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HIV infection among heroin users and area of residence

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Abstract

The aim of this study was to develop a hypothesis to explain the link between HIV prevalence and area of residence. The study was conducted in two parts using two existing data sources. In Part 1, the bloodborne viral test status and test results of a sample of clients attending treatment in December 2001 in two areas of Dublin, an inner city area (Dublin 8) and a suburban area (Dublin 24), were extracted from the Bloodborne Viral Status Dataset created by Grogan. In Part 2 the characteristics of heroin users seeking treatment for the first time at treatment services in their respective areas of residence, Dublin 8 or Dublin 24, between 1997 and 2000 were examined, using data from the National Drug Treatment Reporting System. A higher proportion of heroin users in Dublin 8 had HIV and hepatitis C than did their counterparts in Dublin 24. The analysis suggests that heroin users in Dublin 8 were more likely both to have ever used cocaine and to have used heroin daily, than were those who lived in Dublin 24. Also, a higher proportion of injectors living in Dublin 8 used heroin and cocaine concurrently than did their counterparts in Dublin 24. In both samples, heroin users who lived in Dublin 8 were older than those who lived in Dublin 24. The findings led to a hypothesis: 'The risk of acquiring HIV is associated with area of residence and may be linked to cocaine use.'

Introduction

Canadian researchers have found that the prevalence of HIV among drug users is linked to area of residence.¹ Between 1985 and 2002, there were 3,009 persons in Ireland identified as having antibodies to HIV.² Of these, 1,084 (36%) were intravenous drug users. Kelly and Clarke³ reported a fall in the number of HIV cases among injecting drug users between 1994 and 1998, and suggested that this might be attributable to the introduction and expansion of harm-reduction measures. However, in 1999, there was a sharp increase in the number of injecting drug users testing positive for HIV, with 69 new cases; the trend continued into 2000 with 83 new cases.^{2,4,5} Clarke and colleagues⁶ reviewed the demographic data of new HIV-positive cases diagnosed between January 1999 and December 2000. The authors reported that 40 per cent of these cases were less than 22 years old and that there was a clustering of cases in the Rialto (Dublin 8) area. The numbers of new injector cases in 2001 and 2002 were lower than those in 1999, at 38 and 50 respectively, but remained higher than in 1998. Grogan and colleagues⁷ ascertained the prevalence and incidence of bloodborne viruses among heroin users attending methadone treatment services in the HSE South Western Area in December 2001 by means of a retrospective review of participants' clinical and laboratory records. The researchers observed that there was a large pool of HIV-positive cases living in Dublin 8, while

a smaller number of HIV cases lived in Dublin 24 (Dr E Keenan, personal communication, 2003). The authors of the present paper developed a hypothesis to explain this observation by examining existing data from two sources.

Methods

This paper analyses data from two separate samples, both comprising heroin users from Dublin 8 and Dublin 24. Dublin 8 is situated close to and south of Dublin's inner city, while Dublin 24 is a suburb eight miles from the city centre. Both areas contain a number of electoral divisions with high levels of deprivation, as well as a number of problem heroin users.⁸

The first sample was a subset of the Bloodborne Viral Status Dataset created by Grogan and colleagues.⁷ This dataset is a one-in-four systematic sample of all clients on the Central Treatment List (a listing of clients receiving an opiate substitute held by the Drug Treatment Centre Board) who were attending treatment in the HSE South Western Area in December 2001. Each record was examined using a checklist to extract the bloodborne viral test status. In addition, demographic characteristics and treatment characteristics were collected. The data subset used in

Part 1 of this study comprised Central Treatment List clients living and treated in Dublin 8 and Dublin 24 in December 2001.

The second sample was a subset of the National Drug Treatment Reporting System (NDTRS) population; this database is maintained by the Health Research Board. The data collected include treatment-seeking behaviour, socio-demographic and economic characteristics, types of problem drugs used and drug-using behaviours. The data on heroin users treated in their respective areas of residence for the first time, Dublin 8 or Dublin 24, were extracted for the years 1997 to 2000. The characteristics of cases living in Dublin 8 were compared with those of cases living in Dublin 24 in an attempt to explain the differences in the proportions testing positive for HIV and hepatitis C in the two geographical areas.

The two data sources were used to develop the hypothesis because some variables were common to both samples (demographic and treatment characteristics) and some were different (drug using characteristics in the NDTRS and bloodborne viral status in the Bloodborne Viral Status Dataset). The data returned to the NDTRS are anonymous, therefore this database could not be merged with the Bloodborne Viral Status Dataset in order to link the more extensive epidemiological information with the bloodborne viral status information.

Statistical analyses were carried out using STATA version 7.0 and SPSS version 11. A multiple logistic regression model was developed to control for confounding and identify effect modification. This model allowed comparison of the characteristics associated with heroin users living in each area. Exact 95 per cent confidence intervals were calculated for proportions testing positive for each infection and for regression adjusted odds ratios.

Results

The results will be presented in two parts.

Part 1

We reviewed the records of 101 clients of treatment centres in Dublin 8, and those of 64 clients of centres in Dublin 24. The clients attending treatment centres in Dublin 8 were older than those treated in Dublin 24 (Table 1). A higher proportion of male clients attended treatment in Dublin 24 than in Dublin 8, at 64.1 per cent versus 52.5 per cent, though this was not statistically significant. There was no association between the number of months spent in treatment and area of residence.

In both areas, uptake of testing for HIV, hepatitis B and hepatitis C was high (Table 1). Higher proportions tested positive for HIV and hepatitis C in Dublin 8 than in Dublin 24. While the differences noted in demographic and treatment characteristics by area of residence may explain the higher rates of hepatitis C among the cohort treated in Dublin 8, they do not fully explain the high number of HIV-positive cases observed in Dublin 8 compared with Dublin 24.

Part 2

In an attempt to explain the excess risk of HIV among those treated in Dublin 8 compared to those treated in Dublin 24, data on heroin users attending treatment services in their respective areas of residence for the first time were analysed. Between 1997 and 2000, problem heroin use was reported by 803 first-time attenders at treatment services in Dublin 8 and Dublin 24. Of these, 501 lived and were treated in Dublin 8, while 302 lived and were treated in Dublin 24. Of the 803 individuals treated, injector status was known for 795 individuals; 624 (78.5%) of the 795 reported ever injecting. A higher proportion of injectors lived in Dublin 8 than in Dublin 24: 84.8 per cent (423/499) versus 67.9 per cent (201/296) respectively, p value <0.0001 .

After controlling for confounding factors, we examined the characteristics associated with heroin users in both areas (Table 2). Heroin users who lived in Dublin 8 were five times more likely to report cocaine as a second problem drug than those who lived in Dublin 24. They were three times more likely to report daily drug use, almost twice as likely to have been treated previously elsewhere, 60 per cent less likely to be employed, and more likely to be older and female than heroin users living in Dublin 24. Injecting drug use was not a significant independent factor once cocaine and frequency of heroin use were entered in the model. The use of cannabis as a second drug in each of the areas was associated with the period of data collection. The reason for this is not clear; it may reflect a reporting bias or an actual change in drug-using patterns; the former is the more likely explanation.

Table 1 Socio-demographic characteristics and bloodborne viral status of clients attending drug treatment centres in Dublin 24 and Dublin 8 in 2001

	Dublin 24	Dublin 8	
	Number (% and 95% confidence intervals for positive test results)		p value
Age in years	64	101	
29 or younger	53 (82.8)	61 (60.4)	
30 to 39	9 (14.1)	33 (32.7)	
40 or older	2 (3.1)	7 (6.9)	<0.01
Gender	64	101	
Male	41 (64.1)	53 (52.5)	0.1
Months in treatment	64	101	
0 to 12 months	19 (29.7)	21 (20.8)	
13 to 24 months	10 (15.6)	33 (32.7)	
25 to 36 months	15 (23.4)	20 (19.8)	
37 months or more	20 (31.3)	27 (26.7)	0.1
Tested for HIV virus	64	101	
Yes	55 (85.9)	94 (93.1)	
No	6 (9.4)	7 (6.9)	
Unknown	3 (4.7)	0 (0.0)	0.1
Of those tested:			
Positive	1 (1.8, 95% CI 0.05-9.7)	18 (19.1, 95% CI 11.8-28.6)	<0.01
Negative	54 (98.2)	76 (80.9)	
Tested for hepatitis B surface antigen	64	100	
Yes	53 (82.8)	80 (80.0)	
No	7 (10.9)	15 (15.0)	
Unknown	4 (6.3)	5 (5.0)	0.7
Of those tested:			
Positive	0 (0.0, 95% CI 0.0-6.7)	1 (1.3, 95% CI 0.03-6.8)	1.0
Negative	53 (100.0)	79 (98.7)	
Tested for hepatitis C virus	64	101	
Yes	58 (90.6)	92 (91.1)	
No	3 (4.7)	7 (6.9)	
Unknown	3 (4.7)	2 (2.0)	0.5
Of those tested:			
Positive	31 (53.4, 95% CI 39.9-66.7)	67 (72.8, 95% CI 62.6-81.6)	0.02
Negative	27 (46.6)	25 (27.2)	

Table 2 Logistic regression model identifying the characteristics* of heroin users living in Dublin 8 compared to their counterparts living in Dublin 24

	Total (803) n	Dublin 24 (302) n (%)	Dublin 8 (501) n (%)	Odds ratio (95%CI)	p value†
Calendar year first sought treatment (n=803‡)					
1997-1999	542	240 (44.3)	302 (55.7)	1	
2000	261	62 (23.8)	199(76.2)	Interaction	
Ever previously treated for drug misuse (n=762)					
Never treated	263	135(51.3)	128(48.7)	1	
Previously treated	499	157(31.5)	342 (68.5)	1.8(1.2-2.7)	<0.01
Age (in years) at this treatment contact (n=800)					
19 or younger	148	85 (57.4)	63 (42.6)	1	
20 to 29	483	181 (37.5)	302 (62.5)	2.4(1.5-4.0)	< 0.0001
30 to 39	146	31 (21.2)	115 (78.8)	6.2(3.1-12.2)	< 0.0001
40 or older	23	5(27.1)	18(78.3)	6.9(1.7-27.9)	<0.01
Gender (n=791)					
Male	535	212(39.6)	323 (60.4)	1	
Female	256	88 (34.4)	168 (65.6)	1.9(1.3-2.9)	0.001
Regular employment (n=773)					
No	581	181 (31.2)	400 (68.8)	1	
Yes	192	116 (60.4)	76 (39.6)	0.4 (0.2-0.6)	< 0.0001
Cannabis cited as a problem drug (n=803)					
No	598	196(32.8)	402 (67.2)	1	
Yes	205	106(51.7)	99 (48.3)	Interaction	
Cocaine cited as a problem drug (n=803)					
No	683	290 (42.5)	393 (57.5)	1	
Yes	120	12(10.0)	108(90.0)	5.7(2.8-11.6)	< 0.0001
Used primary drug daily in the last month (n=773)					
No	325	177 (54.5)	148 (45.5)	1	
Yes	448	109 (24.3)	339 (75.7)	5.6 (3.7-8.4)	< 0.0001
Cannabis cited as a problem drug, by year treated (interaction)					<0.01

* The initial model also included the variables age, education status, benzodiazepines cited as a problem drug, injector status and age started injecting.

† For the whole model D2 258.8 df 12 p < 0.00011 Numbers do not always add up to total as not all questions were answered.

A much higher proportion of injectors living in Dublin 8 than in Dublin 24 used heroin and cocaine concurrently, 18.0 per cent (76/423) versus 1.0 per cent (2/201) respectively, p value < 0.0001.

Level of education achieved was not associated with area of residence.

Discussion

The findings indicate that a higher proportion of heroin users in Dublin 8 had HIV and hepatitis C than their counterparts in Dublin 24. They were five times more likely to report cocaine as a problem drug, three times more likely to report daily drug use, and more likely to be older than those who lived in Dublin 24. Of note, Dublin 8 is close to the city centre and may have a higher proportion of homeless people living in unstable accommodation in the area. It is generally accepted that homeless persons have more chaotic drug using problems and we were not able to control for this factor in the study.

Although the study findings are limited because there were two unlinked samples, the demographic profile of the two samples by respective areas of residence was similar. The small sample size in Part 1 led to wide confidence intervals around the proportions with each of the infections; nevertheless, there was a clear difference between the two areas in the proportion testing positive for HIV. Because of resource limitations in Part 1, the researchers did not ascertain the injector status of the respondents. In Part 2, there was an interaction between cannabis and year treated but this did not affect the more pertinent relationships reported.

There is historical evidence that the prevalence of HIV is not uniformly distributed in geographical areas of Dublin. In 1994, O'Kelly and Bury⁹ reviewed clinical records to estimate the proportion of heroin users in an electoral division in Dublin 8 who had acquired the HIV virus over a nine-year period. Of the 82 injecting drug users participating in the study, 53 (65%) tested positive for HiV between 1985 and 1994.

The authors noted that, while the overall prevalence of HIV infection among all injecting drug users in Dublin was around 15 per cent, their study population had an extremely high prevalence at 65 per cent. This indicates that this area may have had a larger pool of infected HIV cases in Dublin 8 than other areas of Dublin. We suggest that a case-control study be conducted to establish the exact relationship between HIV and area of residence.

At the time of the Part 1 data collection, there were established needle-exchange programmes in Dublin 8, whereas there were no such programmes in Dublin 24. Since 2001 two small community-based needle-exchange facilities have been established in Dublin 24. Despite the presence of needle exchanges in Dublin city, there is a long history of heroin users borrowing and lending injecting equipment. In 1997, 186 injecting drug users who attended a drug treatment centre in Dublin reported several high-risk behaviours: 56 per cent shared needles, of whom 94 per cent reported cleaning their equipment, but less than half of them had done so effectively.¹⁰ In more recent studies, older injectors were more likely to test positive for HIV than their younger counterparts.¹¹⁻¹³ Length of injecting and needle-sharing status were also associated with testing positive for HIV among injectors entering Irish prisons.¹³

Between December 2000 and October 2001, Corr¹⁴ evaluated the outreach service operated by the Health Promotion Unit of Merchants Quay Ireland (a large non-government organisation), located in Dublin 8. The outreach workers reported that, among the 99 clients who were met more than once, almost one-fifth had changed to safer drug-using practices and half had adopted less safe practices. It may be useful to explore why half of those participating in the Merchants Quay Ireland study developed additional unsafe injecting practices despite receiving safe injecting information, as this may further explain our observations on the transmission of HIV in this area.

In 2003, Merchants Quay Ireland¹⁵ explored cocaine use among those attending their Health Promotion Unit and found that cocaine use was common among attendees. The respondents reported high-risk practices associated with binge use of this drug.

In the international setting, Millison and colleagues¹ reported that the prevalence of HIV among injecting drug users recruited through needle-exchange programmes during 1997 and 1998 in nine Ontario cities ranged from 1.4 per cent to 14.7 per cent. Testing positive for HIV antibodies was associated with injecting drugs for more than five years, use of (powder) cocaine, use of crack, binge injecting (10 or more times per day at least once in the previous six months), and being a longer-term user of needle-exchange facilities. Other researchers have reported an association between binge cocaine use and testing positive for HIV.^{16,17} The findings of the present study also suggest differences in the prevalence of HIV by geographical area and its association with demographic characteristics and drug-using practices, particularly cocaine use.

These findings led to a hypothesis: 'The risk of acquiring HIV and hepatitis C is associated with area of residence and may be linked to cocaine use'. This should be the subject of both qualitative and quantitative studies in order to identify the factors that lead to the excess risk among those living in Dublin 8 compared to Dublin 24 so that strategies may be developed to address them. The results of this study highlight the emerging cocaine problem and the high-risk practices associated with it. Our findings suggest that current harm reduction methods are not robust enough to prevent transmission of HIV among heroin users who also use cocaine. There is a clear need to ascertain which aspects of harm reduction are not effective and to determine what changes in harm reduction services are required to prevent transmission.

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