Heroin craving and its correlations with clinical outcome indicators in people with heroin dependence receiving methadone maintenance treatment

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Abstract

Background: Craving for substance use has been added as one of the diagnostic criteria of substance use disorders in *DSM-5*. However, further research is necessary to examine and expand the clinical potential of craving in the assessment and treatment for heroin users. This study aimed to examine the psychometrics of the Desire for Drug Questionnaire–Chinese Mandarin version (DDQ-CM) and its clinical utility of assessing craving for heroin measured among heroin users with methadone maintenance treatment (MMT).
Method: Self-reported craving for heroin use was measured on the DDQ-CM and visual analog scale among 314 intravenous heroin users receiving MMT. Self-reported heroin dependence, attitude toward heroin use, readiness to change heroin use, and depression were collected.
Results: The results found that although the original three-factor model was acceptable for applying the DDQ-CM for heroin users with MMT, only the concurrent validity of the subscales of Desire and Intention and Negative Reinforcement was supported but not that of Control. Meanwhile, the levels of craving on the subscales of Desire and Intention and of Negative Reinforcement on the DDQ-CM were positively associated with the levels of heroin dependence, positive and negative attitudes toward heroin use, and depression, but negatively associated with readiness to change heroin use.
Conclusions: This study supported the application of the subscales of Desire and Intention and Negative Reinforcement on the DDQ-CM to measure heroin craving in Taiwanese-Chinese heroin users and supported the clinical implication of craving in heroin users with MMT.
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1. Introduction

Craving for substance use has been added as one of the diagnostic criteria of substance use disorders in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (*DSM-5*) [1]. This revision is based on the results of previous studies that craving is a latent trait for addictive substance use [2] and a predictor of clinical outcome of substance dependence [3]. However, the results of other studies queried the role of craving in the diagnosis of substance use disorder [4,5]. For example, research found that the level of craving does not increase after exposure to heroin-related cues among former heroin users [5]. In addition, craving may have different roles among those using various substances. Compared with cocaine users, heroin users reported distinct environments related to the development of craving [4]. The inconsistence in the results of previous studies indicates that further research is necessary to examine the assessment and clinical potential of craving in heroin users.

One commonly employed method of assessing craving is a single-item Likert-type rating or visual analog scale (VAS)

[6,7]. The VAS is the most common tool for measuring global craving in substance users because of ease of administration and scoring, suitability for frequent and repeated measurements, and apparent sensitivity to rapid changes in the psychological state being assessed [8]. However, the VAS has been questioned for failing to reflect the presumably multidimensional nature of craving [9]. It has been proposed that craving contains both automatic and cognition-controlled processes that might mediate drug-taking and plays the important role in craving for drugs [10]. Thus, asking substance users to rate their experience on multiple, specific cognitions and sensations may ensure a more comprehensive assessment of the multidimensional nature of craving than an overall rating of craving not otherwise specified [11].

The 13-item Desire for Drug Questionnaire (DDQ) is a frequently used instrument for measuring the level of instant craving for heroin [12]. The DDQ measures three factors: desire and intention, negative reinforcement, and control. The DDQ demonstrates high reliability and concurrent validity for patients receiving treatment for drug dependency, and thus it can be employed in both clinical and research fields [12]. However, to our knowledge, the psychometric of the DDQ for measuring craving has never been examined in nonwestern heroin users. With the increase in heroin use and HIV epidemic caused by sharing injection needles in Asia [13], further study examining the suitability of the DDQ for measuring craving in Asian heroin users is required.

Heroin users usually suffer from a chronic relapsing course [14]. All severity of heroin dependence, positive and negative attitudes toward heroin use, readiness to change and depression are related to the relapse of heroin use [14–16]. Meanwhile, craving for heroin increases the risk of heroin use in people receiving MMT [17]. If craving is significantly associated with these cognitive and emotional predictors of relapse of heroin use, craving should be evaluated and intervened promptly.

Although methadone maintenance treatment (MMT) has been demonstrated as a cost-effective intervention for reducing heroin use [18], a high proportion of heroin users dropped out from the MMT program and relapse into heroin use [15]. The first aim of the present study was to examine the psychometrics of the DDQ–Chinese Mandarin version (DDQ-CM) among heroin users with MMT. Second, this study examined the clinical implication of craving for heroin measured using the DDQ-CM, including the association of craving with heroin dependence, attitude toward heroin use, readiness to change heroin use, and depression. We hypothesized that heroin users with MMT who have a high level of craving for heroin have severe heroin dependence, a positive attitude toward heroin use, increased depression, and a low level of readiness to change their heroin use.

2. Methods

2.1. Participants

From August 2012 to May 2013, a total of 356 intravenous heroin users receiving MMT at the addiction treatment outpatient clinics of two hospitals (one general hospital and one mental hospital) in Southern Taiwan were consecutively invited for the study. Of them, 314 heroin users (88.2%, 34 women and 280 men) agreed to participate in the study. The participants satisfied the criteria for heroin dependence in the *DSM, Fourth Edition, Text Revision* (*DSM-IV-TR*) [19]. Those who had severe psychopathology such as delusion, hallucination, or conscious disturbance and those who had severe heroin withdrawal symptoms that might inhibit their ability to comprehend the procedure and questionnaires were excluded. The Institutional Review Boards of Kaohsiung Medical University and Kai-Suan Psychiatric Hospital approved the study protocol.

2.2. Instruments

2.2.1. The Desire for Drug Questionnaire–Chinese Mandarin version

The DDQ measures the level of instant craving for heroin according to 13 items answered on a 7-point Likert scale ranging from 0 (totally disagree) to 6 (totally agree) [12]. The DDQ was composed of three subscales, namely Desire and Intention (e.g., "My desire to use heroin now is overwhelming"), Negative Reinforcement (e.g., "Even major problems in my life would not bother me if I used heroin now"), and Control (e.g., "If I started using heroin now, I would be able to stop") [12]. A higher total score indicates a higher level of craving for heroin. We first translated the English version of the DDQ into Chinese Mandarin by using standard forward–backward and pretest methods. The original version was first translated into Chinese Mandarin by a bilingual translator. Subsequently, the Chinese Mandarin version was back-translated into English by another bilingual translator. Finally, the original version was compared with the back translation. If discrepancies existed in the back translation, translators collaborated to correct the final Chinese Mandarin version. We further invited six experts in the field of addiction psychiatry to examine the adequacy of the questionnaire. The final DDQ-CM was administered to 10 heroin users to test whether the DDQ-CM could be easily understood by the participants. No items were substantially changed during the process of translation and testing.

2.2.2. Visual analog scale

A VAS modified from the study of Cullbertson and colleagues [6] and Sinha and colleagues [7] was used to assess the level of craving for heroin. The VAS includes the following question: "How much did you crave/desire/want heroin in the preceding week?" The level of conscious craving was rated from 0 (*none*) to 100 (*very much*).

2.2.3. Clinical Opiate Withdrawal Scale

The Clinical Opiate Withdrawal Scale (COWS) is an 11-item questionnaire assessing signs and symptoms of opioid withdrawal that can be clinically observed or measured (e.g., sweating, runny nose) [20]. Higher scores indicate greater withdrawal symptoms.