

## Regular Article

# Psychiatric comorbidity and gender difference among treatment-seeking heroin abusers in Taiwan

SHU-CHUAN CHIANG, MD, MS,<sup>1,2</sup> HUNG-YU CHAN, MD,<sup>1</sup> YUAN-YING CHANG, MD,<sup>3</sup> HSIAO-JU SUN, MD,<sup>1</sup> WEI J. CHEN, MD, ScD<sup>4</sup> AND CHIH-KEN CHEN, MD, PhD<sup>5,6,7</sup>

<sup>1</sup>Tao-Yuan Psychiatric Center, Department of Health, Executive Yuan, <sup>3</sup>Tzu-Li Clinic, <sup>6</sup>Chang Gung University School of Medicine, Taoyuan, <sup>2</sup>Chia Nan University of Pharmacy and Science, Tainan, <sup>4</sup>Institute of Epidemiology, College of Public Health, National Taiwan University, <sup>7</sup>Division of Mental Health and Drug Abuse Research, National Health Research Institutes, Taipei and <sup>5</sup>Department of Psychiatry, Chang Gung Memorial Hospital, Keelung, Taiwan

## Abstract

The objectives of the present study were to estimate the psychiatric comorbidity of Taiwanese heroin users seeking treatment and to identify the gender differences in psychiatric comorbidity and drug use behavior. Subjects were interviewed using a structured questionnaire on drug use behavior and the Mini International Neuropsychiatric Interview for psychiatric disorders. Of the subjects, 58.5% of the male and 62.5% of the female subjects had at least one non-substance-use axis I psychiatric disorder or antisocial personality disorder. Compared to male subjects, female subjects were younger, were less educated, had higher rates of unemployment and had earlier onset of illicit drug use. Female subjects were 11-fold more likely than male subjects to exhibit suicidal behavior. Among heroin abusers in the present study, female subjects were more widely exposed to unfavorable social factors and had substantially higher incidence of suicidal behavior than male subjects. Drug treatment centers should be aware of these gender differences and pay particular attention to comorbid depressive disorders and suicidal behavior of female heroin abusers.

**Key words** comorbidity, gender, heroin, substance abuse.

## INTRODUCTION

Heroin dependence is a lifelong disease associated with high rates of health problems, mental health problems, and involvement with the criminal justice system.<sup>1</sup> Hser *et al.* showed that after a 33-year follow-up, 40.5% of heroin users studied had used heroin within the previous year.<sup>1</sup> Those with drug use disorders typically have other mental disorders with reported comorbidity rates of 53%. Major depressive disorder, alcoholism and antisocial personality are comorbid psychiatric disorders common among substance abusers.<sup>2</sup> Studies have shown that at least 46–86.9% of patients with heroin dependence have at least one comorbid psychiatric disorder.<sup>2–4</sup> Khantzian and Treece

reported that 77% of narcotic addicts met criteria for one or more diagnoses on axis I, and 65% met the criteria for a personality disorder on axis II.<sup>4</sup> In total, 93% of users met the criteria for one or more psychiatric disorders other than substance abuse.<sup>2</sup> Chen *et al.* examined psychiatric comorbidity among hospitalized and incarcerated male heroin addicts in Taiwan, concluding that the most prevalent coexisting axis I disorders were additional substance use disorders and mood disorders, and antisocial personality disorder was the most frequent axis-II diagnosis.<sup>5</sup> Chen *et al.* also determined that 83% of hospitalized users were diagnosed with at least one coexisting axis I or II disorder.<sup>5</sup> High psychiatric comorbidity confounds the treatment course for drug dependence, typically leading to poor prognosis. For example, among opioid addicts, depression is the predominant risk factor for continued drug use.<sup>6–8</sup>

Women were previously perceived as subject to proportionally fewer substance abuse problems than men, and numerous studies of both alcoholism and drug

Correspondence address: Dr Chih-Ken Chen, MD, PhD, Department of Psychiatry, Chang Gung Memorial Hospital, 222 Mai-Chin Road, Keelung, 204 Taiwan. Email: kenchen@cgmh.org.tw

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abuse focused exclusively on male subjects. In the United Kingdom, the male to female ratio for illicit drug use is approximately 3:1.<sup>9</sup> In the Epidemiological Catchment Area study conducted in the early 1980s, 1-month prevalence rates for drug use disorders in male subjects were two- or threefold higher than for women.<sup>2</sup> However, recent studies showed that gender differences in prevalence rates for drug use disorder are lower than expected.<sup>10</sup> The National Comorbidity Study identified lifetime prevalence of drug dependence as 9.2% for men and 5.9% for women.<sup>11</sup> The National Household Survey on Drug Abuse showed that lifetime illicit drug use for women is approximately 30%, whereas that in men is 40%.<sup>12</sup> Moreover, although drug abuse in women is less common than that in men, female addicts have higher rates of psychiatric comorbidity than male addicts.<sup>2,3,13</sup>

Differences between male and female subjects in many aspects (e.g. etiological consideration and psychiatric comorbidity) of substance use disorders have received increasing attention over the past decade. Female opiate addicts have been shown to be frequently unemployed, have high rates of depression and anxiety disorders, and more severe medical problems than men.<sup>14</sup> Heroin and methamphetamines are the principal illicit drugs used in Taiwan.<sup>15</sup> Compared with male methamphetamine abusers, more female methamphetamine abusers in Taiwan reported having mental disturbances and suicidal behaviors.<sup>16</sup> Previous studies of female heroin addicts in Taiwan have focused primarily on demographics and drug use behavior. No systemic assessment of gender differences in psychiatric comorbidities exist for heroin addicts in Taiwan. The primary aims of the present study were to characterize demographic and psychosocial features, drug-related experiences, clinical manifestations, and comorbid disorders in relation to heroin use; and to determine gender differences in psychosocial characteristics, drug use behavior and psychiatric comorbidity.

## METHODS

### Study participants

Study subjects were heroin abusers who visited the outpatient department at Tao-Yuan Psychiatric Center (TYPC) in Northern Taiwan from March to September 2002. The eligibility criteria were: (i) males or females, aged more than 15; and (ii) meeting the DSM-IV criteria for heroin abuse or heroin dependence. One hundred and fifty-five subjects were recruited consecutively. Subjects were guaranteed that all personal information was strictly confidential. Informed consent

was obtained from each subject. This investigation was approved by the institutional review boards at TYPC.

### Measurements

Subjects were interviewed using a structured questionnaire on drug use behavior, which was previously used to assess illicit drug use behavior<sup>17</sup> and the Mini International Neuropsychiatric Interview (MINI).<sup>18</sup> All interviews were conducted by a well-trained psychologist who had received a 30-day training program in TYPC and was supervised by the first author, a senior psychiatrist specializing in treatment of substance use disorders.

The structured questionnaire for drug use behavior was designed to assess severity of illicit drug addiction. This questionnaire consisted of three sections: (i) personal history (demographic data, history of physical illness, developmental history, sociodemographic background, and family history); (ii) substance use history (age at initial use, duration and frequency of using a variety of substances, including alcohol and illicit drugs, such as heroin, methamphetamines, marijuana, and glue; glue sniffing is prohibited by the Social Order Maintenance Law in Taiwan); and (iii) criminal history (both previous criminal records and off-the-record illegal behaviors).

The MINI is a short structured diagnostic interview for DSM-IV or ICD-10 psychiatric disorders.<sup>18</sup> It has been shown to have good reliability and has been widely used in international clinical trials and epidemiological studies.<sup>19,20</sup> The MINI was translated into Mandarin by the Taiwan Society of Psychiatry; its inter-rater reliability was approximately 0.75 in previous studies.<sup>21,22</sup>

### Data analysis

Group comparisons of categorical variables between male and female heroin users were analyzed using Fisher's exact test, and comparison of continuous variables were done with the Student's *t*-test. All continuous variables are presented as means  $\pm$  SD. A two-tailed value of  $P < 0.05$  was considered statistically significant. All statistical analyses were done with SPSS version 11 (SPSS, Chicago, IL, USA).

## RESULTS

### Demographics

Of 155 subjects enrolled, 123 were male and 32 were female. The mean age was  $30.8 \pm 7.7$  years. The women were significantly younger than the men (Table 1). Women also had fewer years of formal education than

**Table 1.** Demographic characteristics of opiate addicts by gender

Variables	Female <i>n</i> = 32	Male <i>n</i> = 123	Total <i>n</i> = 155	<i>P</i> -value
Age (years), mean $\pm$ SD	24.7 $\pm$ 6.0	32.4 $\pm$ 7.3	30.8 $\pm$ 7.7	<0.001
Year of education, mean $\pm$ SD	9.2 $\pm$ 2.7	10.6 $\pm$ 1.8	10.3 $\pm$ 2.1	0.001
Employment status				0.09
Employed, % ( <i>n</i> )	53.1 (17)	70.7 (87)	67.1 (104)	
Unemployed, % ( <i>n</i> )	46.9 (15)	29.3 (36)	32.9 (51)	
Marital state				0.38
Single, % ( <i>n</i> )	71.9 (23)	58.5 (72)	61.3 (95)	
Married, % ( <i>n</i> )	18.8 (6)	29.3 (36)	27.1 (42)	
Divorced, % ( <i>n</i> )	9.4 (3)	12.2 (15)	11.6 (18)	
Family history of illicit drug use	12.5 (4)	10.6 (13)	11.0 (17)	0.75
Family history of alcohol use disorders	43.8 (14)	21.1 (26)	25.8 (40)	0.01
Living with alcohol/drug abusers	34.4 (11)	17.1 (21)	20.6 (32)	0.05
Criminal record				
Any conviction, % ( <i>n</i> )	62.5 (20)	71.5 (88)	69.7 (108)	0.39
Illicit drug use, % ( <i>n</i> )	62.5 (20)	63.4 (78)	63.2 (98)	1.0
Violent crime <sup>†</sup> , % ( <i>n</i> )	6.3 (2)	17.1 (21)	14.8 (23)	0.17
Other crime, % ( <i>n</i> )	0 (0)	8.9 (11)	7.1 (11)	0.12

<sup>†</sup> Violent crimes included crimes against persons, property crimes; other crimes included prostitution and sex offense.

**Table 2.** Drug use history of opiate addicts by gender

Variable	Female <i>n</i> = 32	Male <i>n</i> = 123	Total <i>n</i> = 155	<i>P</i>
Route for administration of heroin				0.58
Non-injection, % ( <i>n</i> )	18.8 (6)	13.8 (17)	14.8 (23)	
Injection, % ( <i>n</i> )	81.3 (26)	86.2 (106)	85.2 (132)	
Mean age of first substance use				
Methamphetamine (mean $\pm$ SD)	16.6 $\pm$ 5.0	22.6 $\pm$ 6.9	21.2 $\pm$ 6.9	<0.001
Heroin (mean $\pm$ SD)	21.7 $\pm$ 5.9	26.4 $\pm$ 6.6	25.4 $\pm$ 6.7	<0.001
Any illicit drug (mean $\pm$ SD)	16.8 $\pm$ 5.6	23.1 $\pm$ 6.9	21.8 $\pm$ 7.1	<0.001
Use of illicit drug before age of 15, % ( <i>n</i> )	46.9 (15)	13.0 (16)	20.0 (31)	<0.001
Duration of drug use (years), mean $\pm$ SD	7.8 $\pm$ 4.2	9.5 $\pm$ 4.6	9.2 $\pm$ 4.5	0.06
Duration of heroin use (years), mean $\pm$ SD	3.0 $\pm$ 3.2	6.0 $\pm$ 4.7	5.4 $\pm$ 4.6	<0.001
Lifetime prevalence of substance use				
Methamphetamine, % ( <i>n</i> )	93.8 (30)	81.3 (100)	83.9 (130)	0.11
Glue, % ( <i>n</i> )	15.6 (5)	5.7 (7)	7.7 (12)	0.07
Marijuana, % ( <i>n</i> )	9.4 (3)	3.3 (4)	4.5 (7)	0.16
Sedatives, % ( <i>n</i> )	34.4 (11)	13.8 (17)	18.1 (28)	0.02

men. No significant gender differences were found for employment status, criminal records, or marital status. Compared with the male subjects, female heroin users were more likely to have a family history of alcohol use disorders, while there was no significant between-gender difference in rates of family history of illicit drug use or in rates of living with substance abusers.

### Drug use patterns

Mean age at first heroin use was 25.4  $\pm$  6.7 years and mean duration of heroin use was 5.4  $\pm$  4.6 years.

Table 2 presents the results for heroin use patterns and drug use history between male and female subjects. Compared with the men, women were significantly younger at first heroin use, and younger at first use of any illicit drug, whereas the men used heroin for longer periods than the women. Two methods of heroin use were found: smoking of heroin mixed with tobacco in cigarettes, and injecting of heroin. Twenty-three subjects smoked heroin (without prior experience of injecting heroin), and 132 injected heroin. No significant gender differences were noted for administration methods. In addition to heroin, the most frequently

**Table 3.** Axis I non-substance use psychiatric disorders of opiate addicts by gender

Category	Female <i>n</i> = 32 % ( <i>n</i> )	Male <i>n</i> = 123 % ( <i>n</i> )	Total <i>n</i> = 155 % ( <i>n</i> )	OR (95%CI)	<i>P</i>
Any axis I disorder	50.0 (16)	30.1 (37)	34.2 (53)	2.3 (1.1–5.1)	0.04
Mood disorder	37.5 (12)	11.4 (14)	16.8 (26)	4.7 (1.9–11.6)	0.001
Major depressive disorder	28.1 (9)	8.9 (11)	12.9 (20)	4.0 (1.5–10.7)	0.006
Dysthymic disorder	25.0 (8)	5.7 (7)	9.7 (15)	5.5 (1.8–16.7)	0.002
Bipolar disorder	0	0	0		
Anxiety disorder	34.4 (11)	26.8 (33)	28.4 (44)	1.4 (0.6–3.3)	0.4
General anxiety disorder	28.1 (9)	25.2 (31)	25.8 (40)	1.2 (0.5–2.8)	0.74
Obsessive-compulsive disorder <sup>†</sup>		0.8 (1)	0.6 (1)	–	1.0
Panic disorder	3.1 (1)	0	0.6 (1)	–	1.0
Agoraphobia	3.1 (1)	0	0.6 (1)	–	1.0
Specific phobia <sup>†</sup>	10.0 (3)	1.6 (2)	3.3 (5)	6.7 (1.1–41.9)	0.04
Social phobia	0	0	0	–	
Post-traumatic stress disorder	0	0	0		
Eating disorder	3.1 (1)	0	0.6 (1)	–	1.0
Psychotic disorder	0	0.8 (1)	0.6 (1)	–	1.0
Psychotic disorder, lifetime	3.1 (1)	2.5 (3)	2.6 (4)	1.3 (0.1–12.8)	0.83
Antisocial personality disorder <sup>†</sup>	26.7 (8)	43.0 (52)	39.7 (60)	0.5 (0.2–1.2)	0.11
Conduct disorder before age of 15 <sup>†</sup>	54.8 (17)	50.0 (61)	51.0 (78)	1.2 (0.6–2.7)	0.63
Current suicidal risk	68.8 (22)	33.3 (41)	40.6 (63)	4.4 (1.9–10.2)	0.001
Low or moderate risk	40.9 (9)	90.2 (37)	73.0 (46)		<0.001
High risk	59.1 (13)	9.8 (4)	27.0 (17)		
Suicide attempts, lifetime	46.9 (15)	4.1 (5)	12.9 (20)	20.8 (6.7–64.6)	<0.001

OR, odds ratio; CI, confidence interval.

<sup>†</sup> Missing data.

used illicit drug was methamphetamine. Compared with the men, more women abused sedatives, while there was no between-gender difference in lifetime prevalence of abusing methamphetamine, glue, or marijuana.

### Psychiatric comorbidity

Both the male and the female subjects had high comorbid rates for psychiatric illnesses. Of the 155 subjects, 58.5% of the male and 62.5% of the female subjects had at least one non-substance use axis I psychiatric disorder or antisocial personality disorder. The most frequently diagnosed comorbidity was mood disorder for the women and antisocial personality disorder for the men (Table 3). When all axis I psychiatric diagnoses were considered, more than one-third of participants had at least one psychiatric disorder other than a substance use disorder. Compared with male subjects, the women had a substantially higher rate of axis I psychiatric diagnosis other than substance use disorder. Of these 155 subjects, anxiety and mood disorders were the most frequently diagnosed comorbidities. Female subjects had significantly higher rates of mood

disorders than the men. Women had a higher rate of specific phobia than male subjects, while there was no between-gender difference in prevalence of other anxiety disorders, eating disorder, or psychotic disorders. Four patients had lifetime experiences of psychotic disorders, and all of them had a history of methamphetamine abuse. For personality-related disorders, 40% of subjects met the criteria for antisocial personality disorder, whereas no appreciable gender differences were identified for rates of antisocial personality disorder or conduct disorder before the age of 15. Female subjects had a considerably higher rate of suicide attempts than men. Upon initial assessment, women were more likely than the men to be at risk for suicide. On logistic regression analysis, suicidal attempts were significantly associated with gender (OR, 23.2; 95% confidence interval [CI], 5.9–91.7,  $P < 0.001$ ) and major depressive disorder (OR, 19.6; 95% CI, 4.5–85.8,  $P < 0.001$ ), but not with methamphetamine abuse ( $P = 0.617$ ).

### DISCUSSION

This study demonstrated that heroin abusers in Taiwan who seek treatment have high psychiatric morbidity.

Compared with male subjects, female heroin users more frequently had a DSM-IV axis I psychiatric disorder other than a drug use disorder. Female subjects had a markedly higher rate of mood disorders than the men, and were 11-fold more likely than the men to exhibit suicidal behavior. Furthermore, compared to the men, women were younger, had less education and had earlier onset of illicit drug use. Methamphetamine was the most commonly used concomitant illicit drug. Approximately 85% of heroin abusers in the present study had tried methamphetamine at least once.

Complicating treatment of heroin users is that comorbidity is common. Approximately one-third of subjects in the present study were diagnosed with at least an axis I psychiatric disorder other than a substance use disorder (anxiety and mood disorders were predominant). Prevalence of mood disorders, anxiety disorders and antisocial personality disorders in the present study was 16.8%, 28.4% and 39.7%, respectively, and higher than those previously reported in community surveys of the general population in Taipei, Taiwan.<sup>23</sup> The association of heroin abuse and those aforementioned psychiatric disorders is in large part consistent with the findings of psychiatric comorbidity in use disorders of other psychoactive drugs.<sup>2,5</sup> In examining gender differences in comorbidity with substance-use disorders, physicians should bear in mind the gender differences in psychiatric disorders in the general population.<sup>24</sup> Epidemiological surveys indicated that in the general population, anxiety and mood disorders are more common in women, whereas antisocial personality disorder is more common in men.<sup>10,11,25</sup>

From an epidemiological perspective,<sup>26</sup> a number of possible explanations exist for the observed association between heroin abuse and these comorbid conditions. First, heroin abuse and these comorbid psychiatric illnesses may share common etiologies. Second, heroin abuse may cause some psychiatric disorders, or reveal a previously latent psychiatric illness. Third, certain psychiatric disorders may lead to heroin use disorder; this could occur through self-medication.<sup>27</sup> If comorbid psychiatric disorders resulted in heroin abuse, appropriate treatments of these comorbid disorders can reduce heroin use. Even when comorbid psychiatric disorders result from heroin use, appropriate treatments can also improve the relationship between heroin users and medical service personnel. As such, treating illicit drug users for their comorbid psychiatric disorders is critical, regardless of whether the comorbid psychiatric disorders were caused by or were consequences of heroin use. Drug use prevention strategies should focus on those with a psychiatric disorder.<sup>25</sup> Previous studies found that joint treatment for

opiate dependence and a comorbid mental disorder, such as major depression, improved treatment outcomes.<sup>28,29</sup> A recent survey further showed that associations between most substance use disorders and independent mood and anxiety disorders were overwhelmingly positive and significant, indicating that treatment for a comorbid mood or anxiety disorder should not be withheld from individuals with substance use disorders.<sup>30</sup>

That as many as 46.9% of female heroin abusers in the present study reported suicidal behaviors warrants special attention to suicide risk in treating female heroin abusers. A study in Taiwan reported that 35.9% of the female methamphetamine abusers in the detention center exhibited suicidal behaviors.<sup>16</sup> Heroin users are 14-fold more likely than the general population to die from suicide.<sup>31</sup> The prevalence of attempted suicide among heroin users is also many orders of magnitude greater than that reported in community surveys. Darke and Ross concluded that the principal risk factors for suicide in the general population also apply to heroin users (gender, psychopathology, family dysfunction and social isolation), and that heroin users are more likely to be exposed to these factors.<sup>31</sup> The present study identified that female heroin users had been exposed to numerous risk factors reportedly associated with suicide. For example, compared with male subjects, female heroin users in the present study had less education, high rates of unemployment and comorbid depression, and had earlier onset of heroin and other illicit drug use.

This present study also identified a number of social factors that differentiate male and female heroin abusers. Compared to men, more female substance abusers are separated or divorced<sup>32</sup> and have less frequent criminal problems.<sup>33</sup> Griffin *et al.* demonstrated that men are more likely to be employed, have higher level jobs, and to be self-supporting.<sup>34</sup> Gender differences for marital, legal and employment status of subjects in the present study were generally consistent with those in previous reports, although some differences did not reach a level of significance. The present findings also showed that criminal behavior other than illicit drug use was common among heroin abusers. Approximately 11.0% of subjects reported a family history of illicit drug use. Of female heroin users, 34.4% reported living with drug or alcohol abusers. Having sexual partners who abused drugs has been previously reported to significantly influence female drug use; most female subjects who inject heroin were given their first injection by a male sexual partner.<sup>35</sup> In the present study, women were significantly younger and had significantly earlier onset of heroin use and illicit drug use than men. This analytical finding is consistent with gender

differences for onset time among heroin abusers or methamphetamine abusers reported previously in Taiwan.<sup>16,36</sup>

With regard to mode of use, an alarming 85.2% of heroin users in the present study currently injected heroin. One likely reason for this large proportion is that unlike Western countries, needles can be bought without a prescription in Taiwan and, hence, needles for injection are easily obtained. The danger in sharing needles should be underscored, because the number of acquired immunodeficiency (AIDS) virus carriers has increased substantially in Taiwan. Powis *et al.* reported that among heroin users in the community, women use smaller amounts of heroin for a shorter duration, and are less likely to inject than male users.<sup>35</sup> However, in the present study, the majority of the heroin users, both the male and the female subjects, injected heroin. Heroin injection is often associated with heroin overdose, viral infection, abnormal liver function, severe drug use pattern and poly drug use.<sup>37–39</sup>

Some other study limitations might have affected interpretation of the results. First, this cross-sectional design does not permit elucidation of the temporal relationship between time-varying factors, such as the duration of experiencing psychiatric disorders. Another limitation is that all data were self-reported and can be affected by recall and observer bias. Such biases, which could not be excluded, were minimized by using highly structured interviews and trained researchers. Third, heroin users seeking treatment were not a probabilistic sample and many characteristics identified in the present sample may not be generalizable to all heroin users. Fourth, the MINI does not assess all personality disorders. Among personality disorders, borderline personality disorder should not be overlooked. Indeed, many of the subjects reported risk-taking behaviors, self-destructive behaviors and depressive episodes. It would be interesting to study their personality in further detail using some personality inventories. The MINI does not either specifically classify drug-induced mood disorders or drug-induced psychotic disorders. Studies in the future should pay particular attention to differentiating drug-induced mood or psychotic disorder from functional mood or psychotic disorders.

To summarize, both the men and the women among treatment-seeking heroin abusers had high comorbid rates for psychiatric illnesses. Among heroin abusers in Taiwan, certain gender differences exist for rate of comorbid psychiatric illnesses, particularly depressive disorders. Among heroin users, female subjects were exposed more widely to unfavorable factors and had an overwhelmingly higher incidence of exhibiting suicidal behavior than male subjects. Drug treatment cen-

ters should be aware of these gender differences and pay particular attention to comorbid depressive disorders and suicidal behaviors of female heroin users.

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