk factor for relapse during an abstinence period and which may have a negative effect on the treatment outcome of patients with SUD (8). Finally, studies have suggested that impulsivity is associated with suicide attempts and self-injurious behaviors (9).

In our previous study, we evaluated impulsivity in two different groups of men with alcohol use disorder (AUD) (n=94) or opioid use disorder (OUD) (n=78) and healthy controls (n=63) (5). Impulsivity scores were higher among both the AUD and the OUD groups than the healthy controls. The severity of impulsivity discriminated both AUDs and OUDs from healthy controls. These findings were similar to previous studies showing higher impulsivity scores in patients with AUD (2) and OUD (10) compared to the general population. When subscales of aggression and impulsivity were taken as independent variables, together with current age and hostility, motor impulsiveness (MI) discriminated patients with AUD, whereas, together with physical aggression, non-planning impulsiveness (NPI) discriminated patients

with OUDs from healthy controls. Thus, although aggression and impulsivity did not discriminate AUDs and OUDs from each other and impulsivity, different dimensions of impulsivity discriminated these groups from healthy controls. The results suggest that both aggression and impulsivity are important constructs on which to focus in the treatment of substance dependents, but different dimensions might be the center of attention for patients with different substances of dependence. Consistent with the previous study (11), the NPI dimension of impulsivity, which may be defined as a tendency to choose a small, more immediate reward over a larger, more delayed reward and being centered on the "present orientation" with a "lack of planning for the future and foresight," discriminated OUD from controls in this study. These findings may suggest that NPI is characteristic of patients with OUD rather than AUD. Finally, in a 2010 study, impulsivity was higher both in drug users and in their siblings than in controls, whereas, although drug users differed from controls on all three subscales of the Barrat Impulsiveness Scale-11 (BIS-11), siblings differed from controls only with respect to NPI (12). This may indicate that NPI exists before drug exposure, while the MI and attentional impulsiveness (AI) components are exacerbated by drug exposure (13).

Previous studies have shown that current patients with OUD have higher levels of impulsivity than nonaddicts do on measures of impulsivity (11,14), while impulsivity measured with the BIS-11 distinguishes opioid users from nonusers (15). Even the methadone-maintained patients scored higher on the BIS-11 subscales than did normal volunteers with no history of SUD (10). Previous studies did, however, show that methadone treatment reduces criminal and disruptive behaviors and that buprenorphine may produce even better results than methadone in patients with prominently violent suicidal and impulsive behaviors (16). The initiation of illicit drug use in some cases may be due to impaired impulse control, which may lead to drug addiction, with repeated episodes of drug use (17). SUD may facilitate impulsive acts by interfering with normal inhibitory controls (7). From a neuropsychological point of view, opioid use has implicit short- and long-term consequences. In particular, impulse control dysfunction and negative affective states have been reported (18). The continuous intake of this substance increases levels of impulsivity that return to baseline (preopioid) levels throughout abstinence; in subjects with OUD, impulsivity, therefore, becomes more intense as a result of chronic opioid exposure, rather than being a vulnerability trait (19). Subjects with OUD may prefer this substance because of the self-medication dynamics, which have positive effects in managing the preexisting aggressiveness (20) that is usually supported by impulsiveness (21). It may, therefore, be true that individuals who become opioid users are more likely to show impulsiveness, not because of the drug itself, but because of a preexisting premorbid impulsive disposition that leads them to form ties selectively with opioid (22).

In our other study, we evaluated the changes in impulsivity and aggression scores among male patients with OUD using buprenorphine/naloxone as a maintenance treatment and those who relapsed within 12 months after their discharge from the hospital (23). Among 78 consecutively admitted male patients with OUD, 52 were available to be examined by face-to-face interview 12 months after discharge from the hospital. Patients were investigated by using the BIS-11 both at baseline and at the end of 12 months. Among 52 patients with OUD, 44.2% (n=23) were considered to have relapsed during the 12-month follow-up. Sociodemographic variables were not different between the groups. The mean scores of impulsivity were not different between the relapse group (RG) and the maintenance group (MG) at baseline, whereas impulsivity scores were higher in the RG than in the MG at the end. In the MG, impulsivity (motor and non-planning) was lower at the end of 12 months, whereas impulsivity (attentional and non-planning) was higher in the RG. In logistic regression models, MI evaluated both at baseline and after 12 months predicted relapse. MI seems to be an important dimension that may be related to relapse. While impulsivity scores increased in the RG during the 12-month follow-up, they decreased in the MG.

The impulsive behavior might be causally linked to

several distinct processes in SUD, including onset, maintenance, related problems, and relapse (24). It has also been suggested that substance use might facilitate impulsivity by interfering with normal inhibitory controls (7). Impulsivity has been found to be a high–risk factor for early substance use and related to the severity of drug abuse and treatment retention (25). Additionally it has been reported that impulsivity might contribute significantly to the risk of suicide attempts in substance-dependent patient, may interrupt their outpatient or inpatient treatment, and mediate the effects of substance use on aggression (5).

Studies have also pointed out that the structure of impulsivity differed on the dimensional level depending on the type of substance dependence (11), which may indicate the different psychopharmacological properties and behavioral functions of these substances. Studies suggested that impulsivity may be considered as an endophenotype of addictive behaviors (7). Impulsive behavior is defined as the coexistence of four heritable temperamental traits: high novelty seeking (NS), low harm avoidance (HA), low persistence (P), and, rarely, high reward dependence (RD) (26). It was suggested that the subjects most vulnerable to substance dependency may be those with high impulsivity and/or high NS (27). Thus, it is important to evaluate the relationship of personality dimensions with impulsivity in substance-dependent populations.

Measures of impulsivity dimensions seem, therefore, related to various measures of temperament; a combined approach to this issue could help to create more homogeneous diagnostic categories (or subtypes) and aid in the identification of at-risk individuals for specific symptoms, behaviors, or treatment responses. An adequate, tailored pharmacologic and psychologic treatment of impulsivity dimensions according to related temperament dimensions in subjects with SUD could produce a better response to therapeutic efforts, as well as reducing the risk of dropout (28).

Finally, in recent two studies, we evaluated the relationship of impulsivity dimensions with comorbidities such as antisocial personality disorder (ASPD) (29) and attention deficit hyperactivity disorder (ADHD) (30) in the same group of male patients with OUD. Findings of the first study suggested that impulsivity (particularly its motor and attentional dimensions) is related to the presence of ASPD, together with the severity of psychopathology and NS among patients with OUD (29). Findings of the second study suggest that probable ADHD is related with the severity of psychopathology, particularly obsessive compulsive dimension, while the severity of impulsivity may have a partial mediator (particularly NPI and MI) effect on this relationship among patients with OUD (30). Measurement and detection of these factors may contribute to directing patients with OUD to the most appropriate psychotherapy option available as an addition to the medication. Thus additional to common comorbid diagnoses among patients with OUD, such as ADHD and ASPD, dimensions of impulsivity should be the focus of attention.

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