

The Opening of South America's First Needle Exchange Program and an Epidemic of Crack Use in Salvador, Bahia-Brazil

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By 1998, 21% of cumulative AIDS cases in Brazil had occurred among injection drug users (IDUs). After a protracted political battle, the first needle exchange program (NEP) in South America opened in Salvador, Bahia. This paper uses a variety of quantitative and qualitative data sources to describe the opening of the NEP and the impact upon it of a crack cocaine epidemic that swept the region shortly after the NEP opened. Quantitative data sources include 3 cross-sectional studies conducted in various districts of Salvador before and after the NEP opened, and process measures from the NEP. Qualitative data sources include participant observation in Pelourinho, a heavy drug-use area of Salvador, the field notes of outreach workers, and newspaper articles from the most widely read local newspaper. The initial cross-sectional study demonstrated a 58% HIV seroprevalence and a similar percentage of IDUs reported needle-sharing. These data were used to support the need for a local NEP, which ultimately opened in March 1995. Use of the NEP in Pelourinho dropped precipitously with the arrival of a crack cocaine epidemic, documented clearly in the newspaper and outreach workers' field notes. The data permit an analysis of when the epidemic arrived and the geographical spread of the drug through Salvador. They also clearly document how drug users switched from cocaine injection to crack in large numbers and how the NEP was forced to adapt to these changes in drug-use patterns. Reductions in injection risk behavior are documented in Pelourinho, but are difficult to ascribe with certainty to the NEP because of the limited numbers of persons still injecting and the consequent selection bias. There are now 30 NEPs throughout Brazil.

KEY WORDS: injection drug use; Brazil; crack; needle exchange; prevention.

INTRODUCTION

Between 1986 and 1998, AIDS cases among injection drug users (IDUs) in Brazil increased from 3%

of 1,762 cumulative cases to 21% of 140,362 cases. In São Paulo, a state with 55% of the national AIDS cases, roughly 43% of adult women with AIDS between 1983 and 1994 were IDUs or sexual partners of IDUs (Centro de Referência DST/Aids, 1998). In the northeastern state of Bahia, 3,235 AIDS cases had been reported to the National Program on STD/AIDS through 1998, 21% of them among IDUs (Coordenação Nacional de Doenças Sexualmente transmissíveis e AIDS, 1998). In 1993 and 1994, 58% of cocaine injectors in the state capital of Salvador tested positive for HIV (Andrade, 1996). Drug injection has also resulted in hepatitis C prevalences of 67%–77% among IDUs in Rio de Janeiro, Santos-São Paulo, and Salvador (Carvalho *et al.*, 1996,

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1999; Oliveira *et al.*, 1993; Lima *et al.*, 1994). The HTLV-1 prevalence among IDUs in Salvador is 35% (Andrade *et al.*, 1998).

Brazil has become an important route for cocaine trafficking to Europe and the United States. Between 1980 and 1990, the amount of cocaine apprehended by the Brazilian Federal police increased from 92 to 2,634 kg (Galduroz *et al.*, 1994), and in the last 7 years crack use has become epidemic, particularly in large cities like São Paulo and Salvador, mainly among poor people living on the street (Dunn *et al.*, 1996; Nappo *et al.*, 1994; Nunez, 1998). Crack was very rapidly introduced in Salvador beginning in 1996 and has particularly affected IDUs living in poverty. Cocaine is the most commonly injected drug in Brazil (Carvalho *et al.*, 1996; Dourado *et al.*, 1998; Lima *et al.*, 1994). There is evidence of a rapid switch from intravenous cocaine use to crack use shortly following the introduction of crack, as inferred from data that will be presented in this paper.

Studies in many countries have documented the efficacy of needle exchange programs (NEPs) as a method to control the transmission of HIV among IDUs, their sex partners, and their children (Des Jarlais *et al.*, 1995; Kaplan and Heimer, 1995; Lurie and Reingold, 1993). Research studies have suggested that NEPs can save thousands of lives and millions of dollars annually (Lurie and Drucker, 1997). Recent studies have shown the usefulness of NEPs in referring IDUs to drug treatment (Brooner *et al.*, 1998), and that NEPs do not increase the discarding of used syringes (Doherty *et al.*, 1997).

The Brazilian Federal law on drug abuse forbade NEPs, but a local agreement made it possible to open an NEP in Salvador in 1995. Based in part on the Salvador experience, there are now 30 NEPs working around the country, all supported by the National Program on STD/AIDS of the Brazilian Ministry of Health.

This paper discusses the opening of the Salvador NEP, the first in South America, and the impact upon it of the crack epidemic that swept the region. We use a variety of quantitative and qualitative data sources to describe these two complex and interacting developments.

METHODS

Setting

Salvador is a city of approximately 3 million inhabitants. The colonial district, Pelourinho, is in the

center of Salvador and is now being renovated after years of architectural and social deterioration. Although Pelourinho is an important cultural center, especially for Afro-Brazilian culture, areas of poverty, prostitution, and drug use and trafficking surround it. It was the location of the first NEP. In the other three Salvador districts where NEPs opened (Calabar, Engenho Velho, and Ribeira) people also live in poverty, but generally better social and family structures help to offset the ravages of drug use. In all three, the population is young with a great number of women of childbearing age. Calabar and Engenho Velho are situated in Salvador's inner-city, whereas Ribeira is an approximately half-hour drive from Pelourinho. In Calabar, there is a long history of community health activities, but this is not the case in either Engenho Velho or Ribeira.

The Center for Studies and Therapy of Drug Abuse (CETAD) of the Federal University of Bahia is a free public health service, which provides therapeutic and prevention support for drug users, their families, and the general population in Salvador. The drug users attending CETAD are mainly young and poor or middle class.

Quantitative Data

Three cross-sectional studies of IDUs who had injected drugs in the 6 months prior to the interview were conducted by CETAD. The first was prepared for one of the authors' (TA) doctoral thesis and involved behavioral and psychosocial surveys and HIV-1 serotesting of 100 IDUs in Pelourinho between April 1992 and August 1994 (Andrade, 1996). The second was a behavioral survey with HIV-1 serotesting of 221 IDUs in Pelourinho between July 1994 and September 1996. The third study was a behavioral survey of IDUs from Pelourinho ($n = 21$) and Engenho Velho ($n = 62$) after the NEPs in those neighborhoods opened. There was no serotesting in the third study, which was conducted between March and September 1997. This paper presents detailed results from the second and the third surveys. The first survey is presented in less detail because the second presents more recent information on a similar population, with a larger sample size, and the NEP essentially only opened after the second survey.

The questionnaires in all three studies, while not identical, were based on the WHO "Multi-city study on drug injecting and risk of HIV infection" questionnaire (World Health Organization, 1994). Specific questions addressing NEP use were added

for the third survey. In the second and third surveys, each interviewee received US\$3 as compensation. Subjects in all studies signed consent forms and specially trained interviewers in private settings administered the questionnaires. The studies were approved by the ethics committees of the School of Medicine of Bahia Federal University, the Regional Council of Medicine of Bahia, and the University of California.

In all studies, subjects were recruited using snowball sampling techniques (Watters and Biernacki, 1989). This technique provides a study sample based on referrals made by subjects who have already been recruited (Biernacki and Walford, 1981; Lopes *et al.*, 1996). Drug dealers and users were contacted by trained research assistants and were invited both to be subjects and to act as mediators between the investigators and additional potential subjects. Following World Health Organization guidelines, sera were screened for HIV-1 antibodies by the Abbott 3rd Generation Plus EIA (Delkenheim, Germany) and confirmed by Western Blot (Cambridge Biotech Corporation, Worcester, MA, USA). Syphilis testing utilized the VDRL with confirmation by indirect immunofluorescence (both Behring, Marburg, Germany).

Additional quantitative data (e.g., type of drug used) came from ongoing surveys of drug users entering the CETAD drug treatment center between 1996 and 1998 and from process measures (syringes exchanged, condoms distributed) from the annual activity reports of the NEPs in Pelourinho, Calabar, and Engenho Velho.

Quantitative Data Analysis

Continuous variables were described using means and standard deviations. The relationships between continuous variables and HIV in the second survey, and between those variables and NEP use (ever/never) in the Engenho Velho part of the third survey were analyzed using the Mann-Whitney Test. The Pelourinho part of the third survey was excluded from the NEP analysis because of small sample size. Categorical and dichotomous variables were described with percentages. The association between dichotomous variables and HIV (in the first and second surveys) and between those variables and NEP use (in the Engenho Velho part of the third survey) were measured using the odds ratio (OR) with 95% confidence intervals (CI). All *p*-values are reported at the .05 level (two-sided).

Qualitative Data

There were three sources of qualitative data: (1) the qualitative portion of the principal investigator's doctoral thesis, collected through participant observation and in-depth interviews among IDUs in Pelourinho between April 1992 and August 1994; (2) field notes taken by outreach workers as part of their work at the Pelourinho, Engenho Velho, and Calabar NEP sites; and (3) newspaper articles about crack/cocaine published between January 1, 1996, and December 31, 1997, in *A Tarde*, the most widely read newspaper in Salvador.

The participant observation was performed by one of the authors (TA) for 4 hr twice a week. Informants were identified through contacts with local health professionals, sex workers, drug users, and drug dealers. These individuals introduced the researcher to local IDUs and the locations of drug use and sales. All observations were recorded as field notes at the end of each day. Every fifth IDU interviewed was invited to participate in an in-depth interview. These IDUs were asked to talk about their life histories, particularly their childhoods and their relationships with their parents. The interviews took 30–45 min and were recorded on cassette tape for later analysis.

Each outreach worker recorded daily prevention activities among IDUs and other field observations in his or her notebook. These field notes were presented and discussed weekly with the district NEP supervisor. The notes of three outreach workers from Pelourinho, Engenho Velho, and Calabar were available for analysis.

Qualitative Data Analysis

These data are presented descriptively, including quotations from the outreach workers' field notes and newspapers articles. Counts of the numbers of mentions of crack and NEPs in the field notes and newspapers are also reported.

RESULTS

Intravenous Drug Use in Salvador

In the first survey, data were available from 100 IDUs. In addition, 16 in-depth interviews and 30 months of participant observation were performed (Andrade, 1996).

The mean age of IDUs was 24.9 ± 8.2 years and 30% were women. Although all subjects were

contacted in Pelourinho, 41% of the IDUs came from other Salvador districts. Forty-seven percent of the IDUs were illiterate, and 56% reported illegal activities as their main source of income. Fifty-nine percent of the IDUs reported never having used a condom. Homosexual or bisexual activities were reported as their principal sexual activities in the previous 6 months by 11% of the IDUs.

Injecting drug use in the previous 6 months by any sexual partner was reported by 35% of the IDUs. Fifty-eight percent of IDUs reported ever sharing syringes, and 49% reported that they had ever shared paraphernalia other than syringes (e.g., cotton swabs, cookers).

More than half of the IDUs (58%) tested positive for HIV-1. The proportions testing positive among men and women were similar. The highest infection rate was among IDUs under 19 years (68%). HIV infection among IDUs living in Pelourinho was significantly higher than among those who came from other districts (56% vs. 26%; OR 2.1; 95% CI 1.2–3.8). HIV infection was also significantly associated with having ever shared syringes (67% for sharing vs. 45% for not sharing; OR 1.5; 95% CI 1.0–2.2).

IDUs in Pelourinho were not very concerned about HIV transmission through the sharing of syringes. A woman living in Pelourinho told the local health service director:

Sometimes there are fifteen guys shooting with the same syringe. Some of them I know are HIV-positive and I have told them about the risk of HIV infection. They don't pay attention to what I say. I have talked with the professionals in the public health service about providing syringes to them. If I had syringes I would give them to them. (Andrade, 1996)

Participant observation among IDUs in Pelourinho showed that the sharing of syringes was commonly associated with having difficulty obtaining new syringes, helping someone who had difficulty finding suitable veins for injection or having problems with malfunctioning injection equipment. One IDU reported that

My arm had a lot of scarring and so I wore long sleeves. Sometimes I couldn't tell if the needle was in my vein, so I tried again and blood came out of my arm. If the needle becomes blocked, you try again, and if you aren't successful you borrow a syringe from another person even if it is dirty with blood. (Andrade, 1996)

IDUs in Pelourinho lived in poor economic and social conditions. Most of them had few skills, were unemployed, and were earning money from infor-

mal or illegal activities. Many IDUs had injuries from fights among themselves and because of police violence. In this context, injecting drugs was sometimes a way for IDUs to live with their own suffering:

I was depressed, I just had left jail and needed that shot. (Andrade, 1996)

My son was killed by a gun shot to his head, and so I shot as much drug as I could get. (Andrade, 1996)

I shoot up when I am worried about something and I don't know what to do. When my son is sick and I don't have money to go to the market, then I shoot up if someone offers. (Andrade, 1996)

There was some overlap between the first and second Pelourinho surveys: 18% (40/221) of the IDUs had been previously interviewed. Although the NEP was open for about half of the period during which the second survey was conducted, actual exchange activity was limited for much of this period (see next section). The second survey is, therefore, essentially a survey of injection drug use in the absence of NEPs.

The mean age of the sample was 25.2 ± 7.8 years, with women representing a small portion of the IDUs (18%; see Table I). Most of the IDUs could read (70%), but the educational levels were low (mean, 3.4 ± 2.8 years). Two-thirds had mostly lived in a fixed location in the last 6 months (67%). Forty-seven percent of the IDUs reported illegal activities as their principal source of income, with only 8% reporting a full-time job or a temporary job as their principal source of income. The great majority (92%) had never been in a drug treatment program.

Most IDUs began injecting drugs at an early age (mean, 16.6 ± 4.7 years) and had injected for a mean of 8.6 ± 7.2 years. The most commonly used drug was cocaine (97%), followed by marijuana (92%), benzodiazepines (64%), inhalants (52%), and crack (37%). The most commonly injected drug was cocaine (97%), followed by heroin (11%) and benzodiazepines (7%). Eighty-six percent of the IDUs had injected in the last 2 months, and 56% had done so in the last week. Among the IDUs who injected in the previous week, only 12% reported injecting at least daily.

The majority of IDUs reported that they had at some time used drugs in a group (78%). Over half of the IDUs reported passing on used syringes (53%) and sharing syringes (60%) in the last 6 months. Forty-five percent of the IDUs reported sharing syringes in the last month, with 45% of those who had ever shared reporting sharing more than twice. Twenty-six percent of the IDUs had shared syringes with more than two people in the last week. Among IDUs reporting

Table I. Selected Socioeconomic, Drug- and Sexual Behavior Data from Surveys Conducted in Salvador, 1994–97

Variables	Mean \pm SD or prevalence of variable; N = 221 (Pelo-2)	Mean \pm SD or prevalence of variable; N = 62 (EV-3)	Mean \pm SD or prevalence of variable; N = 21 (Pelo-3)
Age	25.2 \pm 7.8	24.6 \pm 5.4	27.7 \pm 9.8
Female	18.1	8.1	23.8
Can read	67.9	91.9	47.4
Education (years)	3.4 \pm 2.8	6.3 \pm 2.4	2.5 \pm 1.4
Have an illegal source of income	47.1	3.2	47.6
Never had drug treatment	92.3	93.5	80.0
Drugs used in the last 6 months			
Heroin injection	10.4		9.1
Cocaine use	98.6	98.4	85.7
Cocaine injection	96.8	92.9	87.5
Crack use	36.7	71.7	81.0
Benzodiazepine use	64.3	32.8	47.4
Injected last week	55.7	43.5	28.6
Sources of new syringes in the last 6 months			
NEP	3.2	41.9	61.9
Pharmacy	95.9	75.8	57.1
Passed on syringes	53.4	32.3	40.0
Shared syringes in the last 6 months	60.0	37.1	57.1
Always cleaned used syringes in the last 6 months ^a	39.4	76.2	70.6
Cleaned with bleach ^b	2.8	0.0	0.0
Ever used condom with principal sex partner ^c	18.0	44.4	4.8
Ever used condom with a casual sex partner ^d	40.5	88.0	35.0
Ever used NEP in Salvador	N/A	39.3	71.4
Times used NEP in previous month	N/A	4.3 \pm 4.6	3.8 \pm 8.8

^a Among those who ever shared syringes.

^b Among those who ever shared and cleaned syringes.

^c Among those with a principal sex partner.

^d Among those with a casual sex partner.

sharing in the last 6 months, 39% said that they always cleaned their used syringes, but most of those who cleaned said that they used cold water (86%). Eight percent said that they used alcohol, and only 3% said that they used bleach to clean their used syringes. Although 96% of IDUs reported obtaining new syringes at pharmacies in the previous 6 months, 75% reported reusing the same syringe. The two most frequent reasons for sharing syringes were “did not have my own syringes” (56%) and “like sharing syringes” (36%).

More than half of the IDUs (57%) said they had a principal sexual partner at the time of the interview. Forty-nine percent reported vaginal sex, and 16% reported anal sex with a principal opposite sex partner in the previous month. Only 18% of the IDUs with principal partners reported ever using condoms with that partner.

Forty-one percent of the IDUs reported having a casual partner at the time of the interview. Thirty percent reported vaginal sex, and 17% reported anal sex with their casual opposite sex partners in the previous month. The rate of ever using condoms with

casual partners (41%) was higher than with the principal partner (18%).

Thirty-five percent of the sample had ever had sex for money, gifts, or drugs, with similar proportions among women and men (39% and 34%, respectively). Only 29% of the IDUs reported contact with any HIV prevention activity in the preceding year.

Fifty percent (108/217) of IDUs tested positive for HIV antibodies, and 29% (60/206) had reactive tests for syphilis.

All bivariate analyses between predictor variables and HIV infection that were statistically significant are displayed in Table II. IDUs over 23 years of age (the approximate median age) were at a higher risk for HIV infection (OR 1.8; 95% CI 1.0–3.2). Although women were a minority of the IDUs, their odds of having HIV-1 infection was higher than for men (OR 3.6; 95% CI 1.7–7.9). Living in the same home with two or more people and living with someone who used or injected drugs were also positively associated with HIV infection. Reporting difficulty obtaining new syringes as a cause for syringe sharing was

Table II. IDU Characteristics Associated with HIV Infection in Salvador, Bahia, Brazil, 1994–96

Variable	Prevalence of variable (%) ^a	HIV prevalence (%) ^b	Bivariate OR (95% CI) or <i>p</i> value
Age >23 years	50.1	56.0	1.76 (1.03–3.23)
Females	18.1	74.4	3.63 (1.67–7.91)
At least 4 times in jail after first use of injection drug	49.8	57.1	1.87 (1.08–3.22)
Mostly lived in a fixed place in the last 6 months	66.5	56.3	2.19 (1.23–3.90)
Live in a home with ≥2 people	29.5	65.6	2.52 (1.37–4.62)
Someone in home uses drugs	40.3	58.4	1.81 (1.05–3.12)
Someone in home injects drugs	30.3	62.7	2.14 (1.18–3.87)
Reuse the same syringe	75.1	55.8	2.75 (1.43–5.28)
Get new syringes from pharmacy in last 6 months	95.9	51.4	8.48 (1.04–68.97)
Get new syringes from friends in last 6 months	20.8	34.1	0.44 (0.22–0.88)
Share syringes because difficult to get if ever shared syringes	13.0	75.0	3.49 (1.06–11.5)
Frequency of vaginal sex with principal opposite sex partner in last month if had principal sex partner			0.020
None	10.7	76.9	
1–2 times	11.6	64.3	
3–6 times	26.4	54.8	
≥7 times	51.2	36.1	
Have a casual partner	40.6	37.5	0.42 (0.24–0.73)
Vaginal sex with casual opposite sex partner in last month	29.5	31.3	0.33 (0.18–0.61)
Had contact with any HIV prevention activity in past year	28.8	63.9	2.18 (1.18–4.03)
Believe sharing syringes transmit HIV	60.7	57.0	2.07 (1.18–3.65)
Believe oral sex transmit AIDS	26.6	63.2	2.09 (1.12–3.90)
Positive syphilis test	29.0	74.1	5.27 (2.67–10.42)

^a(*N* = 221).^b(*N* = 217).

strongly associated with HIV infection (OR 3.5; 95% CI 1.1–11.5).

IDUs who reported not having had vaginal sex with their principal opposite sex partner in the previous month had a high prevalence of HIV infection (77%), and this rate decreased as the frequency of vaginal sex with these partners increased ($p = .020$). IDUs who reported having a casual partner and having had vaginal sex with that partner in the previous month were at a decreased risk for HIV infection (OR 0.4; 95% CI 0.2–0.7 and OR 0.3; 95% CI 0.2–0.6, respectively). Having a positive test for syphilis was strongly associated with HIV infection (OR 5.2; 95% CI 2.7–10.4).

In sum, IDUs in Pelourinho, although not injecting very frequently compared to IDUs in other countries, had high rates of both risk behaviors for HIV and HIV infection itself. Lack of access to sterile syringes appeared to be an important factor in the high HIV prevalence.

The Opening of the Salvador Needle Exchange Program

The first attempt to open an NEP in South America was made by the Municipal Government of

Santos in São Paulo State in 1989. However, it was prevented from opening by the Brazilian Legislation on Psychoactive Drugs, which provides for 3–15 years in jail for anyone facilitating the use of addictive substances. Santos municipal government employees involved in attempting to open an NEP, including the municipal Secretary of Health, were cited (Bueno, 1998), although the charges were eventually dropped for lack of proof. Ultimately, an agreement was signed between the mayor of Santos and the municipal Justice Department that, although it prevented an NEP in Santos in the short run, facilitated the establishment of NEPs elsewhere by not establishing a legal precedent precluding NEPs.

In 1992, the National Program on STD/AIDS of the Ministry of Health (“the National Program”), in partnership with the World Bank, prepared a \$7 million project on HIV prevention among drug users, including NEPs. The United Nations Drug Control Program (UNDCP) provided an additional \$2 million. Experts from countries with NEPs conducted IDU HIV-prevention training programs in Brazil in 1993. However, in January 1994, the coordinator of the Prevention Technical Unit of the National Program, who was also the principal NEP advocate in the government, was dismissed.

In 1994, the National Program sent researchers to observe U.S. NEPs; one of the authors (TA) prepared a study to evaluate the Salvador NEP when it opened. A national multicity study on risk behavior and HIV prevalence among IDUs also began that year. In September 1994, the Federal Council on Psychoactive Drugs, a branch of the Ministry of Justice, released a proposal approving NEPs when associated with research projects. Also in 1994, a book on drugs, AIDS, and harm reduction strategies written by authors from Brazil and other countries was published (Mesquita and Bastos, 1994).

In March 1995, CETAD opened an NEP approved by the Bahia State government, partly as a result of the preliminary findings in the two previously described cross-sectional surveys. Support from the Bahia State Secretary of Justice and Human Rights in the form of financial and technical support to CETAD, and the participation of a CETAD representative on the State Council on Psychoactive Drugs, facilitated the opening of the NEP. A meeting with police resulted in a seminar for the drug enforcement unit in which the activities of CETAD and the principles of harm reduction were stressed.

Prominent local newspapers wrote articles on the opening of the NEP, including interviews with health professionals, religious representatives, and IDUs. Six months later the National Program coordinator visited the NEP. Based in part on this visit, she changed her stance on NEPs and began to help other states to implement them, with the aid of the CETAD NEP coordinator.

For 6 months after the NEP opened, CETAD workers answered questions from the media about the NEP, aided by a media consultant. In these interviews, CETAD workers focused on the high HIV seroprevalence among IDUs in Salvador, drug abuse as a health problem, and NEPs as a way to save lives. They also responded to suggestions that NEPs could increase drug abuse by referring to data from other countries refuting these concerns (Guydish *et al.*, 1993; Watters *et al.*, 1994). Some headlines in Salvador newspapers reflect the heated debate over the NEP opening:

Salvador will give syringes to drug addicts." (Staff writer, 1995a).

Program wants to prevent infectious diseases. (Staff writer, 1995b).

CETAD doesn't want controversy with Catholic Church. (Staff writer, 1995c).

The first NEP in Salvador was located in the São Francisco Health Service in Pelourinho, but between March 1995 and February 1996 only 90 syringes were

exchanged. During this period, due to ongoing controversy, CETAD encouraged IDUs to obtain new syringes at CETAD offices, which are 2 km away, but few IDUs did so—only 31 syringes were exchanged at CETAD in that period. NEP workers noticed that the prevention activities offered by the NEP tended to occur more readily in private locations such as IDU homes or the old, deteriorated buildings used by IDUs for living or using drugs. After an outreach worker began contacting IDUs and providing injection equipment from her home, the number of syringes exchanged, condoms distributed, and public health referrals increased.

In September 1996, as part of a partnership between CETAD and the municipal Secretary of Health, the São Francisco Health Service reopened in Pelourinho. With a staff of 11 people, including one doctor, two nurses, two social workers, and one psychologist, all of them trained in HIV prevention among IDUs by CETAD workers, the São Francisco Health Service was now specifically oriented toward IDUs. It provided health assistance and referrals, as well as HIV prevention strategies including syringe exchange and condom distribution. In July 1996, a second NEP site opened in Calabar, followed by Engenho Velho (January 1997) and Ribeira (December 1997).

For each of the four districts, the NEP now has two outreach workers and one supervisor. In addition to syringes, all NEPs in Salvador provide referrals for drug treatment, alcohol wipes, spoons for preparing the drug prior to injection, sterile water for injection, condoms, instructions on safe sex and safe injection techniques, and medical and social service referrals.

In Calabar, community meetings prior to the NEP opening allowed community representatives to express their concerns about AIDS; many attendees promised their support for the NEP. The local NEP is integrated into the community health service. The outreach workers and the Health Service workers reached a great number of young noninjecting drug users, but IDUs avoided the outreach workers and refused to go to the health service. Field notes taken by outreach workers in Calabar illustrate the difficulty of reaching IDUs:

One IDU left the area when he saw us coming close. On the next street one group did the same. (Field notes, Calabar, September 10, 1996)

One IDU told me that he didn't go to the health center because he works during the day, but others didn't go to avoid learning their HIV serostatus. (Field notes, Calabar, September 9, 1996)

Needle exchange activity in Engenho Velho and Ribeira is now seven times higher than in Calabar. In the first 6 months of 1998, 2,757 syringes were changed in Engenho Velho and 2,695 in Ribeira, compared to 350 in Calabar (Center for Study and Therapy of Drug Abuse [CETAD], 1998a).

In Engenho Velho, to avoid police attention to IDUs in outreach workers' homes, NEP sites were moved to the Community Center in December 1997. This increased the NEP's visibility in the community, but many IDUs avoided the new site, and most syringe exchanges still occurred in outreach workers' homes. However, this created strains in the private lives of the outreach workers.

In Ribeira, police enforcement against drug trafficking has been intense. In June 1998, the police entered an outreach worker's home looking for a thief and forced the outreach workers to lie down at gunpoint. This resulted in a meeting between the NEP coordinator and police representatives in which safety for IDUs and NEP workers at NEP sites was discussed.

In September 1997, even though the Federal Law had not changed, the Government of São Paulo State passed a law permitting NEPs. After a frustrated attempt to open an NEP in December 1995, when the police confiscated syringes and other equipment from the Santos Municipal Government, São Paulo State today has 5 NEPs. There are 30 NEPs across the country, including in the states of Rio Grande do Sul, Rio de Janeiro, Santa Catarina, Parana, and Mato Grosso.

In the third cross-sectional survey, 62 IDUs were interviewed in Engenho Velho between March and September 1997, after the NEP there had opened. Some results from a concomitant survey of 21 IDUs in Pelourinho are also presented briefly (see Table I).

The mean age of the IDUs in Engenho Velho was 24.6 ± 5.4 years, with women representing a small minority (8%). Ninety percent of the IDUs could read and the mean number of years of education was 6.3 ± 2.4 . All IDUs reported living in a fixed place in the previous 6 months. Thirty-two percent of the IDUs reported a full-time job or a temporary job, and only 3% reported illegal activities as their principal source of income. However, as in Pelourinho, only 7% of the IDUs had ever been in drug treatment.

The most commonly used drugs were cocaine (98%), followed by marijuana (92%). Crack use was reported twice as often by IDUs in Engenho Velho (72%) as by IDUs in the second survey in Pelourinho 2 years earlier (37%). Benzodiazepine use was reported by 33% of the IDUs, approximately half the rate reported by IDUs in Pelourinho 2 years earlier

(64%). As in Pelourinho 2 years earlier, cocaine was the drug most commonly injected (93%).

Thirty-two percent and 37% of the IDUs reported passing on used syringes and sharing syringes in the last 6 months. These rates had been 53% and 60% in Pelourinho 2 years earlier and were 40% and 57% in Pelourinho at the time of the Engenho Velho survey. Among IDUs reporting sharing syringes in the last 6 months, the percentage of people who said that they always cleaned their used syringe (84%) was more than double that reported by IDUs in the second survey in Pelourinho (39%). However, no IDUs reported using bleach. The proportion of IDUs in Engenho Velho who reported reusing the same syringe (45%) was smaller than in the second survey in Pelourinho (75%).

The rates of ever using condoms among IDUs in Engenho Velho, both with principal sex partners and casual sex partners, were more than two times higher than among those reported by IDUs in the second Pelourinho survey (44% vs. 18% for principal partner and 88% vs. 41% for casual partner).

Thirty-nine percent of the IDUs surveyed in Engenho Velho had ever used the NEPs in Salvador. The mean number of times the NEPs were used, for those who did so in the previous month, was 4.3 ± 4.6 . IDUs who passed on syringes and who had reused syringes in the previous 6 months were less likely to use the NEPs (OR 0.3; 95% CI 0.1–1.0 and OR 0.4; 95% CI 0.1–1.0). NEP users were also less likely to have shared syringes in the past 6 months (OR 0.1; 95% CI 0.03–0.5). IDUs who obtained new syringes from pharmacies were less likely to use the NEPs (OR 0.3; 95% CI 0.1–1.1). IDUs who had ever used condoms with their principal sexual partner were more likely to have used the NEPs (OR 4.8; 95% CI 1.3–17.0). There was a strong association between NEP use and having had contact with any HIV prevention activity in the year preceding the interview (OR 10.7; 95% CI 3.1–37.4).

In sum, compared to the IDUs in Pelourinho in the second survey, the Engenho Velho IDUs had better indices of socioeconomic status and reported less risky drug-use and sexual risk practices, but they were more likely to have used crack cocaine.

We experienced considerable difficulty identifying IDUs for the Pelourinho part of the third survey, leading to the small sample size. The mean age of the 21 IDUs recruited was 27.7 ± 9.8 years, with women representing the minority (24%). As in the second survey, illegal activities were the principal source of income for 48% of IDUs. The mean age at which the first injection was taken was 15.1 ± 3.6 years and the

mean number of years injecting was 12.8 ± 9.1 , almost twice as long as for IDUs in Engenho Velho (6.9 ± 5.4). The most commonly used drugs in the third Pelourinho survey were marijuana (91%) and cocaine (86%). Crack use was reported by a higher proportion of IDUs (81%) than in the Engenho Velho part of this survey (72%) and was more than twice the rate reported by the IDUs in the second Pelourinho survey only 2 years previously.

The proportion of IDUs in the third Pelourinho survey who reported sharing syringes in the previous month (14%) was almost the same as in Engenho Velho and three times less than that reported by IDUs in the second survey in Pelourinho. The proportion of IDUs who reported always cleaning used syringes in the previous 6 months (71%) was lower than that reported by IDUs in the Engenho Velho part of this study but almost two times higher than that reported by IDUs in Pelourinho 2 years earlier. Seventy-one percent of IDUs reported ever having used an NEP in Salvador (twice as high as in Engenho Velho) and among the NEP users the mean number of times the NEPs were used in the last month was 3.8 ± 8.8 . Sixty-two percent of IDUs reported NEPs and 57% reported pharmacies as sources of new syringes in the previous 6 months. No cross-tabulations between demographic and behavior variables and NEP use were conducted because of the small sample size.

To summarize, the limited data from the third Pelourinho survey indicate that crack use had become more common, but that drug-related HIV risk behaviors had declined since the previous Pelourinho survey. Although this is consistent with a beneficial NEP effect, such an interpretation must be considered quite tentative.

The 1996 Salvador Crack Epidemic

Beginning in approximately July 1996, a major crack epidemic hit Pelourinho, later spreading to other neighborhoods such as Engenho Velho, Pituba, Patamares, and Calabar. The popularity of the drug was attributable to its lower cost, stronger effects, and the ability to use it (smoking) in a manner less socially objectionable than injecting. Numerous indicators, both qualitative and quantitative, confirm the epidemic.

In 1993, none of the 285 clients attending CETAD for the first time reported using crack. In 1996, crack users were 4% (25/625) of new CETAD attendees, but in 1997 crack users comprised 14% (66/482) of the new client population. In 1998, crack users constituted 20% (16/58) of CETAD first-time

clients in January, 33% (27/81) in May, and 40% (23/57) in June (CETAD, 1998b).

Similarly, crack use did not feature prominently in the field notes of CETAD NEP outreach workers until June 1996. In the second half of 1996, however, mentions of crack use became very frequent in Pelourinho. Crack was mentioned in almost half (47%) of 162 field notes taken by one of the Pelourinho outreach workers between July and December 1996. In Calabar, only 2 of 43 (5%) field notes taken by one of the outreach workers between August and November 1996 were about crack use.

The field workers' notes graphically describe the arrival of crack and the switch from injecting to crack in Pelourinho:

The IDUs are crazy for "stones," as they call crack. It is like a fever, a disease, an epidemic. (Field notes, Pelourinho, September 15, 1996)

New people are becoming addicts in this community, including mothers and children sniffing glue and smoking crack. (Field notes, Pelourinho, October 1996)

The majority of IDUs are now using crack only. They told me the effect is stronger and they feel very crazy. (Field notes, Pelourinho, August 3, 1996)

One IDU told me that injecting drugs has stopped; now it's crack only. The crack trip is good and doesn't damage his veins, he says. (Field notes, Pelourinho, November 28, 1996)

The field workers' notes also document the exchange of crack for sex in Pelourinho:

A beautiful 17-year-old girl wanted a pellet of crack but she didn't have money. The drug dealer said that he would give her the pellet if she had sex with a homeless man passing in the street. The girl then lay down on the floor and had sex with the man without a condom. Then she got one pellet of crack and smoked it immediately. (Field notes, Pelourinho, November 19, 1996)

A friend of mine told me that a woman asked him to exchange one stone of crack for oral sex. (Field notes, Pelourinho, November 26, 1996)

Among 110 field notes taken by one of the outreach workers in Engenho Velho between July 1997 (when the first field notes there were taken) and January 1998, 32 (29%) mentioned crack use.

As crack use in Salvador increased, police enforcement grew and CETAD staff started mentioning the difficulties of conducting HIV prevention with crack users:

This wave of crack is becoming a challenge for us outreach workers. While using injecting drugs, people are more sensitive to [HIV] prevention, but if they

use crack they lose their self control. (Field notes, Pelourinho, July 1, 1996)

More evidence of the rapid spread of crack use in Pelourinho and other districts in Salvador comes from the print media. The first mention of crack in *A Tarde* was in July 1996 when a leading crack dealer from São Paulo accused of leading several crack distribution gangs was arrested in Salvador (Staff writer, 1996a).

The next crack story appeared on August 28, with 10 more by the end of 1996:

The killer stone (“a droga da morte”) that is trouble for the police in the southeast of the country, has now arrived in Salvador, say the police. . . . The drug dealer said that cocaine users now prefer crack because it is cheaper and stronger than cocaine. (Staff writer, 1996b)

In 1997, 24 stories mentioning crack trafficking or abuse appeared in *A Tarde*, most involving cases in Pelourinho:

The historical center (Pelourinho) is recognized as the crackland (“cracolândia”) of the state. (Matos, 1997)

The audacity of the drug dealers knows no limits. The police psychoactive drug division has confiscated 24 “kits of love” (“kits do amor”), that contained small quantities of marijuana, cocaine and crack, along with a small pipe. The kits were discovered at Corsario Beach [10 miles from Pelourinho] and had the purpose of introducing people to crack. (Staff writer, 1997)

The consumption of crack . . . tripled in Salvador in 1997 compared to the previous year. The principal area of consumption is the historical center [Pelourinho] (Souza, 1997).

Further confirmation of the switch to crack in Pelourinho is suggested by the declines in injected cocaine use and the increases in crack use between the second and third Pelourinho surveys (see above and Table I). The extreme difficulty we encountered recruiting IDUs to the third part of the Pelourinho survey, resulting in the small sample size, can be similarly interpreted. Additional quantitative information comes from the master’s thesis of one NEP worker. Eighty-four percent of the 38 crack users interviewed (25 in Pelourinho, 8 in Engenho Velho, and 5 at CETAD) in 1997 reported starting use crack less than 1 year previously (Nunez, 1998). Among 10 crack users who reported injecting drugs in the year prior to the interview, only 2 reported continuing injecting, 5 had stopped injecting drugs because they had started using crack while 3 had stopped because of difficulties with the injection process itself. Ninety-

seven percent of the crack users reported that getting crack in Salvador was “easy” or “very easy.”

The Effect of the Salvador Crack Epidemic on the Needle Exchange Programs

Initially, the NEPs in Pelourinho worked well, with increasing numbers of syringes exchanged and condoms distributed. However, the introduction and rapid spread of crack in Pelourinho and the popularity of the new drug with IDUs soon altered the course of the NEP in that district.

The Pelourinho outreach workers’ field notes clearly document the impact of the switch to crack upon the NEP:

Syringe exchange is going slowly this week, because the majority of IDUs have switched to crack use. (Field notes, Pelourinho, August 17, 1996)

Needle exchange is going slowly. The IDUs have switched to crack use, which is the drug of the moment. (Field notes, Pelourinho, September 8, 1997)

Syringe exchange keeps decreasing. Even the alcoholics have switched to crack use. (Field notes, Pelourinho, November 13, 1996)

Conversely, when the crack supply was temporarily reduced and the price became higher or the drug dealers mixed crack with other substances to maximize profit, there was a reversion to drug injection and a resultant increase of activity at the NEP:

More syringes are being exchanged now because there aren’t “stones” in the community. (Field notes, Pelourinho, October 12, 1996)

Today I provided syringes for two IDUs. There isn’t crack in the community, but it doesn’t matter for IDUs because they just return to injecting drugs. (Field notes, Pelourinho, October 13, 1996)

As IDUs changed from injecting drugs to crack, the number of syringes exchanged decreased rapidly (See Fig. 1). Although 1,462 syringes were exchanged between June and December 1996 in Pelourinho, this decreased to 64 between January and June 1997 and to only 5 syringes in the second half of 1997. The number of condoms distributed followed a similar course, dropping from 5,029 between July and December 1996 to 306 between January and June 1997. In the second half of 1997, the number of condoms distributed started to increase again as NEP workers worked to provide condoms to crack users (data not shown).

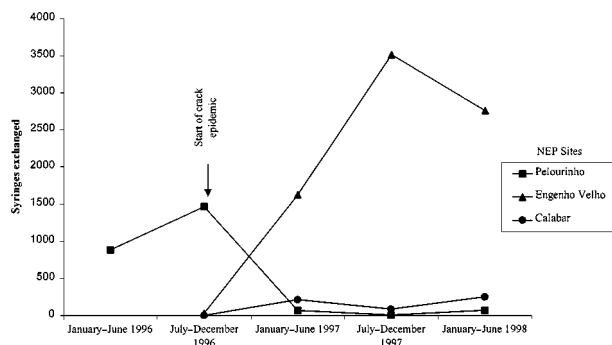


Fig. 1. Syringes exchanged in Salvador, Bahia—Brazil, 1996–1998.

Violence became more frequent as disagreements about crack trafficking often occurred:

Last Sunday he didn't pay the other crack user for the pellet of crack and when the other drug user came back, he injured him with a knife. (Field notes, Pelourinho, November 28, 1996)

The outreach workers no longer felt safe in the Pelourinho streets. As police enforcement grew and the violence associated with the crack trade became worse, the streets became less safe for everyone, including IDUs. This reduced contacts between IDUs and the outreach workers:

I have never seen anything similar in all the time I have lived here: there are a lot of IDUs, crack users and policemen. It's very easy to get drugs, and violence has gone up. (Field notes, Pelourinho, October 26, 1996)

Today syringe exchange worked well because the police didn't come here. (Field notes, Pelourinho, September 3, 1996)

Data from the other districts where NEPs operated also suggest that crack use was becoming more frequent, although apparently still not at Pelourinho levels. In the third survey, 72% of IDUs in Engenho Velho reported crack use, compared to 81% in Pelourinho.

Although crack use in Engenho Velho arrived later and had not yet had the same impact as in Pelourinho, the numbers of syringes exchanged between January and June 1998 also decreased from their previous levels (Fig. 1). Similar changes in condom distribution were also noted (data not shown).

DISCUSSION

The data, both quantitative and qualitative, presented in this study show how it was possible to open

an NEP under challenging political circumstances and how the crack epidemic had different impacts in different parts of Salvador. The IDU populations differed tremendously from one district to another. Worse social conditions, reflected in low levels of education, illegal activities as major sources of income, and low employment rates (especially in Pelourinho), were associated with higher rates of sharing syringes, lower rates of cleaning syringes, and less condom use with both principal and casual partners. The effect of the crack epidemic on the IDU population in Pelourinho and, consequently, on the local NEP was greater than in the other districts.

The HIV prevalence among IDUs in this study, particularly among women, is very high (58%–74%). This HIV prevalence is close to that found in the IDU population living in similar socioeconomic conditions in the city of Santos, São Paulo State (World Health Organization, 1994).

Even though the main injecting drug was cocaine, which has a very short half-life, the frequency of injecting was not high. However, the use of drugs in a group and sharing syringes and paraphernalia were very common. Cleaning used syringes indicates some health concern among IDUs in this study, but most of the IDUs used cold water. It is unclear if the water was used primarily for HIV prevention or simply to unclog syringes.

These epidemiological findings and the strong commitment of CETAD made the first NEP in Brazil possible. The high HIV seroprevalence and syringe-sharing rates among IDUs found in the first two surveys provided valuable support for establishing NEPs in Brazil. The NEP in Salvador led the National Program to support new NEPs. Demographic and behavioral data showing different profiles of IDUs in the various districts of Salvador were also important in creating district-specific NEP strategies.

The NEPs were forced to continuously adapt to changing circumstances. Needle exchange in outreach workers' homes was an alternative to the small number of syringes exchanged at CETAD. However, it soon became uncomfortable, as IDUs sometimes arrived at inconvenient times, disturbing the outreach worker's private life. In places where it is difficult to use outreach worker's homes, local community organizations or the community health service are other potential NEP locations. In Vancouver, Canada, the rise of cocaine also forced a change in NEP services (Strathdee *et al.*, 1997).

Even though the police in Bahia didn't forbid NEPs, their enforcement of laws against drug trafficking presented challenges. The outreach workers'

notes show that the number of IDUs attending the NEPs decreased as police enforcement increased. This finding echoes that in West Oakland, California, where police action or the threat thereof decreased NEP utilization and limited volunteer involvement in the NEP (Bluthenthal *et al.*, 1997). In a related matter, partial repeal of laws restricting IDUs' ability to possess syringes was associated with decreased syringe sharing and increased pharmacy syringe purchase (Groseclose *et al.*, 1995).

The following emerged as critical in the development of the Salvador NEPs: (a) NEPs were promoted to the public, the media, and the politicians as a way to save human life, detached from controversies about values and drug use; (b) local data about risk behavior and HIV infection among IDUs helped demonstrate the extent of the local problem; (c) data from other countries were used to address questions about NEP efficacy and possible negative effects; (d) political alliances, including those with organizations directly involved in the prevention of drug abuse and HIV infection, were critical; (e) CETAD's long history and its knowledge of the local community facilitated the debate; (f) meetings with the police explained the purpose and workings of the NEPs and minimized disruptions because of police enforcement near the NEPs; and (g) ongoing outreach work enabled the NEPs to stay abreast of changes in local patterns of drug use and to adapt the NEPs accordingly.

The results illustrate how different sources of data, both quantitative and qualitative, were used to detect and monitor an evolving crack epidemic in Salvador. Crack use in Brazil dates back to the beginning of the 1990s (Inciardi, 1993), but only in 1995 did crack become a significant force in Salvador. The diverse data provided by ongoing surveys of drug users entering the CETAD drug treatment center, outreach workers' field notes, and the local newspapers confirm just how rapidly crack was introduced in Salvador. The impact of the crack epidemic on the NEPs has been clearly demonstrated in the outreach workers' notes and the NEP data showing decreased numbers of syringes and condoms distributed at the NEP sites after the crack epidemic. Based on this experience, the CETAD NEPs now include crack users in its target population.

The arrival of the crack epidemic made a comprehensive evaluation of the NEP's efficacy difficult. It was impossible to identify sufficient IDUs in Pelourinho after large numbers switched to crack, and, unfortunately, no baseline data had been collected in Engenho Velho. Although this limits the strength

of the conclusions regarding NEP efficacy that can be drawn from this study, there were substantial decreases in syringe sharing and increases in syringe cleaning over time in Pelourinho. Similarly, levels of risk behavior were lower in Engenho Velho after the NEP than in Pelourinho before the NEP. These data suggest, but not confirm, a beneficial effect of the NEPs.

The qualitative data, gleaned as they were from a variety of sources ranging from newspapers articles to participant observation to outreach workers' field notes, are subject to bias. They are also dependent upon the outreach workers' work habits and on periodic swings in media interest. However, the rapid and simultaneous changes in drug-use patterns documented in the quantitative data and the various qualitative data sources leave little doubt that a major crack epidemic swept through Salvador in July 1996, beginning in Pelourinho.

Quantitative survey data are based largely on IDU self-report. The paradoxical finding that greater frequency of sex was associated with a lower risk of HIV infection may be explained by imprecision in the survey instrument or to lower frequencies of unprotected intercourse among those who have sex most frequently (due, for example, to health department outreach to sex workers).

Much work is necessary before NEPs in Brazil are transformed into a truly effective public health intervention. More governmental and nongovernmental organizations need to open NEPs and those that are open need to be enlarged. Particular emphasis must be placed on meeting with police representatives in order to emphasize the impact of their enforcement actions for the health of drug users. More research on IDU risk behavior and HIV seroprevalence in other parts of the country is necessary. With 30 NEPs, mostly in south and southeast Brazil, only one-third of which exchange more than a 1,000 syringes per month, and with only two more years of funding guaranteed by the National Program at the time of writing, Brazil has a very fragile NEP network to face the huge challenge represented by HIV infection among IDUs.

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