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**THE PREVALENCE, PATTERNS AND HARMS OF COCAINE USE AMONG  
INJECTING AND NON-INJECTING DRUG USERS IN SYDNEY.**

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## **EXECUTIVE SUMMARY**

In response to the cocaine “epidemic” witnessed in the United States in the mid to late 1980’s, a number of investigations into the use of cocaine in Australia were conducted. The results of these studies did not give cause for serious concern as the prevalence of cocaine use was found to be low and there appeared to be few problems associated with such use. It was recognized, however, that there was a need to continually monitor the situation and look out for changes in the dynamics of the cocaine market.

Recent research has indicated that the prevalence of cocaine use among injecting drug users has increased substantially over the last few years. The route of cocaine administration amongst this group is overwhelmingly by injection, and as cocaine is typically injected more frequently than other drugs, the increased severity of injection-related problems that has been recently noted is of particular concern.

The current study aimed to investigate the use of cocaine in Sydney. The prevalence and patterns of cocaine use among injecting drug users were examined, as were the patterns of cocaine use among non-injectors. In order to investigate the effect of route of administration, the prevalence and nature of cocaine-related harms among cocaine injectors and non-injectors were compared.

A sample of 153 injecting drug users and 35 non-injecting cocaine users were interviewed about their patterns of cocaine use, problems they had experienced as a result of such use, health, psychosocial functioning, and criminality.

Cocaine use and injecting was found to be highly prevalent among injecting drug users in Sydney, with the majority (86%) having used cocaine in the past and two-thirds (67%) having used the drug in the previous six months. Cocaine use among this group was associated with higher levels of unemployment, criminality, heroin use, polydrug use/injection, and injecting frequency, as well as a greater number of injection-related health problems.

In several respects, the cocaine use patterns of non-injectors were either heavier than or similar to those of injectors. However, while non-injectors were more likely to report physical problems directly associated with cocaine use, they were generally in better physical and psychological health, were more socially functional, and had lower levels of criminality than injectors.

Cocaine dependence was prevalent among both injecting and non-injecting cocaine users, with 34% of injectors, and 17% of non-injectors, meeting the proposed SDS criteria for dependence. Dependence was associated poorer physical and psychological health, regardless of the preferred route of administration.



In summary, route of administration was revealed as an important factor to consider when examining the correlates of cocaine use, with injecting cocaine use being associated with greater overall harm to the user. The most influential mediator in the relationship between cocaine use and associated harm, however, appeared to be dependence. Cocaine dependence was associated with a greater severity of harm regardless of whether cocaine was injected or administered otherwise. As such, the role of dependence should be one of the primary considerations in the designs of future cocaine research.

## **1.0 INTRODUCTION**

The use of cocaine has been an issue of longstanding concern in countries such as the United States, where the prevalence of use among both the general and heroin using populations increased dramatically during the late 1970's and early 1980's (Kinlock, Hanlon & Nurco, 1998) and peaked during the mid to late 1980's (Platt, 1997). Although the level of cocaine use in the United States had decreased substantially by 1992 and remained stable throughout most of the 1990's, cocaine is still the second most widely used illicit drug in that country after cannabis (Office of National Drug Control Policy, 2000).

The widespread use of cocaine in the United States prompted concerns in the mid 1980s that a similar "epidemic" would eventuate in Australia (Hall & Hando, 1993). Subsequent research, however, found that cocaine use among Australian recreational drug users was typically of a low frequency and associated with a history of polydrug use, and it was estimated that, even if the availability of cocaine were to increase, there would not be a high market potential for the drug (Hall et al., 1991; Homel et al., 1990; Spooner et al., 1993). Moreover, the problems associated with the level of cocaine use at that time appeared to be few and of a mild degree (Chen et al., 1993; Moosburger et al., 1988; Mugford & Cohen, 1989; Webster et al., 1992).

Studies such as these suggested that the use of cocaine in Australia was not following the same course as that in the United States and two of the major reasons cited for this were

the lower availability and higher price of cocaine in Australia (Hando, 1995). It was recognized, however, that the status quo in Australia could be disturbed if cocaine became cheaper and more readily available and that, consequently, the use and availability of cocaine in this country should be continually monitored (Wodak, 1987).

A study conducted in Sydney, Australia during 1993-1994 for the World Health Organization identified two distinct groups of cocaine users – a group with a higher socio-economic status (SES) who typically administered the drug intranasally and another with a lower SES who injected cocaine (Hando et al., 1997a). The lower SES users were more likely to be unemployed or, in the case of females, working in the sex industry, had lower levels of education, were more criminally active, and were more likely to be enrolled in a methadone maintenance program.

Hando et al. (1997a) found that the prevalence of cocaine use among the Australian general population during the 1990's was low (2-3%) and that there had been few problems associated with such use. Among the lower SES injectors in Sydney, however, the use of cocaine had increased. The more frequent and heavy use of cocaine among the lower SES users was associated with a greater degree of harm, with this group being more likely to report physical and psychological problems, financial difficulties, legal problems, and violence (Hando et al., 1997a). The increase in cocaine use among Sydney injecting drug users (IDU) documented by Hando and colleagues (1997a) was confirmed by Malcolm et al. (1996) who, since early 1994, had noted an increase in cocaine use among IDU attending an inner-city needle and syringe program.

Hando et al. (1997a) also revealed an increase in the availability of cocaine among IDU, due to a change in marketing strategy tailored to the circumstances of the lower SES user, whereby smaller, more affordable quantities of cocaine were introduced.

While Hando et al.'s (1997a) findings were not suggestive of an increase in cocaine use among the general population, the increase in both use and associated problems among IDU, as well as the greater availability of cocaine among this group, led to their recommendation that the prevalence, patterns, and consequences of cocaine use in Sydney be monitored at regular intervals in order to detect any significant changes in the cocaine situation.

The Illicit Drug Reporting System (IDRS), which was designed to detect emerging trends in illicit drug use in Australia (Hando et al., 1997b), has provided a vehicle through which the use of cocaine has been monitored on an annual basis. Over the last few years, the IDRS has detected a progressive increase in both the prevalence and frequency of current (i.e. in the preceding six months) cocaine use and injecting among IDU in Sydney. In 1996, 41% of Sydney IDU surveyed for the IDRS had used cocaine in the previous six months (Hando et al., 1997b). By 1998, however, this figure had risen to 59%, with injection being the most common route of administration (McKetin et al., 1999). Moreover, the median number of use days in the past six months increased from 3 days in 1996 to 25 days in 1998, with the proportion of those using daily during this period increasing from 2% to 17% (McKetin et al., 1999). Associated with the increase in cocaine use detected in 1998 by the IDRS was an increase in the availability of cocaine

and a decrease in the price of small purchase units of cocaine known as “caps”, amounts that are also a common feature of the heroin market (McKetin et al., 1999).

The problems associated with injecting cocaine use are well documented. In the United States, injecting cocaine use has been associated with a higher frequency of injecting, higher levels of needle-sharing, increased sexual risk-taking, and a higher HIV seroprevalence than injecting heroin use (Chaisson et al., 1989; Schoenbaum et al., 1989). Studies conducted in Europe (Torrens et al., 1991) and Australia (Darke et al., 1992a) have also revealed an association between cocaine injecting and higher levels of HIV risk-taking behaviours. In accordance with the higher injecting frequency demonstrated by the aforementioned research, injecting cocaine use has also been associated with a greater number of injection-related problems such as vascular damage, abscesses, and infections (McKetin et al., 1999)

Given the upward trends in the prevalence of cocaine use and related harms demonstrated by the IDRS, as well as the paucity of current research on cocaine use patterns in Australia (Hando et al., 1999), further investigation into the use of cocaine was both timely and warranted.

The current study was designed to go beyond the scope of the IDRS and provide a detailed tableau of cocaine use in Sydney. In addition to determining the prevalence and patterns of cocaine use among IDU, it was intended that the patterns of cocaine use among non-injecting users be examined. In order to investigate the role of route of

administration, the prevalence and nature of cocaine-related harms among cocaine injectors and non-injectors were compared.

### *1.1 Study Aims*

The specific aims of the present study were as follows:

1. To determine the prevalence of cocaine use among IDU in Sydney;
2. To investigate the patterns of cocaine use among injecting and non-injecting cocaine users;
3. To identify the physical and psychological harms associated with cocaine use and make comparisons according to route of administration;
4. To examine the prevalence and correlates of cocaine dependence.

## **2.0 METHOD**

### *2.1 Procedure*

All subjects were volunteers who were paid A\$30 for their participation in the study. Recruitment took place from June 1999 to February 2000, via advertisements placed in treatment agencies, needle and syringe programs, rock magazines, and by word of mouth.

Subjects contacted the researchers, either by telephone or in person, and were screened for eligibility for inclusion in the study. To be eligible for the study subjects must have injected a drug at least six times in the preceding six months or used cocaine at least once during this period via a route of administration other than injecting. Interviews were conducted by one of the research team and took between 30 and 45 minutes to complete.

All subjects were guaranteed, both at the time of screening and interview, that any information they provided would remain strictly anonymous and confidential.

### *2.2 Structured interview*

#### 2.2.1 Demographic characteristics

Demographic details included: age, gender, suburb of residence, level of secondary and tertiary education, employment status, drug treatment history, and prison history.

#### 2.2.2 Drug use history

Drug use history was obtained by asking subjects which drug classes they had ever used, which ones they had ever injected, and which ones they had injected in the preceding six

months. The number of days on which they had used each drug class during the previous six months was also obtained. Further questions about the age at which subjects first injected a drug, the type of drug first injected, the frequency of recent injecting, and the subjects' main drug of choice were also asked. In the case of subjects who had used heroin in the previous six months, an overdose history was obtained.

### 2.2.3 Cocaine use patterns

Information on patterns of cocaine use was obtained by asking subjects, where applicable, about initial and recent (i.e. last six months) routes of cocaine administration, frequency of recent cocaine injecting, daily consumption patterns, binge use, methods of use, and social contexts in which cocaine had been used.

### 2.2.4 Cocaine dependence

Cocaine dependence, based on the preceding six-month period, was measured using the Severity of Dependence Scale (SDS) (Gossop et al., 1995). This is a 5-item scale that measures psychological dependence over the preceding 12 months. For the purpose of the present study, these items were modified to reflect dependence over the preceding six months. Scores range from 0-15, with higher scores indicating a higher degree of dependence on the drug in question.



### 2.2.5 Physical and psychological problems associated with cocaine use

Subjects were asked whether or not they had experienced physical and/or psychological problems that they directly associated with their use of cocaine. They were also asked to describe the nature of these problems and report when they occurred.

### 2.2.6 Risk behaviours

The HIV Risk-taking Behaviour Scale (HRBS), a component of the Opiate Treatment Index (OTI) (Darke et al., 1992b), was administered in order to measure needle use and sexual behaviour in the month preceding interview that placed subjects at risk of either contracting or transmitting blood borne viruses. Nine of the original 11 items were used in the present study, with higher scores being indicative of a higher degree of risk-taking.

### 2.2.7 Health

The Health Scale of the OTI was administered to gain an indication of the subjects' general health as well as any injection-related problems that they had experienced in the preceding month. This scale is comprised of 51 items and scores range from 0-51, with higher scores indicating poorer health. Questions about the subjects' lifetime history of injection-related problems were also asked.

### 2.2.8 Social functioning

The Social Functioning Scale of the OTI, which measures social adjustment, social support, and drug culture involvement over the preceding six months, was administered.

Scores on this scale range from 0-48, with higher scores being indicative of poorer social functioning.

### 2.2.9 Crime

The OTI Criminality Scale was administered to subjects. This scale measures property crime, drug dealing, fraud, and violent crime committed during the month preceding interview. Scores on this scale range from 0-16, with higher scores indicating a greater degree of criminal involvement.

### 2.2.10 Psychopathology

The Brief Symptom Inventory (BSI) (Derogatis, 1993) was administered in order to measure the psychological symptom patterns of the subjects. The BSI is a 53-item scale with 9 primary symptom dimensions: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. Scores are calculated on a pro-rata basis according to the number of endorsed items, with higher scores indicating a greater severity of symptomatology.

## 2.3 *Analyses*

For continuous variables t-tests were employed. Categorical variables were analysed using chi-square. Where distributions were highly skewed, medians were reported. All analyses were conducted using SPSS for Windows, Version 9 (SPSS Inc, 1999).

## **3.0 RESULTS**

### *3.1 Sample characteristics*

The sample consisted of 153 IDU and 35 non-injecting cocaine users (NICU). The IDU group comprised the IDU survey component of a broader study monitoring trends in illicit drug use, the IDRS (McKetin et al., 2000), which was conducted in conjunction with the present study.

#### 3.1.1 Injecting drug users

The mean age of IDU was 29.1 years (SD 7.84, range 17-48), with 67% being male (Table 1). The mean length of school education was 9.6 years (SD 1.65, range 2-12), with 27% having completed a trade or technical course and 3% having completed a university course. The majority (86%) of IDU were unemployed, with 9% currently in full-time employment and 5% in part-time or casual employment. Twenty-seven percent of IDU were currently enrolled in a drug treatment program for a median of 24 months. The majority of those in treatment (93%) were enrolled in a methadone maintenance program on a median dose of 60 milligrams (range 15-250), the remainder being enrolled in naltrexone or detoxification programs. More than half (57%) of the IDU reported a history of imprisonment.

#### 3.1.2 Non-injecting cocaine users

The mean age of NICU was 30.0 years (SD 5.34, range 22-41), with 57% being male (Table 1). The mean length of school education was 11.3 years (SD 0.96, range 9-12), with 63% having completed a trade or technical course and 26% having completed a

university course. The majority (77%) of NICU were in full-time employment, with 9% in part-time or casual employment and 3% engaged in full-time tertiary studies. NICU were not currently enrolled in a drug treatment program or engaged in sex work and had never been in prison.

**Table 1: Demographic characteristics of IDU and NICU**

| <b>Variable</b>                 | <b>IDU<br/>(N=153)</b> | <b>NICU<br/>(N=35)</b> |
|---------------------------------|------------------------|------------------------|
| Age (mean yrs)<br>(range)       | 29.1<br>(17-48)        | 30.0<br>(22-41)        |
| % Male                          | 67                     | 57                     |
| Education (mean yrs)<br>(range) | 9.6<br>(2-12)          | 11.3<br>(9-12)         |
| % Unemployed                    | 86                     | 9                      |
| % Prison history                | 57                     | 0                      |
| % In drug treatment             | 27                     | 0                      |

### 3.2 *Drug use history*

#### 3.2.1 Injecting drug users

IDU had first injected a drug at a mean age of 18.1 years (SD 5.22, range 11-46), with 60% reporting heroin and 37% amphetamine as the first drug injected (Table 2). A large proportion of users (78%) nominated heroin as their current drug of choice, however 3% reported an equal preference for heroin and cocaine and nominated both as their main drugs of choice (See Table 2 for more detail). Heroin had been used on a median of 180 days (range 1-180), i.e. every day, in the previous six months and was the drug most frequently injected during this period by the majority of users (88%). Almost half (44%) of the heroin users had injected heroin at least 3 times a day in the month preceding interview.

IDU had used a mean of 9.3 different drug classes over their lives (SD 2.39, range 3-13) and a mean of 6.2 drug classes in the previous six months (SD 2.13, range 1-11). They had injected a mean of 3.8 drug classes (SD 1.68, range 1-9) in their lifetime and a mean of 2.5 drug classes (SD 1.23, range 1-5) in the previous six months (Table 2).

One half (50%) of IDU had experienced a heroin overdose at some point in their lives and 17% had done so in the last six months. The median number of lifetime overdoses was 2 (range 1-20) and a median of 12 months (range 1-288) had elapsed since the last overdose.

**Table 2: Drug use histories of IDU and NICU**

| <b>Variable</b>  | <b>IDU<br/>(N=153)</b>               | <b>NICU<br/>(N=35)</b>                 |
|--|--------------------------------------|--|
| Age first injected a drug (mean yrs)<br>(range)  | 18.1<br>(11-46)                      | 20.4 #<br>(18-23)                      |
| First drug injected (%):-<br><br>Heroin<br>Amphetamine   | <br><br>60<br>37                     | <br><br>80 #<br>-                      |
| Main drugs of choice (%):-<br><br>Heroin<br>Amphetamine<br>Cocaine<br>Ecstasy<br>Cannabis<br>Alcohol | <br><br>78<br>3<br>12<br>0<br>5<br>0 | <br><br>0<br>0<br>26<br>31<br>20<br>20 |
| No. of drug classes ever used  | 9.3<br>(3-13)                        | 8.5<br>(5-13)                          |
| No. of drug classes used in last 6 months  | 6.2<br>(1-11)                        | 5.3<br>(3-10)                          |
| No. of drug classes ever injected  | 3.8 (mean)<br>(1-9)                  | 0 (median)<br>(0-5)                    |
| No. of drug classes injected in last 6 months  | 2.5<br>(1-5)                         | -                                      |

# N=5

### 3.2.2 Non-injecting cocaine users

Fourteen percent of NICU had previously injected a drug (n=5), with the majority (80%) of these users reporting heroin as the first drug injected. The mean age of first injection was 20.4 yrs (SD 2.41, range 18-23). The most frequently nominated drug of choice was ecstasy (31%), followed by cocaine (26%), cannabis (20%), and alcohol (20%) (Table 2).

NICU had used a mean of 8.5 different drug classes over their lives (SD 1.72, range 5-13) and a mean of 5.3 drug classes in the previous six months (SD 1.66, range 3-10). They had injected a median of 0 drug classes (range 0-5) in their lifetime and had not injected any drug classes in the previous six months (Table 2).

### 3.3 *Prevalence of cocaine use among IDU*

The majority (86%) of IDU had used cocaine in the past. Most of those who had ever used cocaine had also injected it (94%).

Two-thirds (67%) of IDU had used cocaine in the six months preceding interview. This sub-group of IDU will hereafter be referred to as “injecting cocaine users” (ICU). Ten percent of ICU reported cocaine as the drug most frequently injected during this period, with 20% nominating cocaine as their drug of choice, either exclusively (17%) or on a par with heroin (3%).

### 3.4 Comparisons of ICU and other IDU

#### 3.4.1 Demographics

ICU did not significantly differ from those who hadn't used cocaine in terms of mean age (29.4 vs 28.4 yrs), proportion of males (65% vs 71%), or mean level of education (9.6 vs 9.5 yrs). ICU were, however, significantly more likely to be unemployed than other IDU (90% vs 77%,  $\chi^2 = 5.20$ ,  $p < .05$ ). The proportions of ICU and other IDU who were engaged in sex work (13% vs 4%), had a history of imprisonment (62% vs 47%), or were enrolled in methadone maintenance treatment (MMT) (26% vs 24%) did not differ significantly (Table 3).

Among those enrolled in MMT, there were no significant differences between either the median dose (70 vs 50 mg) or length of treatment (24 vs 21 mths) of ICU and other IDU.

#### 3.4.2 Drug use history

ICU and other IDU first injected a drug at similar mean ages (18.1 vs 18.3 yrs) (Table 3). The two groups did not significantly differ in terms of the median days of heroin use in the preceding six months (180 vs 180), however ICU had higher mean OTI scores (2.9 vs 2.2,  $t_{147} = 2.30$ ,  $p < .05$ ) than other IDU, indicating a higher daily frequency of heroin injecting in the last month. ICU were significantly more likely to have used benzodiazepines (71% vs 45%,  $\chi^2 = 9.39$ ,  $p < .01$ ) and hallucinogens (9% vs 0%,  $\chi^2 = 4.78$ ,  $p < .05$ ) during the previous six months. Although similarly large proportions of ICU and other IDU had injected a drug at least once a day during the previous month (82% vs



73%), a higher proportion of ICU had injected a drug more than three times a day during this time (38% vs 12%,  $\chi^2=11.48$ ,  $p<.01$ ) (Table 3).

ICU had used a significantly greater number of drug classes than other IDU in their lifetime (9.7 vs 8.4,  $t_{79}=3.01$ ,  $p<.01$ ), as well as in the last six months (6.8 vs 5.0,  $t_{151}=5.48$ ,  $p<.001$ ). ICU had also injected a greater number of drugs in their lifetime (4.0 vs 3.1,  $t_{151}=3.40$ ,  $p<.01$ ) and in the last six months (3.0 vs 1.7,  $t_{151}=6.69$ ,  $p<.001$ ) (Table 3).

There was no significant difference between the proportion of ICU that had experienced a heroin overdose in the previous six months and that of other IDU (32% vs 39%), and the two groups reported similar median numbers of lifetime heroin overdoses (1 vs 0) (Table 3).

#### 3.4.3 Drug-related problems

The proportions of ICU and other IDU who had borrowed (17% vs 18%) or lent (25% vs 24%) a used needle in the month preceding interview did not significantly differ. There was also a lack of any significant difference between ICU and other IDU with respect to mean scores on the injecting (5.1 vs 4.5) and sexual (4.3 vs 3.9) risk-taking behaviour sub-scales of the HRBS. While the mean OTI health scores of ICU did not significantly differ from other IDU (18.1 vs 17.2), ICU reported a greater mean number of injection-related problems in the preceding month (1.6 vs 1.3,  $t_{151}=1.97$ ,  $p=.05$ ) (Table 3).

**Table 3: Comparisons of ICU and other IDU**

| <b>Variable</b>                                 | <b>ICU<br/>(N=102)</b> | <b>Other IDU<br/>(N=51)</b> |
|---|------------------------|-----------------------------|
| <i>Demographics</i>                             |                        |                             |
| Age (mean yrs)                                  | 29.4                   | 28.4                        |
| % Male  | 65                     | 71                          |
| Education (mean yrs)                            | 9.6                    | 9.5                         |
| % Unemployed                                    | 90                     | 77 *                        |
| % Engaged in sex work                           | 13                     | 4                           |
| % In MMT  | 26                     | 24                          |
| % Prison history                                | 62                     | 47                          |
| <i>Drug use history</i>                         |                        |                             |
| Age first injected a drug (mean yrs)            | 18.1                   | 18.3                        |
| OTI heroin use                                  | 2.9                    | 2.2 *                       |
| No. of drug classes ever used                   | 9.7                    | 8.4 *                       |
| No. of drug classes used in last 6 months       | 6.8                    | 5.0 *                       |
| No. of drug classes ever injected               | 4.0                    | 3.1 *                       |
| No. of drug classes injected in last 6 months   | 3.0                    | 1.7 *                       |
| % Injected a drug > 3 times/day in last month   | 38                     | 12 *                        |
| No. of past overdoses (med)                     | 1                      | 0                           |
| % Overdosed in last six months                  | 32                     | 39                          |
| <i>Drug-related problems</i>                    |                        |                             |
| % Borrowed needle in last month                 | 17                     | 18                          |
| % Lent needle in last month                     | 25                     | 24                          |
| HRBS (injecting)                                | 5.1                    | 4.5                         |
| HRBS (sexual)                                   | 4.3                    | 3.9                         |
| OTI health                                      | 18.1                   | 17.2                        |
| No. of injection-related problems in last month | 1.6                    | 1.3 *                       |
| OTI social functioning                          | 21.7                   | 22.0                        |
| OTI crime                                       | 2.3                    | 1.2 *                       |
| GSI   | 1.1                    | 1.1                         |
| % Positive psychiatric case                     | 63                     | 68                          |

\* Significant difference exists between groups

Mean OTI social functioning scores did not significantly differ between ICU and other IDU (21.7 vs 22.0). ICU, however, attained significantly higher mean scores on the OTI crime sub-scale (2.3 vs 1.2,  $t_{133}=3.24$ ,  $p<.01$ ), indicating more frequent commission of crime (Table 3). Specifically, ICU were more likely to have sold drugs in the preceding month (50% vs 14%,  $\chi^2 = 19.01$ ,  $p<.001$ ).

Mean scores on the Global Severity Index (GSI) of the BSI were similar for ICU and other IDU (1.1 vs 1.1), as were mean scores on all nine sub-scales of the BSI.

Furthermore, the proportions of ICU and other IDU who could be classified as a positive psychiatric case did not significantly differ (63% vs 68%) (Table 3).

### *3.5 Comparisons of ICU and NICU*

#### *3.5.1 Demographics*

ICU were similar to NICU in terms of mean age (29.4 vs 30.0 yrs) and proportion of males (65% vs 57%). ICU, however, had attained a significantly lower level of education (9.6 vs 11.3,  $t_{135}=-6.12$ ,  $p<.001$ ) and were more likely to be unemployed (90% vs 9%,  $\chi^2 = 81.67$ ,  $p<.001$ ), engaged in sex work (13% vs 0%,  $\chi^2 = 4.98$ ,  $p<.05$ ), and/or have a prison history (62% vs 0%,  $\chi^2 = 40.02$ ,  $p<.001$ ) (Table 4).

### 3.5.2 Drug use history

There were no significant differences between ICU and NICU in terms of the mean age at which they first injected a drug (18.1 vs 20.4 yrs), the mean number of drug classes ever used (9.7 vs 8.5), or the mean number of drug classes used in the previous six months (6.9 vs 5.3) (Table 4).

ICU were significantly more likely than NICU to have used heroin (100% vs 0%,  $\chi^2 = 137.0$ ,  $p < .001$ ), methadone (53% vs 0%,  $\chi^2 = 30.59$ ,  $p < .001$ ), other opiates (37% vs 3%,  $\chi^2 = 15.14$ ,  $p < .001$ ), benzodiazepines (71% vs 23%,  $\chi^2 = 24.44$ ,  $p < .001$ ), and antidepressants (17% vs 0%,  $\chi^2 = 6.66$ ,  $p < .05$ ) in the previous six months. Conversely, NICU were more likely than ICU to have used ecstasy (77% vs 17%,  $\chi^2 = 43.71$ ,  $p < .001$ ), inhalants (23% vs 4%,  $\chi^2 = 11.69$ ,  $p < .01$ ), and alcohol (94% vs 56%,  $\chi^2 = 17.05$ ,  $p < .001$ ) during this period. The two groups did not differ with respect to their recent use of amphetamines, cannabis, or hallucinogens.

**Table 4: Comparisons of ICU and NICU**

| <b>Variable</b>                              | <b>ICU<br/>(N=102)</b> | <b>NICU<br/>(N=35)</b> |
|--|------------------------|------------------------|
| <i>Demographics</i>                          |                        |                        |
| Age (mean yrs)                               | 29.4                   | 30.0                   |
| % Male                                       | 65                     | 57                     |
| Education (mean yrs)                         | 9.6                    | 11.3 *                 |
| % Unemployed                                 | 90                     | 9 *                    |
| % Engaged in sex work                        | 13                     | 0 *                    |
| % Prison history                             | 62                     | 0 *                    |
| <i>Drug use history</i>                      |                        |                        |
| Age first injected a drug<br>(mean yrs)      | 18.1                   | 20.4                   |
| No. of drug classes ever<br>used             | 9.7                    | 8.5                    |
| No. of drug classes used in<br>last 6 months | 6.9                    | 5.3                    |
| <i>Drug-related problems</i>                 |                        |                        |
| HRBS (sexual)                                | 4.3                    | 4.9                    |
| OTI health                                   | 18.1                   | 10.9 *                 |
| OTI social functioning                       | 21.7                   | 6.6 *                  |
| OTI crime                                    | 2.3                    | 0.5 *                  |
| GSI  | 1.1                    | 0.6 *                  |
| % Positive psychiatric case                  | 63                     | 43 *                   |
| <i>Cocaine Dependence</i>                    |                        |                        |
| % Dependent according to<br>SDS criteria     | 34                     | 17                     |
| SDS  | 3.6                    | 1.9 *                  |

\* Significant difference exists between groups

### 3.5.3 Drug-related problems

Mean scores on the HRBS sexual sub-scale did not significantly differ between ICU and NICU (4.3 vs 4.9) (Table 4). ICU, however, attained significantly higher mean scores on the OTI health (18.1 vs 10.9,  $t_{135} = 4.56$ ,  $p < .001$ ), social functioning (21.7 vs 6.6,  $t_{135} =$

12.69,  $p < .001$ ), and crime (2.3 vs 0.5,  $t_{132.5} = 6.09$ ,  $p < .001$ ) scales, indicating poorer health, greater social dysfunction, and a higher level of criminality among this group. Further analysis revealed that, while ICU were more likely to have committed property crime in the month preceding interview (29% vs 7%,  $\chi^2 = 6.86$ ,  $p < .01$ ), they were not significantly more likely to have committed drug dealing offences (50% vs 36%), fraud (8% vs 0%), or violent crime (8% vs 0%) during this time.

The mean GSI score was significantly higher for ICU than for NICU (1.1 vs 0.6,  $t_{74} = 3.42$ ,  $p < .01$ ), as were scores on the somatization (0.9 vs 0.4,  $t_{86.7} = 4.36$ ,  $p < .001$ ), interpersonal-sensitivity (1.1 vs 0.7,  $t_{76.6} = 2.3$ ,  $p < .05$ ), depression (1.4 vs 0.7,  $t_{77} = 3.58$ ,  $p < .01$ ), phobic anxiety (0.7 vs 0.3,  $t_{92.5} = 2.81$ ,  $p < .01$ ), and paranoid ideation (1.4 vs 0.7,  $t_{98.5} = 5.34$ ,  $p < .001$ ) sub-scales. ICU were also more likely than NICU to be classified as a positive psychiatric case (63% vs 43%,  $\chi^2 = 4.22$ ,  $p < .05$ ) (Table 4).

#### 3.5.4 Current cocaine use

The usual route of administration among ICU was overwhelmingly by injection (92%). Other reported routes of administration during the preceding six months were intranasal (snorting) and smoking. While over half (60%) of those ICU who had injected cocaine in the last six months ( $n=97$ ) had injected cocaine no more than once a week, a significant proportion (21%) had injected cocaine at least once a day and 7% had done so more than three times a day.

Cocaine had been used on a median of 12 days (range 1-180) in the six months preceding interview. On a typical day of use, cocaine was used on a median of 2 occasions (range 1-48) (Table 5). Nearly one-fifth (17%) of ICU, however, reported that a typical use pattern entailed using the drug more than four times a day. Similarly, while cocaine was used on a median of 2 occasions (range 1-40) on the last day of use, 17% had used cocaine more than four times on this day. It should be noted that consumption patterns on the last day of use were only analysed for those who had used cocaine in the preceding month (n=78). When asked for the maximum number of times cocaine was used in any one day in the previous six months, subjects reported a median of 4 occasions (range 1-48), however 20% reported using the drug more than eight times in one day (Table 5).

An analysis of OTI scores revealed that the frequency of cocaine use over the month preceding interview, irrespective of route of administration, was at least daily among 28% of cocaine users, and at least three times a day among 14% of users (Table 5).

The majority (77%) of NICU had exclusively administered cocaine intranasally (snorted) in the previous six months. One-fifth (20%) of NICU had used a combination of administration methods, such as smoking or swallowing in addition to snorting (20%), and a further 3% had applied cocaine to the gums during this period. While one person had injected cocaine in the past, they had not done so in the previous six months.

**Table 5: Cocaine use patterns of ICU and NICU**

| <b>Variable</b>   | <b>ICU<br/>(N=102)</b> | <b>NICU<br/>(N=35)</b> |
|---|------------------------|------------------------|
| Days used cocaine in last 6 months (med)                          | 12<br>(1-180)          | 8<br>(1-48)            |
| No. of use occasions on typical day in last 6 months (med)        | 2<br>(1-40)            | 4 *<br>(1-20)          |
| No. of use occasions on day of maximum use in last 6 months (med) | 4<br>(1-48)            | 8 *<br>(1-24)          |
| % Used cocaine $\geq$ once a day in last month                    | 28                     | 11 *                   |
| % Ever binged on cocaine  | 52                     | 54                     |
| % Binged in last 6 months   | 29                     | 43                     |
| Min. length of binge period in last 6 months (med)                | 2<br>(1-180)           | 1<br>(1-4)             |
| Max. length of binge period in last 6 months (med)                | 5<br>(1-180)           | 2 *<br>(1-24)          |
| Min. daily frequency of use during binge period in last 6 months  | 4<br>(1-11)            | 6<br>(1-15)            |
| Max. daily frequency of use during binge period in last 6 months  | 9<br>(3-40)            | 12<br>(8-25)           |

\* Significant difference exists between groups



Cocaine had been used on a median of 8 days (range 1-48) by NICU in the previous six months. On a typical day of use, cocaine was used on a median of 4 occasions (range 1-20), however almost half (46%) of NICU reported using cocaine more than four times on such a day and 11% typically used cocaine at least 10 times a day (Table 5). On the last day of use, NICU had used cocaine on a median of 3 (range 1-24) occasions. A quarter (25%) of this group, however, had used cocaine at least seven times on the last day of use and 7% had used cocaine at least 10 times on this day. It should be noted that, as for ICU, consumption patterns on the last day of use were only analysed for those who had used cocaine in the preceding month (n=28). When asked for the maximum number of times cocaine was used in any one day in the previous six months, subjects reported a median of 8 occasions (range 1-24), although one in five (20%) NICU had used cocaine on a maximum of 15 or more occasions per day (Table 5).

An analysis of OTI scores revealed that the frequency of cocaine use over the month preceding interview was at least daily among 11% of NICU (Table 5).

ICU and NICU did not significantly differ in terms of the number of median days of cocaine (12 vs 8) use during the preceding six months (Table 5). While the proportion of subjects who had used cocaine at least once a day in the month preceding interview was significantly greater among ICU than NICU (28% vs 11%,  $\chi^2 = 3.94$ ,  $p < .05$ ), the median number of use occasions on a typical (4 vs 2,  $U = 1008.5$ ,  $p < .001$ ) as well as a maximum (8 vs 4,  $U = 1200.5$ ,  $p < .01$ ) day of cocaine use in the preceding six months was significantly greater for NICU than for ICU (Table 5).

### 3.5.5 Binge use of cocaine

Chronically heavy or “binge” use of cocaine was reported by 52% (n=52) of ICU, with almost a third (29%, n=30) reporting that they had binged on cocaine in the preceding six months. Subjects were asked to define their use of the term “binge” by nominating the minimum and maximum number of consecutive days they had used cocaine for in the last six months which they regarded as having comprised a binge period. The median length of binge periods in the six months preceding interview ranged from a minimum of 2 days (range 1-180) to a maximum of 5 days (range 1-180), however binge periods lasting for over a week were reported in over a third (37%, 11/30) of cases. The median daily frequency of cocaine use during a binge episode in the previous six months ranged from a minimum of 4 occasions (range 1-11) to a maximum of 9 occasions (range 3-40) (Table 5). In 50% (15/30) of cases however, cocaine had been used at least 10 times a day during a binge.

Over one half of NICU (54%, n=19) reported that they had previously binged on cocaine, with 43% (n=15) having done so in the six months preceding interview. The median length of binge periods ranged from a minimum of 1 day (range 1-4) to a maximum of 2 days (range 1-24) in the six months preceding interview, although a minority (2/15) reported binge periods lasting for over four days during this time. While the median frequency of cocaine use per day during a binge episode ranged from a minimum of 6 occasions (range 1-15) to a maximum of 12 occasions (range 8-25), the majority (87%, 13/15) had used cocaine at least 10 times a day during a binge in the previous six months (Table 5).

ICU did not significantly differ from NICU in terms of the proportions that had ever binged on cocaine (52% vs 54%) or binged in the previous six months (28% vs 43%). Nor did they differ with respect to the maximum number of use occasions per day during a binge period in the last six months (9 vs 12 median occasions). The maximum length of a binge period during this time, however, was significantly greater among ICU than NICU (5 vs 2 median days,  $U=90.5$ ,  $p<.01$ ) (Table 5).

### 3.5.6 Circumstances surrounding cocaine use

Over one-third (34%) of ICU had mixed cocaine with heroin to form what is known as a “speedball” or “CC” (cocaine cocktail) in the six months preceding interview and 11% reported doing so often. Cocaine and heroin had been administered sequentially by 57% of cocaine users in the previous six months, with 29% reporting that they did this often. Typically, the administration of cocaine preceded that of heroin.

The social context in which cocaine was used by ICU in the previous six months most commonly involved using with a friend (42%), using alone (27%), or using with a partner (23%).

The most common place to inject cocaine in the previous six months was in the cubital fossa (i.e. crook of the elbow), 79% of ICU having injected in this region. Forty percent, however, had injected cocaine in the forearm, 13% in the hand, 6% in the groin, and 5% in the leg and foot, respectively, during this period.

The overwhelming majority (91%) of NICU typically had not mixed cocaine with any other drug in the previous six months. Eleven percent of this group, however, reported that they had often mixed cocaine with cannabis, and a small proportion (6%) reported that they had sometimes mixed cocaine with amphetamines during this time.

The social context in which cocaine was used by NICU in the previous six months most commonly involved using with a friend (86%) and/or partner (46%), with only 6% reporting that they had sometimes used cocaine alone during this period. There were no reports of NICU often using cocaine alone.

ICU were significantly more likely to have often mixed cocaine with heroin (11% vs 0%,  $\chi^2 = 4.19$ ,  $p < .05$ ) or administered cocaine and heroin sequentially (29% vs 0%,  $\chi^2 = 12.93$ ,  $p < .001$ ) in the preceding six months. NICU were more likely to have often used cocaine on its own (91% vs 56%,  $\chi^2 = 14.34$ ,  $p < .001$ ) or mixed with cannabis (11% vs 0%,  $\chi^2 = 11.78$ ,  $p < .01$ ) during this time.

ICU were more likely than NICU to have often used cocaine on their own in the previous six months (27% vs 0%,  $\chi^2 = 11.81$ ,  $p < .01$ ), whereas NICU were more likely than ICU to have often used cocaine with a partner (46% vs 23%,  $\chi^2 = 6.51$ ,  $p < .05$ ) or friend (86% vs 42%,  $\chi^2 = 19.91$ ,  $p < .001$ ) during this period.

### *3.6 Physical and psychological problems associated with cocaine use*

Summaries of the prevalence, nature, and temporal features of the problems related to cocaine use among ICU and NICU are presented in Table 6.

Almost one-quarter (24%) of ICU reported that they had experienced physical problems that they associated with using cocaine. A variety of problems were reported, the most common being vascular problems (4%), sleep deprivation (3%), fatigue (3%), and headaches (3%). Cardiovascular problems, numbness in the arm, vomiting, facial sores/blemishes, and problems with motor skills were each reported by 2% of ICU. Convulsions, weight loss, and respiratory problems were each reported to a lesser extent (1%).

Of the ICU that had attributed physical problems to their cocaine use (n=24), almost two-thirds (65%) had experienced such problems while they were intoxicated by the drug. Of these people (n=15), 47% reported that their problems occurred during or immediately following the injection of cocaine and 27% reported that they usually experienced problems during a binge period. Thirteen percent of subjects who had experienced physical problems reported that such problems occurred during the period following intoxication, i.e. during the “come-down” or withdrawal period and, for an equal proportion of subjects, these problems persisted for a few days after using cocaine. Physical problems attributed to cocaine use were experienced constantly by 13% of ICU.

Forty four percent of ICU reported having experienced psychological problems that they

**Table 6: Physical and psychological problems associated with cocaine use**

| <b>Variable</b>                               | <b>ICU<br/>(N=102)</b>   | <b>NICU<br/>(N=35)</b>   |
|---|--|--|
| % Ever experienced physical problems          | 24   | 46 *   |
| Most common physical problems                 | Vascular problems 4%<br>Sleep Deprivation 3%<br>Fatigue 3%<br>Headaches 3%   | Sinus/nasal congestion 17%<br>Nasal bleeding 11%<br>Chest pain/<br>Palpitations 11%  |
| Time at which physical problems occurred      | (n=24)<br>While intoxicated 65%<br>“Coming down” 13%<br>For a few days<br>After use 13%<br>Constantly 13%  | (n=16)<br>While intoxicated 19%<br>“Coming-down” 13%<br>The next day 50%<br>For several days<br>after use 19%<br>Constantly 6%                           |
| % Ever experienced psychological problems     | 44   | 31   |
| Most common psychological problems            | Paranoia 19%<br>Psychosis 10%<br>Depression 7%<br>Anxiety 6%   | Depression 20%<br>Anxiety 14%<br>Paranoia 9%   |
| Time at which psychological problems occurred | (n=44)<br>While intoxicated 55%<br>“Coming down” 48%<br>During or subsequent<br>to a binge 5%<br>Between episodes<br>of use 9%<br>Constantly 11% | (n=11)<br>While intoxicated 27%<br>“Coming down” 27%<br>The next day 18%<br>1-2 days after use 27%<br>For several days<br>after use 18%<br>Constantly 9% |

\* Significant difference exists between groups

associated with their cocaine use. The most common psychological problems reported were paranoia (19%), psychosis (10%), depression (7%), and anxiety (6%).

Hypersensitivity to sound, anger, social withdrawal, and mood swings were each reported by 2% of cocaine users. A small proportion of users (1%) reported hyperactive speech, delusions of wealth, short-term memory loss, or reduced clarity of thought.

Of those ICU who reported psychological problems associated with cocaine use (n=44), over half (55%) experienced such problems during the period of intoxication, and a similarly large proportion (48%) reported their occurrence during the “come-down” period. In 5% of cases, these problems had occurred either during or subsequent to a binge episode, in 9% of cases they had occurred between episodes of cocaine use, and a further 11% had experienced problems constantly.

Almost a half (46%) of NICU reported that they had experienced physical problems that they associated with cocaine use. The problems most commonly reported were sinus/nasal congestion (17%), nasal bleeding (11%), and chest pain and/or palpitations (11%). There was a single report of tingling in the arms.

Of those NICU who had experienced physical problems (n=16), 19% reported that these problems occurred while intoxicated, 13% during the come-down period, and 50% the day after use. In almost one in five cases (19%), such problems persisted for up to several days following use and, in 6% of cases, were experienced constantly.

Psychological problems attributable to cocaine use were reported by almost one-third (31%) of NICU. Depression was the most common problem reported by NICU (20%), followed by anxiety (14%) and paranoia (9%). There was a single report of intrusive thoughts.

Of those NICU who had experienced psychological problems (n=11), an equal proportion (27%) reported such problems as occurring during intoxication and/or during the come-down period. Problems were experienced on the day after use in 18% of cases, and up to two days after use in 27% of cases. Problems persisting for up to several days after use were reported by 18% of cases, and constant problems by 9% of cases.

The proportion of NICU that reported experiencing physical problems that they attributed to their use of cocaine was significantly greater than that of ICU (46% vs 24%,  $\chi^2 = 5.86$ ,  $p < .05$ ). There were no significant differences, however, between the proportions of ICU and NICU that reported psychological problems attributable to cocaine use (44% vs 31%).

### *3.7 Cocaine dependence*

#### 3.7.1 Prevalence of cocaine dependence among ICU and NICU

Previous research (Hando and Hall, 1993) has suggested that a score greater than 4 on the SDS is indicative of amphetamine dependence. In the present study, over one-third (34%) of ICU, and almost one in five (17%) NICU, exceeded a score of 4 on the SDS. Using the above criterion, it is proposed that these cases be classified as cocaine-dependent.



While ICU were not significantly more likely than NICU to meet the proposed criteria for dependence (34% vs 17%), they attained significantly higher mean scores on the SDS (3.6 vs 1.9,  $t_{88.8} = 3.00$ ,  $p < .01$ ) (Table 4).

### 3.7.2 Comparisons of dependent and non-dependent ICU

Within the ICU sample, a number of comparisons were made between those who were cocaine-dependent, as classified by the SDS, and those who were not cocaine-dependent. These comparisons are summarised in Table 7.

#### 3.7.2.1 Demographics

There were no significant differences between dependent and non-dependent ICU in terms of mean age (29.4 vs 29.4 yrs), sex (62% vs 67% male), or mean level of education (9.5 vs 9.7 yrs). Cocaine-dependent ICU were more likely to be unemployed (100% vs 85%,  $\chi^2 = 5.63$ ,  $p < .05$ ), engaged in sex work (24% vs 8%,  $\chi^2 = 5.05$ ,  $p < .05$ ), and enrolled in MMT (38% vs 19%,  $\chi^2 = 4.12$ ,  $p < .05$ ). Among those in MMT, there were no significant differences in either the median dose (95 vs 45 mg) or length of treatment (36 vs 17 mths) between dependent and non-dependent cocaine users.

#### 3.7.2.2 Drug use history

The mean age at which subjects had first injected a drug did not significantly differ between dependent and non-dependent ICU (17.5 vs 18.4 yrs). Similarly, there were no significant differences between dependent and non-dependent ICU in the median number of days of heroin use in the previous six months (180 vs 180 days), the average amount of

heroin use per day, as measured by OTI mean scores (2.8 vs 3.0), or the proportion who had injected any drug at least daily in the month preceding interview (88% vs 81%).

Cocaine-dependent ICU, however, had used cocaine (76 vs 5 median days,  $U=331$ ,  $p<.001$ ) and benzodiazepines (15.5 vs 4 median days,  $U=790$ ,  $p<.05$ ) significantly more frequently in the previous six months and were more likely to have injected cocaine at least daily (50% vs 5%,  $\chi^2 = 29.43$ ,  $p<.001$ ) during this time. The median number of occasions on which cocaine was used on a typical day in the previous six months was greater among dependent than among non-dependent users (3 vs 2,  $U=702$ ,  $p<.01$ ), as was the maximum number of cocaine use occasions per day during this period (median: 6.5 vs 3,  $U=542$ ,  $p<.001$ ).

Previous binge use of cocaine (85% vs 34%,  $\chi^2 = 23.46$ ,  $p<.001$ ), as well as binge use in the preceding six months (50% vs 18%,  $\chi^2 = 11.35$ ,  $p<.01$ ), was reported by a significantly greater proportion of cocaine-dependent than non-dependent ICU. There were no significant differences between the two groups, however, in either the maximum duration of binge periods (5 vs 6 median days) or in the maximum number of cocaine use occasions per day within a binge period (10 vs 7 median occasions).

There were no significant differences between cocaine-dependent and non-dependent ICU in the mean number of different drug classes ever used (9.7 vs 9.7) or injected (4.0 vs 4.0), nor were there any differences in the mean number of drug classes used (6.8 vs 6.9) or injected (2.9 vs 3.0) in the last six months.

The proportions of cocaine-dependent and non-dependent ICU who had experienced a heroin overdose in the previous six months did not significantly differ (29% vs 34%) and, likewise, the median number of lifetime heroin overdoses were similar for the two groups (1 vs 0).

### 3.7.2.3 Circumstances surrounding cocaine use

Cocaine-dependent ICU were significantly more likely than non-dependent ICU to have often used cocaine and heroin sequentially in the preceding six months (44% vs 21%,  $\chi^2 = 5.72$ ,  $p < .05$ ), although they were no more likely to have often mixed cocaine with heroin (12% vs 11%) or any other drugs during this time.

Cocaine-dependent ICU were significantly more likely than non-dependent ICU to have often used cocaine on their own (41% vs 20%,  $\chi^2 = 5.25$ ,  $p < .05$ ) in the previous six months.

### 3.7.2.4 Drug-related problems

Cocaine-dependent ICU were no more likely than non-dependent ICU to have borrowed (24% vs 13%) or lent (35% vs 19%) used needles during the six months preceding interview. Similarly, there were no significant differences between scores of cocaine-

**Table 7: Comparisons of cocaine-dependent and non-dependent ICU**

| <b>Variable</b>  | <b>Cocaine-dependent ICU<br/>(N=34)</b> | <b>Non-dependent ICU<br/>(N=67)</b> |
|--|---|-------------------------------------|
| <i>Demographics</i>                                    |   |                                     |
| Age (mean yrs)   | 29.4                                    | 29.4                                |
| % Male   | 62                                      | 67                                  |
| Education (mean yrs)                                   | 9.5                                     | 9.7                                 |
| % Unemployed   | 100                                     | 85 *                                |
| % Engaged in sex work                                  | 24                                      | 8 *                                 |
| % In MMT   | 38                                      | 19 *                                |
| <i>Patterns of cocaine use</i>                         |   |                                     |
| Days used cocaine in last 6 months (med)               | 76                                      | 5 *                                 |
| % Injected cocaine $\geq$ once a day                   | 50                                      | 5 *                                 |
| No. of use occasions on a typical day (med)            | 3                                       | 2 *                                 |
| No. of use occasions on a day of maximum use (med)     | 6.5                                     | 3 *                                 |
| % Binge use of cocaine in last 6 months                | 50                                      | 18 *                                |
| Max. length of binge period (med)                      | 5                                       | 6                                   |
| Max. no. of use occasions per day during a binge (med) | 10                                      | 7                                   |
| <i>Drug-related problems</i>                           |   |                                     |
| % Borrowed needle in last month                        | 24                                      | 13                                  |
| % Lent needle in last month                            | 35                                      | 19                                  |
| HRBS (injecting)                                       | 5.4                                     | 5.0                                 |
| HRBS (sexual)  | 4.1                                     | 4.5                                 |
| OTI health   | 20.1                                    | 17.2                                |
| No. of injection-related problems in last month        | 2.1                                     | 1.4 *                               |
| OTI social functioning                                 | 21.7                                    | 21.7                                |
| OTI crime  | 2.2                                     | 2.3                                 |
| GSI  | 1.3                                     | 1.0 *                               |
| % Positive psychiatric case                            | 77                                      | 57 *                                |
| % Physical problems                                    | 41                                      | 15 *                                |
| % Psychological problems                               | 74                                      | 28 *                                |

\* Significant difference between groups

dependent and non-dependent ICU on the injecting (5.4 vs 5.0) and sexual (4.1 vs 4.5) HRBS sub-scales. While the overall scores on the HRBS sexual sub-scale did not differ between users, a significantly greater proportion of non-dependent than dependent cocaine users had never used condoms with their regular partner in the preceding month (45% vs 21%,  $\chi^2 = 5.68$ ,  $p < .05$ ).

Cocaine-dependent ICU reported a greater mean number of injection-related problems in the preceding month (2.1 vs 1.4,  $t_{99} = 2.76$ ,  $p < .01$ ) than non-dependent ICU. In the previous six months, greater proportions of cocaine-dependent than non-dependent ICU had experienced abscesses/infections (21% vs 6%,  $\chi^2 = 4.97$ ,  $p < .05$ ) and/or thromboses (27% vs 0%,  $\chi^2 = 19.47$ ,  $p < .001$ ). Cocaine-dependent users were also more likely than non-dependent users to have injected cocaine in regions other than the cubital fossa during this period, such as the forearm (59% vs 30%,  $\chi^2 = 7.61$ ,  $p < .01$ ), hand (24% vs 8%,  $\chi^2 = 5.05$ ,  $p < .05$ ), and neck (6% vs 0%,  $\chi^2 = 3.96$ ,  $p < .05$ ).

Overall mean scores on the OTI health scale, however, did not differ between cocaine-dependent and non-dependent ICU (20.1 vs 17.2). Similarly, the two groups did not differ in terms of either OTI social functioning scores (21.7 vs 21.7) or OTI crime totals (2.2 vs 2.3).

Cocaine-dependent ICU attained a significantly higher mean GSI score than non-dependent ICU (1.3 vs 1.0,  $t_{99} = 2.00$ ,  $p < .05$ ), as well as higher mean scores on the obsessive-compulsive (1.5 vs 1.1,  $t_{99} = 2.10$ ,  $p < .05$ ), anxiety (1.3 vs 0.8,  $t_{99} = 2.88$ ,  $p < .01$ ),

and psychoticism (1.2 vs 0.8,  $t_{99}=2.30$ ,  $p<.05$ ) sub-scales of the BSI. Accordingly, a higher proportion of dependent than non-dependent ICU met the criteria for psychiatric caseness (77% vs 57%,  $\chi^2 = 3.79$ ,  $p=.05$ ).

Significantly greater proportions of cocaine-dependent ICU than non-dependent ICU reported experiencing physical (41% vs 15%,  $\chi^2 = 8.33$ ,  $p<.01$ ) and/or psychological problems (74% vs 28%,  $\chi^2 = 18.72$ ,  $p<.001$ ) which they attributed to their cocaine use.

### 3.7.3 Comparisons of dependent and non-dependent NICU

Comparisons were made between NICU who were cocaine-dependent, as classified by the SDS, and those who were not cocaine-dependent. These comparisons are summarised in Table 8.

#### 3.7.3.1 Demographics

There were no significant differences between cocaine-dependent and non-dependent NICU in terms of mean age (31.5 vs 29.7 yrs), sex (50% vs 59% male), or mean level of education (11.3 vs 11.3 yrs), and cocaine-dependent NICU were no more likely than non-dependent NICU to be unemployed (17% vs 7%).

#### 3.7.3.2 Drug use history

Among the few NICU who had previously injected a drug ( $n=5$ ) there were no significant differences between those who were cocaine-dependent and those who weren't in terms of their mean age of first injection (21.0 vs 20.0 yrs). Cocaine-dependent NICU had used

cocaine on a significantly greater number of median days than non-dependent NICU in the previous six months (22.5 vs 7,  $U=38$ ,  $p<.05$ ). The median number of days on which other drugs were used during this time, however, did not significantly differ according to dependence status. While there were no significant differences between dependent and non-dependent NICU with respect to the median number of times cocaine was used in a typical day of use (4 vs 5), the maximum number of times NICU had used cocaine per day in the previous six months was significantly greater for dependent than for non-dependent users (median: 12 vs 8,  $U=40.5$ ,  $p<.05$ ). In the month preceding interview, cocaine-dependent NICU were not significantly more likely than other NICU to have used cocaine at least once a day (33% vs 7%).

Dependent and non-dependent NICU did not significantly differ either in terms of the proportion reporting previous binge use of cocaine (67% vs 52%) or the proportion that had binged in the last six months (50% vs 41%). Similarly, there were no significant differences between the two groups in either the maximum duration of binge periods (1 vs 1 median days) or in the maximum number of cocaine use occasions per day within a binge period (2 vs 2.5 median occasions).

There were no significant differences between dependent and non-dependent NICU in terms of the number of drug classes used previously (8.8 vs 8.5) or in the last six months (4.8 vs 5.4).

### 3.7.3.3 Circumstances surrounding cocaine use

There were no significant differences between dependent and non-dependent NICU with respect to whether cocaine was administered alone or mixed with other drugs, nor with respect to the social context in which cocaine was used.

### 3.7.3.4 Drug-related problems

NICU who were cocaine-dependent did not score significantly differently from those who were non-dependent with respect to mean scores on the HRBS sexual behaviour (6 vs 4.6), OTI crime (0.8 vs 0.5), or OTI social functioning (11.0 vs 5.7) scales. The mean OTI health scores of cocaine-dependent NICU, however, were significantly higher than those of non-dependent NICU (17.0 vs 9.7,  $t_{33}=2.66$ ,  $p<.05$ ), indicating poorer health among dependent users.

Mean GSI scores were higher for dependent than for non-dependent NICU. This difference approached, but did not attain, statistical significance (1.3 vs 0.5,  $p=.08$ ). Mean scores on the anxiety (1.4 vs 0.6,  $t_{33}=2.37$ ,  $p<.05$ ) and hostility (1.3 vs 0.6,  $t_{33}=2.81$ ,  $p<.01$ ) sub-scales, however, were significantly higher for dependent NICU. The proportions of dependent and non-dependent NICU who could be classified as a positive psychiatric case were not significantly different (67% vs 38%).

Physical problems associated with cocaine use were not significantly more likely to be reported by dependent than non-dependent NICU (67% vs 41%). Cocaine-dependent



NICU, however, were more likely to report psychological problems which they attributed to their cocaine use (67% vs 24%,  $\chi^2 = 4.17$ ,  $p < .05$ ).

**Table 8: Comparisons of cocaine-dependent and non-dependent NICU**

| <b>Variable</b>  | <b>Cocaine-dependent NICU<br/>(N=6)</b> | <b>Non-dependent NICU<br/>(N=29)</b> |
|--|---|--------------------------------------|
| <i>Demographics</i>                                    |   |                                      |
| Age (mean yrs)   | 31.5                                    | 29.7                                 |
| % Male   | 50                                      | 59                                   |
| Education (mean yrs)                                   | 11.3                                    | 11.3                                 |
| % Unemployed   | 17                                      | 7                                    |
| <i>Patterns of cocaine use</i>                         |   |                                      |
| Days used cocaine in last 6 months (med)               | 22.5                                    | 7 *                                  |
| No. of use occasions on a typical day (med)            | 4                                       | 5                                    |
| No. of use occasions on a day of maximum use (med)     | 12                                      | 8 *                                  |
| % Binge use of cocaine in last 6 months                | 50                                      | 41                                   |
| Max. length of binge period (med)                      | 1                                       | 1                                    |
| Max. no. of use occasions per day during a binge (med) | 2                                       | 2.5                                  |
| <i>Drug-related problems</i>                           |   |                                      |
| HRBS (sexual)  | 6                                       | 4.6                                  |
| OTI health   | 17.0                                    | 9.7 *                                |
| OTI social functioning                                 | 11.0                                    | 5.7                                  |
| OTI crime  | 0.8                                     | 0.5                                  |
| GSI  | 1.3                                     | 0.5                                  |
| % Positive psychiatric case                            | 67                                      | 38                                   |
| % Physical problems                                    | 67                                      | 41                                   |
| % Psychological problems                               | 67                                      | 24 *                                 |

\* Significant difference exists between groups

## **4.0 DISCUSSION**

### *4.1 Major Findings*

Cocaine use was found to be highly prevalent among IDU, injection being the most common route of administration. ICU had higher levels of unemployment, criminality, heroin use, polydrug use/injection, and injecting frequency than other IDU, as well as poorer injection-related health.

The second major finding of this study was that, in many respects, the cocaine use patterns of NICU were either heavier than or similar to those of ICU.

The third finding of major importance was that while NICU were more likely to report physical problems directly associated with cocaine use, they were generally in better physical and psychological health, were more socially functional, and had lower levels of criminality than ICU.

The final major finding of the study was that cocaine dependence was prevalent among both injecting and non-injecting cocaine users, with 34% of ICU and 17% of NICU meeting the proposed SDS criteria for dependence. Dependence was associated poorer physical and psychological health, irrespective of route of administration.

### *4.2 Prevalence and patterns of cocaine use among IDU*

As McKetin et al. (2000) have reported, the high prevalence of recent cocaine use among IDU illustrates that cocaine use has become an established component of the polydrug

use patterns of IDU in Sydney, Australia. While the frequency of cocaine use among IDU in 1999 had decreased relative to 1998, prevalence has consistently increased since 1997 (McKetin et al., 2000). Furthermore, given that 1 in 5 ICU nominated cocaine as their drug of choice, and 1 in 10 reported injecting cocaine more often than any other drug, there is the potential for cocaine use to become even more prevalent among this group in the future.

The increase in cocaine use prevalence is, by itself, cause for concern, but the fact that cocaine use among IDU is overwhelmingly by injection is even more alarming. While it is not surprising that injection would be the preferred route of administration among this group, the implications for the health of ICU are of even greater salience. Apart from the greater risk of blood-borne virus transmission due to the sharing of injecting equipment, injecting drug use is associated with a number of other health risks such as vascular and tissue damage (Cherubin, 1967; Darke et al., 2000; Ostor, 1977; Stone et al., 1990). The finding that ICU in this study were injecting at a higher frequency than other IDU illustrates that cocaine injectors are at an even greater risk of experiencing such health problems.

The patterns of cocaine use demonstrated by the present study indicate that cocaine is not just one of a variety of drugs used by IDU as an adjunct to their heroin use. Although more than half of ICU had, on average, injected cocaine once a week or less in the preceding six months, approximately one in five had done so on an average of at least once a day during this period. Moreover, on both a typical day of use and the last day of

use in the preceding six months nearly one fifth of ICU reported using cocaine on more than four occasions. The average frequency of cocaine use over the preceding month is suggestive of an recent increase in cocaine use among the ICU surveyed for this study, with over one quarter using cocaine at least once a day and 14% using at least three times a day during this period. These findings show not only that cocaine is being used on a regular basis by at least 40% of ICU, but that there are significant proportions who are using cocaine at a frequency equivalent to or greater than their heroin use.

#### *4.3 Comparisons of ICU and other IDU*

Injecting cocaine users were more likely to be unemployed and had higher levels of recent criminality than other IDU. Apart from their frequent cocaine injecting, they had also injected heroin and drugs in general more frequently in the preceding month and had a more extensive polydrug use history, in terms of both lifetime and recent use/injecting. Accordingly, ICU reported a greater number of recent injection-related problems than other IDU. Overall, these findings are consistent with those of previous studies (Chaisson et al., 1989; Hunt et al., 1986; Kosten et al., 1988; Strug et al., 1985; Torrens et al., 1991) and suggest that cocaine use among IDU is associated with a deeper entrenchment in the drug-using lifestyle in general and a greater involvement in injecting drug use. Consequently, injecting cocaine use may pose risks to the user's health over and above those associated with injecting drug use in general, as well as exacerbating the social and legal problems that are typical concomitants of drug use.

#### *4.4 Comparisons of ICU and NICU*

The present study revealed several differences between cocaine users according to their route of administration. Injecting cocaine users had lower levels of education and were more likely to be unemployed, engaged in sex work, and/or have a prison history than non-injecting cocaine users. These differences support Hando et al.'s (1997a) identification of two distinct groups of cocaine users in Sydney – higher and lower SES users. The lower SES users were comparable to the ICU in the present study in that they were injectors, had low levels of education, were usually unemployed or engaged in sex work, and had more extensive criminal histories. The higher SES users were similar to the NICU in the present study in that they used cocaine intranasally, were well-educated, employed in a variety of average to high paying occupations, and generally did not have a criminal history.

Interestingly, ICU and NICU had similar polydrug use histories. Exposure to different drugs did not appear to be associated with the preferred route of drug administration. Thus, while injecting may be a more harmful form of drug administration, non-injectors may be just as likely to take risks in terms of drug experimentation.

Although ICU had used cocaine more regularly in the month preceding interview, the number of days on which cocaine was used in the preceding six months was not significantly different from that of NICU. The frequency of use by NICU, however, on both typical and extreme use days in the preceding six months, was twice that of ICU.

These findings are of interest as they suggest that frequency of cocaine use is not necessarily a function of route of administration. Research into use of other drugs, however, has found that route of administration is a significant predictor of frequency of use, with injection being associated with more frequent use than oral or intranasal administration (Hando & Hall, 1993; Ross et al., 1994; Ross et al., 1997). The higher frequency of use among NICU, therefore, may reflect differences between the groups other than route of administration. NICU may, for example, have used smaller quantities of cocaine on each use occasion than those used by cocaine injectors. The amount of cocaine used on each occasion, however, was not quantified in this study and, as such, the role of dosage is unclear.

NICU were no less likely than ICU to have binged on cocaine either in their lifetime or in the last six months. Moreover, while the maximum length of a binge period during this time was significantly shorter among NICU, the per diem frequency of use during a binge period did not differ according to route of administration. Again, this finding may be confounded by differences in the quantities of cocaine used by the two groups.

ICU were more likely than NICU to have mixed cocaine with other drugs and to be on their own while using. These findings illustrate the need to consider the context in which drugs are used as well as the means by which they are administered. Although the injection of cocaine carries a certain degree of risk to the user's health and safety, this risk may be further compounded by the circumstances surrounding its use.

Injecting cocaine users had poorer physical health, poorer social functioning, and higher levels of recent criminality than non-injecting cocaine users, a finding that is consistent with previous research into the factors associated with route of drug administration (Ross et al., 1994; Ross et al., 1997). The greater severity of BSI psychological symptoms and higher proportion of positive psychiatric cases among ICU is consistent with previous investigations into the psychological morbidity of amphetamine users (Hall et al., 1996; Hando & Hall, 1993). These studies found that injecting amphetamine use was associated with a greater severity of psychological symptomatology than non-injecting amphetamine use.

Overall, ICU were more physically, psychologically, and socially dysfunctional than NICU. Injecting cocaine use, therefore, would appear to be associated with a greater number and severity of problems than cocaine use *per se*. Furthermore, the scope of these problems goes beyond those specifically related to injecting drug use to encompass a broad spectrum of harm to the user.

#### *4.5 Physical and psychological problems associated with cocaine use*

Substantial proportions of both ICU and NICU reported experiencing physical and psychological problems that they directly related to their use of cocaine. While the two groups did not differ with respect to the proportions reporting psychological problems, the prevalence of physical problems among the NICU group was almost twice that among the ICU group.

The greater prevalence of physical problems among NICU may, in part, reflect the route of cocaine administration. The majority of the physical problems reported by NICU were experienced in the nose and sinuses and would thus be readily attributed to the snorting of cocaine, particularly as such problems typically occurred within 24 hours after use. The physical problems reported by ICU, however, may be less easily linked to an episode of cocaine use. It is possible that some ICU who had experienced vascular problems attributed them to heroin use instead and, therefore, did not report them. Similarly, some ICU who had suffered sleep deprivation, fatigue, and headaches may have regarded such problems as non-specific to cocaine use or non-specific to drug use in general and, likewise, neglected to report them.

With the exception of psychosis, which was only reported by ICU, the most commonly reported psychological problems were the same for both groups (depression, paranoia, and anxiety). While these findings suggest that the use of cocaine has adverse psychological consequences, irrespective of whether it is injected or administered via another route, the association between injecting cocaine use and psychosis demonstrates that injecting cocaine users are at greater risk of psychological harm than their non-injecting counterparts. Similarly, the aforementioned research by Hall et al. (1996) found that the injection of amphetamine was associated with hallucinations, violent behaviour, and paranoia.



#### *4.6 Cocaine dependence*

Using the SDS criterion proposed by Hando and Hall (1993), significant proportions of ICU (34%) and NICU (17%) were diagnosed as cocaine-dependent. While these proportions are, in themselves, of interest and cause for concern, the fact that over one fifth (22%) of the total IDU sample were cocaine-dependent indicates that cocaine use among IDU is not only prevalent, but of a level sufficient to warrant further investigation.

The prevalence of cocaine dependence was not significantly different between ICU and NICU. When dependence was measured on the continuum provided by the SDS, however, the degree of dependence was greater among ICU. The higher SDS ratings among injecting cocaine users than intranasal cocaine users are consistent with previous research which found an association between route of administration and severity of dependence (Gossop et al., 1992).

In terms of the variables associated with dependence, there were some differences between ICU and NICU. In the ICU group, dependence was associated with a more dysfunctional employment profile, heavier cocaine use patterns in all respects, and a greater prevalence of recent binge use. In the NICU group, however, dependence was unrelated to employment, binge use, and typical patterns of cocaine use. A relationship between dependence and poorer physical and psychological health was common to both groups.

Overall, the above findings indicate that, irrespective of route of administration, cocaine dependence is associated with physical and psychological health problems both specific and non-specific to the use of cocaine *per se*. These findings also suggest that, while dependence is associated with heavier cocaine use overall, binge use patterns may be independent of dependence status. Designs for future research, therefore, should take into account the possibility that there may be people who usually use cocaine infrequently and at a level insufficient to render them dependent, yet who are still at risk of suffering physical and psychological harm due to heavy, albeit sporadic, binge use.

#### 4.7 Summary and conclusions

The present study revealed a high prevalence of cocaine use among IDU in Sydney as well as patterns of use among both injectors and non-injectors that may typically involve several occasions of use in one day as well as intermittent periods of extremely heavy use (binges). In accordance with such use patterns, an alarming number of users, particularly cocaine injectors, qualified for a diagnosis of dependence.

Cocaine use was associated with a variety of physical, psychological, and social harms, however the results of this study suggest that factors other than the use of cocaine *per se* may play a mediating role in this relationship.

The route by which cocaine is administered appears to play a role in the determining the relative risk of harm to the user, with injecting cocaine use being associated with a greater level of harm than non-injecting use in several respects. The fact, however, that

significant proportions of NICU were cocaine-dependent, met the criteria for psychological caseness, and reported problems arising directly from their cocaine use, illustrates that non-injecting cocaine use is by no means a benign activity and may pose serious threats to the user's physical and psychological health.

While route of administration is an important factor to consider when examining the correlates of cocaine use, the results of this study suggest that the most influential mediator in the relationship between cocaine use and the aforementioned harms is dependence. Cocaine dependence was associated with a greater severity of harm regardless of whether cocaine was injected or administered via an alternative route and, as such, its role in the findings of future research should not be overlooked.

In conclusion, cocaine has become increasingly popular among IDU in Sydney. While the use of cocaine has not yet eclipsed that of other more entrenched drugs, such as heroin, its negative impact on the user's physical, psychological, and social functioning is sufficient cause for concern.

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