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RESEARCH REPORT

Psychopathology, stress and HIV-risk injecting behaviour among drug users

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Abstract

The relations between psychopathology (or psychological morbidity) and stress (measured by the GHQ-30 and VOEG-13) and HIV-risk injecting behaviour were investigated among 151 and 166 drug users, respectively, participating in a HIV study in Amsterdam, The Netherlands. Scores indicative of psychopathology were obtained by 72% of respondents. Drug users with psychopathology are older, long-term polydrug users and injectors, who experience considerable stress. Drug users in the sample also have higher stress levels than the general population, but, in contrast to the general population, stress does not increase with age. Stress is associated with long-term polydrug use, with cocaine use and with the female sex. Among HIV-positive injecting drug users (IDU's) no positive relation was found between psychopathology or stress and lending of used needles to others. Among HIV-negative IDUs only psychopathology is associated with an increased HIV risk. Our findings suggest that HIV-risk reduction programmes should consider more seriously the role of psychopathology in attempts to persuade drug users to reduce their risks.

Introduction

The present study investigates the relation of psychopathology, stress and HIV-risk injecting behaviour in drug users participating in a HIV study through low threshold methadone programmes in Amsterdam, The Netherlands. Psychopathology, either primary or secondary, has been found to be more prevalent among drug users than among the general population.¹⁻⁵ Next to the existing drug dependence the three most common psychiatric disorders among drug users are depressive disorders, alcoholism and personality disorders, primarily anti-social personality.⁶ Psychopathology has been found

to be an important predictor of addiction treatment success,^{7,8} with a negative relation between severity of psychiatric problems and treatment success. Both addiction treatment and HIV prevention require a certain level of control over addictive behaviour. Addiction treatment demands stopping the addictive behaviour, while HIV prevention demands a certain degree of planning by having clean works available at all times or, if no clean needle is available, either the postponement of drug use or the cleaning of a used needle and syringe or smoking/free basing instead of injecting. Psychopathology, co-existing to addiction, may increase the likelihood of risk-taking behaviour.⁹

The relation between stress and drug use is a complicated one. On the one hand, using drugs seems to decrease stress; on the other hand, stress

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may lead to increased drug taking.¹⁰ Drug use can be seen as a coping mechanism, as a maladaptive attempt by an individual to cope with life stressors through habitual use of drugs.¹¹ Wills & Shiffman¹² predict that a reliance on this approach reduces the probability of learning more adaptive ways to cope with stressors, which, in the long run, will reduce social competence, lead to less and less social support (i.e. to social isolation), to increased dependency on drugs and to increased overall stress levels. This suggests that drug users with high stress levels may have more difficulty in coping with the AIDS threat than others, resulting in less safe behaviour. Dolan *et al.*¹³ found a relation between severity of drug-related problems and needle sharing. Therefore, the hypothesis of the present study is that addicts with co-existing psychopathology or high stress have a higher level of HIV-risk injecting behaviour than other addicts.

The present study aims, first, to provide data on the prevalence of psychopathology (or psychological morbidity), as measured by the General Health Questionnaire (GHQ), and of stress, as measured by a Dutch scale of experienced stress (VOEG-13), in a sample of drug users, and secondly, to investigate the relations between psychopathology and stress as measured by these scales on the one hand, and sociodemographic, social and drug use characteristics on the other hand. The third and major purpose of the present study is to investigate the relations between psychopathology and stress and HIV-risk injecting behaviour. The main HIV-risk behaviour among drug users is the sharing of used needles and syringes. Analysis of behaviour that carries a great risk of HIV infection—borrowing used injection equipment—is most relevant among injecting drug users (IDUs) who are not infected with HIV, while analysis of behaviour with a high HIV-transmission risk—lending used needles—is most relevant among infected IDUs. Therefore, in the present study, the relation between psychopathology, stress and HIV-risk behaviour will be studied separately for HIV-negative and HIV-positive IDUs. In the HIV-positive subgroup lending used needles is used as an indicator of a high HIV-transmission risk, while in the HIV-negative subgroup five indicators for HIV risk are employed: borrowing, first occurrence of injecting, last occurrence of injecting, frequency of injecting and injecting heroin and cocaine together. All five variables have been identified as independent HIV-risk factors among Amsterdam IDUs.^{14,15}

Method

The present research is part of an epidemiological study of HIV infection among drug users which was initiated in 1985. This ongoing study^{14,16,17} involves voluntary, confidential HIV antibody testing and counselling for drug users in Amsterdam, combined with an interview by specially-trained nurses using a standard demographic and behavioural questionnaire. Almost all drug users in the ongoing study have enrolled either through the special STD clinic for addicted prostitutes or through low threshold methadone clinics.* Participants can either participate once or take part in the follow-up study (in which visits are scheduled every 4 months). Drug users participating in the follow-up study receive 25 Dutch guilders (approximately £8) for each follow-up visit and HIV test. Since March 1989, at 4-month intervals, a different additional questionnaire on specific psychosocial or behavioural issues is added to the basic questionnaire.

The present study concerns the period from 1 March to 9 November 1989 and concerns only drug users who participate in the HIV study through low threshold methadone clinics. These drug users were given, next to the basic questionnaire, the GHQ-30 and the VOEG-13. Initially, the Beck Depression Inventory was also used, but due to poor compliance this test was dropped. For this study, the first interview in the study period (either intake or follow-up visit) of each drug user was selected; of the follow-up interviews only those with a previous visit of less than 9 months ago were selected. This resulted in 186 interviews with drug users, who all ought to have completed the GHQ and VOEG-13 during that interview. In order to be able to assess stability of the GHQ-30, HIV-positive drug users who came for a second visit during the study period were given this scale a second time (while HIV-negatives were given another questionnaire).

Statistical analysis and serology

Participants that report having injected drugs are considered IDUs, participants who have injected in the 6 months preceding intake or in the period since their last interview are considered current IDUs. Similarly, all behaviour in the 6 months preceding intake or since the last interview is called current

* Low threshold methadone clinics in Amsterdam provide daily on-site primary medical and social care and supply methadone to drug users. The aim of these clinics, which are not drug free, is to contact heroin users and to stabilize their use.¹⁸

behaviour. Univariate statistics include the χ^2 test of independence, Fisher's exact test, the two sample *t*-test, the Mann-Whitney (M-W) test for two independent samples, Pearson product-moment correlation and Spearman's rank order correlation. As a measure of reliability, Cronbach's alpha was computed. To determine which sociodemographic and long-term drug use variables were independently related with psychopathology or stress (at a 0.05 level of significance), stepwise logistic regressions (forward and backward) were done, including only variables univariately associated (with $p < 0.10$) with psychopathology or stress.

Serological testing for HIV was performed by ELISAs. Confirmation of a positive specimen was performed by competitive ELISAs and immunoblotting, as described previously.¹⁴

Measures

Psychopathology

Psychopathology was assessed using the 30-item version of the General Health Questionnaire (GHQ-30). Generally this scale is used as a self-administered questionnaire. For the present study among active drug users, who often find it difficult to concentrate on written material, the interviewer read out the questions and the possible answers, while the interviewed drug user could either read along or only listen. A validated Dutch version of the GHQ-30 was employed;¹⁹ for non-Dutch English-speaking drug users we used the English GHQ-30.

The GHQ is a psychiatric screening test aimed at detecting functional psychological disturbances in the general population. The questions of the GHQ refer to the occurrence of unusual and unpleasant mental phenomena and to the impairment of normal function.²⁰ A score (range 0-30) is considered as an indicator of psychopathology if there is a discrepancy or discontinuity, as experienced by the respondent, in normal functioning. The GHQ score can therefore be seen as a continuous scale, ranging from normality to psychopathology. Because of its design the GHQ misses psychoses, dementia and character disturbances.²¹ The GHQ has been widely used as predictor of being a 'psychiatric case' as measured by a standardized psychiatric interview.²² Sensitivity and specificity of the GHQ in this regard are around 80%.^{19,21,23} The GHQ can also be used to provide a general indication of psychological morbidity.²⁴

The presence of psychopathology (or psychologi-

cal morbidity) as measured by the GHQ-30 was operationalized according to convention: threshold score 5.²⁵ A score below 5 is assumed to indicate absence of psychopathology, a score of 5 and higher is assumed to indicate psychopathology.

Stress

To measure stress we used the 13-item version of the VOEG (a Dutch 21-item questionnaire on experienced health,²⁶ administered in the same way as the GHQ-30 (see above). The VOEG measures the tendency to somatize psychosocial stress conditions, and can be used as a general indicator of stress.²⁷ The 13-item version (VOEG-13) was developed by Jansen & Sikkels²⁸ and explains 95% of the variance of the original VOEG. The answer 'yes' is coded as 1 and 'no' as 0. Since there is no conventional cut-off score, we used the total score as an indicator of the amount of stress experienced by the respondent.

Results

The sample

The sample of 186 drug users consisted of 31 (17%) drug users who entered the HIV study through low threshold methadone clinics for 'extreme problematic' drug users and 155 drug users (83%) who enrolled through regular low threshold methadone clinics. Thirty-two (17%) drug users came for an intake visit, at which they reported on behaviour in the previous 6 months, while 154 drug users came for a follow-up visit (second to twelfth visit), at which they reported on behaviour in the period since their last interview, with a mean duration of 4.2 months ($SD = 1.1$). Mean age was 32.3 years ($SD = 6.0$). There were 137 (74%) males and 156 (84%) Dutch drug users in the sample. Daily methadone was used by 137 (74%) participants, with a mean dosage of 45 mg. One hundred and sixty-six (89%) drug users were IDUs, and 122 (66%) current IDUs. The IDUs started to inject a mean number of 11.4 years ago. Among the current IDUs, 37 (30%) reported to inject heroin daily, 20 (16%) reported to inject cocaine daily and 28 (23%) reported to inject heroin and cocaine together daily. Seventy-nine (42%) drug users were HIV-seropositive at the present visit. With regard to knowledge of serostatus, 66 (35%) knew that they were HIV-positive (HIV+), 34 (18%) (among whom 27 for whom the present visit was an intake visit) did not know their serostatus (HIV?) and 86 (46%) knew

that they were HIV-negative (based on their last received test result) (HIV-). No seroconversions were found at the present visit.

Non-respondents and non-completers

There were 20 non-respondents on both the VOEG-13 and GHQ-30. Furthermore, the GHQ-30 score could not be calculated for an additional 15 participants due to one or more missing items. With regard to sex, age, being IDU or current IDU there were no significant differences between the 151 drug users who completed both questionnaires and the 35 who did not. However, there was a lower proportion of German and South European drug users (7%) among the 151 completers, as compared to 23% among the non-completers ($\chi^2 = 7.5$, $df = 1$, $p = 0.006$). Furthermore, among the completers there were 57 (38%) HIV-seropositives, as compared to 22 (63%) among the non-completers ($\chi^2 = 7.3$, $df = 1$, $p = 0.007$). With regard to knowledge of serostatus, among the completers there were 34% HIV+, 15% HIV? and 51% HIV-, as compared to 40, 34 and 26%, respectively, among the non-completers ($\chi^2 = 10.2$, $df = 2$, $p = 0.006$).

Psychopathology, as measured by the GHQ-30
GHQ-30 reliability and stability; score distribution. Cronbach's alpha was 0.90 ($n = 151$), indicating high internal consistency. The corrected item-total correlation coefficients varied between 0.20 and 0.71. The mean inter-item correlation was 0.24.

There were 37 HIV-positive drug users who completed the GHQ-30 two times. The mean number of months between times 1 and 2 were 4 months ($SD = 1$). The mean score at time 1 was 10.0 ($SD = 7.0$), at time 2 it was 9.6 ($SD = 6.9$). At time 1, and also at time 2, 29 of the 37 drug users (78%) had psychopathology. Twenty-four persons had a score indicative of psychopathology at both visits. Test-retest correlation (Spearman) between GHQ scores at times 1 and 2 is 0.57 ($p < 0.001$).

The mean GHQ-30 score among the 151 drug users who completed the GHQ-30 is 9.6 ($SD = 7.1$, range 0-27, mode 7, median 7). The distribution of scores is shown in Fig. 1. The distribution is skewed to the right and platykurtic (skewness is 0.72 and kurtosis -0.46).

Prevalence of psychopathology; relations with stress, serostatus, knowledge of serostatus and current social/drug use characteristics. Psychopathology (as

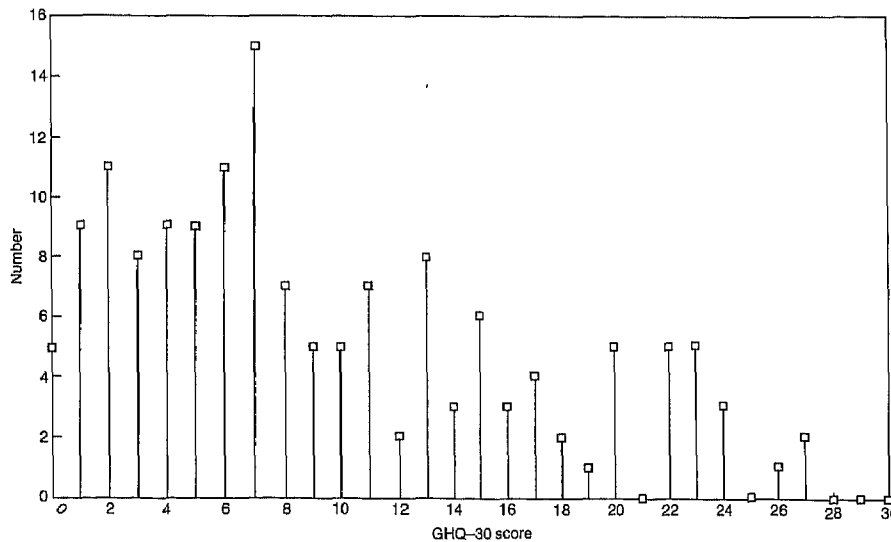


Figure 1. GHQ-30 scores among 151 drug users.

operationalized above) was present in 109 (72%) drug users. Psychopathology was found to be associated with stress; the correlation (Spearman) between GHQ-30 scores and VOEG-13 scores is 0.53 ($n = 151, p < 0.001$). Drug users with psychopathology had a median VOEG-13 score of 6, those without psychopathology a median score of 2 (M-W test, $p < 0.0001$). Neither entering the study through the low threshold clinic for 'extremely problematic' drug users nor a positive HIV serostatus were related to psychopathology. Among HIV+ 81% had psychopathology, versus 73% among HIV- and 66% among HIV-. These differences were not statistically significant.

With regard to current social support and circumstances, the proportions having steady housing, having regular contact with the parents, having a steady partner and having one or more good friends were not significantly different for the group with and without psychopathology.

There is also no significant difference between drug users with or without psychopathology with regard to current daily methadone use, or, among current daily methadone users, with regard to dosage of prescribed methadone. Among the drug users with psychopathology, 77 (71%) are current IDUs, as compared to 23 (56%) among the drug users without psychopathology, but this difference is again not significant ($\chi^2 = 3.1, df = 1, p = 0.08$).

Independent predictors of psychopathology among sociodemographic and long-term drug use variables. Univariately the following six sociodemographic and long-term drug use variables were found to be positively related (with $p < 0.10$) with psychopathology: age, number of years living in Amsterdam,

having regularly injected for one or more years, number of years since first using heroin or methadone regularly and having regularly used barbiturates/tranquillizers for one or more years.

In a stepwise logistic regression analysis with the six above-mentioned variables as independent variables and psychopathology as the dependent variable, number of years since first using heroin regularly and the regular use of barbiturates/tranquillizers for one or more years were found to be the strongest independent predictors of psychopathology (with, respectively, odds ratio (OR) per 5 years 1.51, 95% confidence interval (CI) 1.04-2.19 and OR 2.50, CI 1.11-5.60). None of the other four variables improved the model significantly.

Number of years since first using heroin regularly is highly correlated with age and with number of years regularly injected (Spearman's r is 0.58 and 0.67, respectively, $p < 0.001$).

Stress, as measured by the VOEG-13

VOEG-13 reliability; score distribution. Cronbach's alpha was 0.83 ($n = 166$), indicating high internal consistency. The corrected item-total correlation coefficients varied between 0.37 and 0.61. The mean inter-item correlation was 0.27.

The mean VOEG-13 score is 5.1 (SD = 3.6, range 0-13, mode 2, median 5). The distribution is skewed to the right and platykurtic (skewness is 0.40 and kurtosis is -0.83). Table 1 compares average scores of participants with those of a large general population sample. The rise in stress with increasing age is absent among drug users (Spearman's correlation between age and VOEG-13 scores is -0.04).

Table 1. Average VOEG-13 scores as a function of sex and age for a general population sample* and the present sample of active hard drug users (possible range of scores 0-13)

Age	General population sample ($n = 4159$)		Present sample ($n = 166$)	
	Male ($n = 2093$)	Female ($n = 2066$)	Male ($n = 122$)	Female ($n = 44$)
15-21	2.26	3.25	3.5 ($n = 2$)	—
22-28	2.44	3.71	4.9 ($n = 29$)	5.9 ($n = 16$)
29-35	2.52	3.74	4.7 ($n = 57$)	6.4 ($n = 22$)
36-49	3.29	4.33	4.3 ($n = 31$)	8.0 ($n = 6$)
50-64	3.93	5.29	3.7 ($n = 3$)	—

* The data are from a survey held in 1977 by the Netherlands Central Bureau of Statistics among a sample of 6000 persons taken from Dutch people aged 15 years and over: in the present form these data were presented by Jansen & Sikkels.²⁷

Relations between stress and serostatus, knowledge of serostatus and current social/drug use characteristics. Neither entering the study through the low threshold clinic for 'extremely problematic' drug users nor a positive HIV serostatus were related to stress. Among HIV+ the median stress score is 5.5, as compared to 5.5 among HIV? and 3.5 among HIV-. These differences are not statistically significant.

With regard to current social support and circumstances, drug users who have regular contact with their parents and drug users who have no good friends report more stress (M-W test, $p = 0.008$ and 0.02 , respectively). Current daily methadone users have a similar stress level as drug users who do not use daily methadone, and among daily methadone users there is no relation between stress level and methadone dosage; the same is true when comparing current IDUs with others.

Independent predictors of stress among sociodemographic and long-term drug use variables. In univariate analysis eight sociodemographic and long-term drug use variables were related to the amount of experienced stress (with $p < 0.10$). Associated with an increased stress score are: female sex, incomplete schooling (having left school before age 16), number of years since first working as a prostitute, number of years since first using heroin, methadone, barbiturates/tranquillizers or alcohol regularly and having used cocaine for one or more years regularly. Those who have ever worked as a prostitute are mainly females (60%), as compared to 11% females among non-prostitutes ($\chi^2 = 45.8$, $df = 1$, $p < 0.0001$). In a stepwise logistic regression analysis with the eight above-mentioned variables as independent variables and stress as the dependent variable (dichotomized in scores below or equal to the median and scores above the median), the strongest independent predictors of an above median stress score were, in the forward analysis, the regular use of cocaine for one or more years (OR 3.51, CI 1.31-9.41), female sex (OR 2.16, CI 1.04-4.52) and number of years since first using barbiturates/tranquillizers regularly (OR per 5 years 1.38, CI 1.01-1.86). All three had a positive relation with stress. In the backward analysis the same first two variables were selected (with approximately the same ORs and CIs), but this time number of years since first using heroin regularly was selected (OR per 5 years, 1.41, CI 1.02-1.95). None of the other four variables significantly improved the model.

Relations between psychopathology (n = 56), stress (n = 60) and HIV-risk injecting behaviour among HIV-negative current IDUs

Among the subgroup of 56 HIV-negative current IDUs, those with psychopathology (42 = 75%) more often had injected recently ('today or yesterday'), as compared to those without psychopathology (60 vs 21%, respectively, $\chi^2 = 6.1$, $df = 1$, $p = 0.01$). Also, they currently more frequently injected (median 32 injections per month (range 0-150), versus median 3.5 (range 0-75); M-W test, $p = 0.01$). With regard to type of drug injected, they more frequently injected cocaine by itself and heroin and cocaine together ('speedball') (M-W test, $p = 0.04$ and 0.001 , respectively). Finally, they had more injections per injecting day in the previous month (median 3 as compared to 2 among those without psychopathology; M-W test, $p = 0.04$). Number of years since first injecting is not significantly different between the two groups. Neither is borrowing of used needles, although the relation is in the expected direction: 12 (31%) among 39 HIV-negative current IDUs with psychopathology report borrowing in the previous months as compared to 2 (14%) of the 14 HIV-negative current IDUs without psychopathology (data of three persons are missing).

Only one significant relation was found between stress and the above-mentioned HIV-risk injecting variables: a negative relation between frequency of injecting heroin itself and stress (Spearman's $r = -0.24$, $p = 0.04$, $n = 60$).

Relations between psychopathology (n = 44), stress (n = 50) and HIV-risk injecting behaviour among HIV-positive current IDUs

Contrary to our expectation, lending is associated with having no psychopathology and with having little stress. One (3%) of 35 IDUs with psychopathology reported lending, compared to 2 (22%) of 9 IDUs with a normal score ($\chi^2 = 4.2$, $df = 1$, $p = 0.04$). The four current IDUs who lent used needles and syringes to others had a median stress score of 2 (range 2-3), as compared to a median of 6.5 (range 0-13) among those who did not lend (M-W test, $p = 0.05$).

Discussion

Psychopathology (or psychological morbidity), as measured by the GHQ-30, was found in 72% of the present sample of drug users. This is quite similar to the rate (with the GHQ-28) found in a sample of

Australian heroin users: 61%.²⁹ This high prevalence of psychiatric co-morbidity among drug users is consistent with previous studies (see Introduction) in which other instruments to measure psychopathology were used. With regard to experienced stress, drug users in the present study seem to score higher than males and females in the same age groups in the general population, while the rise in stress with increasing age in the general population^{27,28} is absent. Females in the present sample have a higher stress score than males, which is the same in the general population.

The median GHQ score in the present sample is 7. This suggests relatively mild symptomatology or minor psychopathology among many of the 'cases', which is again similar to the findings reported by Swift *et al.*²⁹ Persons with a high GHQ score report more stress than others. The best independent predictors of psychopathology among demographic and long-term drug use variables are the number of years since first using heroin regularly and having used barbiturates/tranquillizers for one or more years regularly. The first variable is strongly correlated with age and with number of years regularly injected. Thus, in the present study a typical drug user with a high GHQ score is an older, long-term polydrug user and injector, who experiences considerable stress. This is contrary to the study of Swift *et al.*²⁹ in which no relation was found between age, years of problem use of heroin and GHQ score.

The best independent predictors of stress in the present sample are having used cocaine regularly for one or more years, gender and either number of years since first using heroin or since first using barbiturates/tranquillizers regularly. This indicates that the amount of experienced stress is related to duration of drug use, which is in line with Wills and Shiffman's prediction¹² that drug use in the long run will lead to increased stress levels. In the present study, both psychopathology and stress are related to duration of drug use and to polydrug use. However, the two concepts differ in that only stress seems to be related to cocaine use and to female sex.

With regard to current social support and circumstances, in the present sample psychopathology is not related to any of the studied variables, while stress is associated with a lack of good friends. This is in agreement with Wills and Shiffman's prediction of social isolation.¹² The presently found positive association between stress and regular contact with the parents can be interpreted in different ways. One interpretation is that continued contact with

the parents increases the stress level of drug users; however, an alternative interpretation seems more likely: drug users who experience stress tend to see their parents more regularly.

In the present study it is noteworthy that both stress and psychopathology are not significantly related to HIV serostatus or to knowledge of HIV serostatus. However, among drug users who did not complete both questionnaires there were more with a positive HIV serostatus and more who did not know their serostatus, as compared to those who did complete both questionnaires. It is possible that these non-completers would have obtained high stress and/or psychopathology scores.

Our results indicate that GHQ-30 and VOEG-13 are internally consistent instruments. Their relative shortness is valuable, since research among drug users is more and more directed at active drug users as opposed to clinic samples. However, the validity of each scale when used with drug users ought to be studied by comparing them with other instruments.

Several limitations of the present study need to be mentioned. Firstly, since the sample consists of drug users who have entered voluntarily in a HIV study through low threshold methadone programmes, the representativeness of the sample for drug users in Amsterdam is unknown. Secondly, the GHQ and VOEG-13 were not self-administered but administered by an interviewer, which may have influenced the results. This procedure was necessary since most of the interviewed active drug users find it difficult to concentrate on written material. This points to a third limitation: the respondents were active opiate users. The effects of present drug use on the GHQ score or stress score are unknown.

Among the subgroup of HIV-positive current IDUs we observed a relation between low stress and lending and between absence of psychopathology and lending, which was contrary to our hypothesis. We do not have an explanation for these findings. In any case, the results indicate that HIV-positive IDUs with high stress or psychopathology are not a group with a special risk of HIV transmission.

Among HIV-negative current IDUs three HIV-risk factors are related in the expected direction to psychopathology: frequency of injecting, frequency of injecting heroin and cocaine together and recent injecting, while first occurrence of injecting and borrowing are not significantly related to psychopathology. Stress is not related in the expected direction to any of the five variables, while there is a negative relation with frequency of injecting heroin. Therefore, the hypothesis that

stress is positively related to injecting risk behaviour is not supported.

Apparently, in the present sample, psychopathology is related to HIV-risk injecting behaviour only among HIV-negative current IDUs. These findings suggest that HIV-negative current IDUs with psychopathology are a group with an increased risk of HIV infection. A similar finding was reported by Woody *et al.*,³⁰ who found a relation between needle sharing and psychopathological distress (as measured by the Symptom Checklist (SCL-90) and BDI) among IDUs who claimed to be seronegative.

The cross-sectional nature of the present study makes it impossible to draw conclusions about causal relations and their direction. Psychopathology, as measured by the GHQ-30, may be the result or the cause of current frequent injecting in this sample of active drug users. Nevertheless, the present study shows that especially injectors who have a high risk of HIV infection have serious psychological and social problems as well as drug use problems. Whatever the direction of causality, psychopathology may interfere with rational decision making and with capacities for planning. Risk reduction programmes aiming to prevent infection among HIV-negative injectors ought to take this into consideration.

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