

Original Article

AIDS Knowledge among Arrested Drug Users in Taoyuan During the First Two Years of Implementation of a Harm Reduction Program

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Background: In 2004, Taiwan experienced a dramatic increase in number of intravenous drug users (IDUs) in the HIV/AIDS epidemic because IDUs shared syringes, needles, washing water, and diluted liquid. After July 2006, Taiwan implemented a nationwide harm reduction program (HRP). The Public Health Bureau of the Taoyuan county has also started to administer a quiz to arrested drug addicts to assess their knowledge about AIDS prevention. After filling out the quiz, the addicts were given leaflets about AIDS prevention and the HRP in the hope that accurate information about AIDS prevention and the HRP could be shared among drug users and their networks.

Aims: This study aimed to investigate AIDS prevention knowledge among drug users arrested by police in Taoyuan during the first two years of implementation of a HRP and to evaluate the effect of giving out the AIDS leaflets.

Methods: Mean and 95% confidence interval (CI) of the rate of correct answers by time were calculated to assess their AIDS prevention knowledge. Comparison of AIDS prevention knowledge among repeatedly arrested drug users were also made.

Results: Between July 2006 and February 2008, 1,828 arrested drug users filled out the AIDS knowledge quiz, and the mean proportion of correct answers was 52.1% (95% CI=51.4%-52.8%). This proportion of correct answers remained the same over the two-year period. Most respondents (95.0%) answered the questions about pen-washing water and diluted liquid can transmit HIV correctly, and this correct answer rate remained stable throughout the study period. The repeat-arrested drug users (n=153) were found to have worse AIDS knowledge at the second arrest than at the first arrest ($P < .0001$).

Conclusion: The results indicate that during the first two years of the HRP, most respondents already knew that washing water and diluted liquid can transmit HIV, indicating the HRP had successfully promoted safer drug injections. However, for arrested drug users, simply giving out a leaflet about AIDS prevention is insufficient and different education methods is worth trying.

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Keywords: AIDS knowledge, police-arrested drug users, harm reduction program

Introduction

Many countries have experienced an explosion of HIV/AIDS cases among intravenous drug users (IDUs)^[1] and the IDU proportion in the HIV/AIDS epidemic has climbed rapidly from less than 5% to 30-50% in one to three years^[2]. Unfortunately, Taiwan also experienced a dramatic increase of IDUs in the HIV/AIDS epidemic beginning in 2004. In 2001, only seven of the newly diagnosed HIV/AIDS cases (1.1%) were IDUs in Taiwan. This number increased to 19 (2.5%) in 2002, 79 (9.2%) in 2003, 616 (40.4%) in 2004, and jumped to a remarkable 2,410 (71.3%) in 2005^[3].

Since 2004, Taiwan drug-related police strategies have shifted their focus from upper-level dealers and distributors to street-level dealers and users^[4]. A beefed-up police presence around pharmacies has led IDUs to adopt rushed and unsafe injection practices^[5-6]. These practices include repeated and shared use of syringes, needles, washing water and diluted liquid has increased the spread of the HIV among this population. Since IDUs are often infected in groups, the number of HIV infected cases has increased rapidly^[5].

The World Health Organization (WHO) has suggested a harm reduction program (HRP) to deal with the HIV/AIDS epidemic among IDUs. This suggested approach would curtail the further spread of the virus and reduce the harm from drug use, both to the IDUs and to the wider community^[7]. The HRP includes promoting and supplying information and resources on safer drug injections, methadone maintenance treatment (MMT), use of new syringes and needles, as well as HIV/AIDS consultation and HIV testing. In December 2005, Taiwan selected four cities to pilot the HRP, and implemented it nationwide in July 2006^[8]. As a result, the number of IDUs with HIV/AIDS infection has slowed. In 2006, 1,833 (62.8%) of newly diagnosed HIV/AIDS cases were IDUs. The number decreased to 738 (38.2%) in 2007, 383 (22.0%) in 2008, 178 (10.8%) in 2009 and 105 (5.8%) in 2010^[3].

It is important to educate drug users about AIDS prevention to control the outbreak of

HIV infection. Drug addicts are marginalized people and are difficult to reach, so many AIDS studies on drug users or offenders have been conducted in prisons^[9-12]. However, little is known about the AIDS prevention knowledge and HIV risk behaviors among probationers or parolees. Compared with inmates, probationers or parolees have many more opportunities to engage in HIV-risk behaviors but have limited opportunities to receive HIV education and prevention interventions. The need for education for probationers or parolees about AIDS prevention is clear^[13-15].

In Taiwan, there are acts or regulations related to AIDS control. The Taiwan's AIDS Prevention and Control Act of 1990 stated that individuals who use or sell addictive drugs should undergo HIV testing. Since 1997 December, this act added an item suggesting that individuals who use or sell addictive drugs attend lectures on prevention and control of HIV and other sexually transmitted diseases (STDs)^[16]. In 2007, this act was revised and renamed as HIV Infection Control and Patient Rights Protection Act^[16]. In 2008, Regulations Governing Lecture on the Prevention and Control of HIV and Other Sexually Transmitted Diseases specified that the lectures on prevention and control of HIV and other STDs should be last in 2 hours^[17]. However, there are no relevant punishments on individuals who use or sell addictive drugs do not attend lectures.

Due to an outbreak of HIV infection after 2004, the Public Health Bureau of the Taoyuan County began administering a quiz to arrested drug addicts to assess their knowledge about AIDS prevention in July 2006. After filling out the quiz, the addicts were given leaflets about AIDS prevention and the HRP in the hope that accurate information about AIDS prevention and the HRP could be shared among drug users and their networks.

The aim of this study was to report AIDS prevention knowledge among arrested drug users in Taoyuan during the first two years of implementation of the HRP (July 2006 – February 2008) and to evaluate the effect of the dissemination of AIDS leaflets.

Methods

Study Population

Between July 2006 and February 2008, all drug users who were arrested by Taoyuan county police were included in this study. The contractor, who was responsible for drawing blood for an HIV test and paid by the Public Health Bureau of Taoyuan County, asked the arrested drug users to answer questions on a written AIDS knowledge quiz.

This study was approved by the Institutional Review Board (IRB) of the Chang Gung Memorial Hospital (97-1459B) because no IRB exists at the Public Health Bureau of Taoyuan County. Confidentiality was emphasized.

Outcome Measures

The AIDS knowledge quiz consisted of fifteen items including fourteen multiple choice questions with four responses each and one correct answer. The AIDS knowledge quiz was designed by the researchers and had acceptable reliability and validity. Nine experts rated our AIDS knowledge quiz with a mean of 3.2 out of 5 for appropriateness, clarity, and relevance. The known group difference to reflect construct validity was also established for our AIDS knowledge quiz. AIDS knowledge among public health workers had the highest score, followed by IDUs participating in the methadone maintenance treatment (MMT) program, drug users who had been arrested by police, and school adolescents scored the lowest. In the item analysis, the difficulty index and the item discrimination index of these items were all within an acceptable range. Cronbach's α was between 0.60 and 0.82, which demonstrated that the AIDS knowledge quiz had good internal consistency. The correlation coefficient for the same individuals who answered the AIDS knowledge quiz twice within two weeks was 0.59, which reflects sufficient test-retest reliability^[18]. To find out whether drug users recognized the risk of sharing 'pen-washing' water on contracting HIV, the following true/false item was added to the questionnaire: "Will sharing 'pen-washing' water or dilution water before injecting drugs transmit HIV? (yes, no)." (Table 1)

Leaflet About AIDS Knowledge

After arrested drug users filled out the AIDS

knowledge quiz, they were given a leaflet about AIDS prevention and the HRP. The leaflet contained information about major routes of HIV transmission and their risks, methods of prevention, short real stories about how two IDUs became infected with HIV, details about hospitals that offer methadone maintenance treatment programs, their open hours, phone numbers, websites, and details about drug addiction rehabilitation centers.

Statistical Analysis

The percentages of correct answers for each item and all items in the AIDS knowledge quiz with a 95% confidence interval (CI) were computed. An independent t-test or analysis of variance (ANOVA) was conducted to compare the AIDS knowledge between the different groups. For drug users who were arrested more than once, McNemar's test or a paired t-test was conducted for individual items or all items, where appropriate. Chi-square goodness-of-fit was used to compare age, gender, and HIV status between the sample and the general population. SAS 9.1 was used to perform all statistical analysis. The significance level of this study is 0.05.

Results

After excluding 74 observations, in which less than 13 items in the AIDS knowledge quiz were answered and eight observations which did not have an arrest date, we were left with a total of 1,828 (95.2%) valid observations collected between July 2006 and February 2008 for the analysis. There were more males (80.9%) than females (19.1%). The average age was 32.6 years old with the highest percentage of respondents (41%) being between 30-39 year olds, followed by 20-29 year olds (34.1%). The HIV+ rate was 6.1%. (Table 2)

The average score for the quiz was 52.1%, 95%CI=51.4%-52.8%. Fewer than 30% of the respondents answered the information in the following corresponding numbered items correctly: (1) HIV testing services were provided by the Taiwan government (11.0%), (2) early symptoms of HIV/AIDS (16.1%), (3) treatment of HIV/AIDS (20.2%), (4) the incubation period for HIV (24.6%), and (5) high risk group of HIV infection (25.8%).

Table 1. AIDS Knowledge Among Police-arrested Drug Users, Taoyuan, July 2006 to February 2008 (n=1828)

| AIDS knowledge item (options, correct answer is underlined) | % correct |
|---|---------------|
| (1) Which HIV testing service is not currently provided by the government? A. Free HIV testing B. Anonymous HIV testing C. <u>HIV testing as part of blood donation</u> D. HIV testing with results in 5-7 working days. | 201 (11.0%) |
| (2) The early symptoms of HIV/AIDS are hard to distinguish. Which of the following is not one of them? A. <u>Blurred vision</u> B. Unexplained weight loss C. Swollen lymph D. Weakened immunity | 295 (16.1%) |
| (3) Which of the following is not true of HIV/AIDS treatment? A. There is no vaccine B. There is no cure C. Cocktail therapy has excellent results D. <u>Radiotherapy is effective</u> | 370 (20.2%) |
| (4) After infection with HIV, there are no symptoms during a period of time that is called the incubation period. How long can this period last? A. 1-3 years B. 4-5 years C. 6-7 years D. <u>8-10 years</u> | 449 (24.6%) |
| (5) In Taiwan, which of the following groups is not at high risk for AIDS? A. IDUs B. Homosexuals/bisexuals C. <u>Hemophiliacs</u> D. Newborn of a mother with HIV/AIDS | 471 (25.8%) |
| (6) After being infected with the AIDS pathogen, there is a period of time during which blood tests will remain negative but it remains possible to infect others. This is called the "window period". How long can this period last? A. 5-7days B. 2-6 weeks C. <u>1-3 months</u> D. 5-7 months | 561 (30.7%) |
| (7) What is the pathogen responsible for AIDS? A. Bacterium B. Fungus C. Parasite D. <u>Virus</u> | 969 (53.0%) |
| (8) Which of the following is a correct way to prevent HIV/AIDS infection? A. <u>Not sharing needles/syringes, diluents, and wash water with others</u> B. Taking medicine to enhance the body's immunity C. Having sex and not using a condom with strangers D. Using a condom before inserting the penis into the vagina; it is not necessary to wear a condom for genital contact only | 1018 (55.7%) |
| (9) What is the punishment for intentionally infecting someone with HIV/AIDS in Taiwan? A. no punishment B. paying a fine C. <u>prison sentence</u> D. lifetime imprisonment | 1106 (60.5%) |
| (10) Which body system is destroyed by the AIDS pathogen? A. Digestive system B. <u>Immune system</u> C. Endocrine system D. Respiratory system | 1225 (67.0%) |
| (11) In 2006, which group at risk for AIDS experienced the greatest increase in Taiwan? A. <u>IDUs</u> B. Homosexuals/bisexuals C. Hemophiliacs D. Newborn of a mother with AIDS | 1262 (69.0%) |
| (12) Which of the following does not transmit the AIDS pathogen? A. Blood B. Semen C. <u>Saliva</u> D. Vaginal discharge | 1330 (72.8%) |
| (13) Which of the following is not a route for spreading HIV? A. Unprotected sex B. Needle sharing C. <u>Eating together</u> D. Blood transfusion | 1506 (82.4%) |
| (14) Will sharing 'pen-washing' water or dilution before injecting drugs transmit HIV? A. <u>yes</u> B. no | 1737 (95.0%) |
| (15) Which of the following is a medium for spreading HIV? A. Air B. <u>Body fluids</u> C. Soil/dirt D. Food | 1789 (97.9%) |
| Average | 52.1±15.2% |

The information in the following corresponding numbered items were answered correctly by more than 70% of respondents: (12) medium that cannot spread HIV (72.8%), (13) not a route of spreading HIV (82.4%), (14) will sharing 'pen-washing' water or diluted liquids before injecting drugs transmit HIV (95.0%), and (15) medium spread HIV (97.9%). (Table 1)

There were no significant differences in the correctly answered proportion on the AIDS

knowledge quiz by gender ($P=.1070$), age ($P=.2337$) or HIV status ($P=.2615$). (Table 2)

AIDS Knowledge Over Time

Figure 1 summarizes the correctly answered proportion of questions on the AIDS knowledge quiz by arrest date with a 95% CI. The results clearly show that the AIDS knowledge of respondents did not improve over time. Data collected between January and February 2007 were excluded because only three respondents answered

Table 2. Representative of the Sample and AIDS Knowledge among Police-Arrested Drug Users By Gender, Age, HIV Serostatus, Taoyuan, July 2006 To February 2008

| | Population (N=4799) | Sample (n=1828) | <i>P</i> ¹ | Mean±SD (%) | <i>P</i> |
|----------|------------------------|--------------------|-----------------------|----------------|--------------------|
| Gender | | | .0161* | | .1070 ² |
| Male | 3771 (78.6%) | 1479 (80.9%) | | 51.8±15.3 | |
| Female | 1028 (21.4%) | 349 (19.1%) | | 53.3±14.8 | |
| Age | | | <.0001* | | .2337 ³ |
| <20 | 132 (2.8%) | 83 (4.6%) | | 51.2±13.2 | |
| 20-29 | 1517 (31.7%) | 620 (34.1%) | | 51.1±15.3 | |
| 30-39 | 1991 (41.6%) | 747 (41.0%) | | 52.5±15.4 | |
| 40-49 | 916 (19.1%) | 312 (17.1%) | | 53.1±15.3 | |
| ≥50 | 232 (4.9%) | 58 (3.2%) | | 53.9±16.0 | |
| Mean±SD | 33.7±8.5 | 32.6±8.4 | | | |
| HIV | | | .1932 | | .2615 ² |
| Negative | 4465 (93.0%) | 1266 (93.9%) | | 52.5±15.1 | |
| Positive | 334 (6.8%) | 82(6.1%) | | 50.6±14.7 | |

¹Chi-square goodness-of-fit; ²Independent t-test; ³ANOVA

the quiz in the Chinese Lunar New Year period.

AIDS Knowledge Among Repeat-Arrested Drug Users

After eliminating participants who were arrested again on the same day, 153 drug users were arrested more than once. The average interval between the first and second quiz completed by the same person was 3.8 months with a standard deviation of 2.9 months, and within a range between two days and 15.0 months. On average, the respondents did worse the second time they took the quiz than the first time. A significant difference between the first quiz and the second quiz was seen in item numbers 2, 3, 7, and 12. (Fig. 2)

Representative of the Sample

Between July 2006 and February 2008, police made 4799 person-time (3554 individuals) drug-related arrests in Taoyuan. Although it was our intention to survey all arrested drug users, some addicts refused to answer the quiz, and sometimes contractors missed addicts who were arrested in the evenings. A total of 1828 (38.1%) was valid and used to estimate the overall AIDS knowledge. There was no difference in HIV status between the population of those who were arrested during the study period (population) and those who answered the AIDS knowledge quiz (sample). However, our observed sample was younger and consisted of more men than those who did not fill out the quizzes of users. (Table 2)

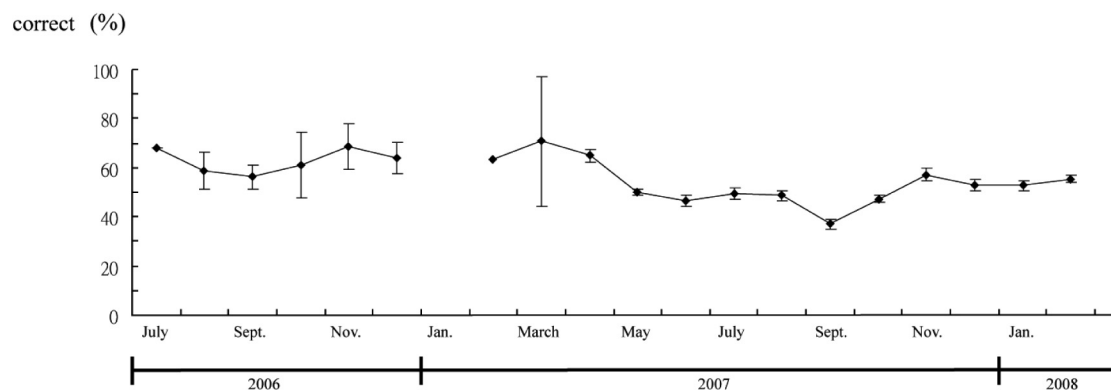


Fig. 1. Proportion of Respondents Answering Correctly on the AIDS Knowledge Quiz among Police-Arrested Drug Users, Taoyuan, July 2006 to February 2008 (n=1828)

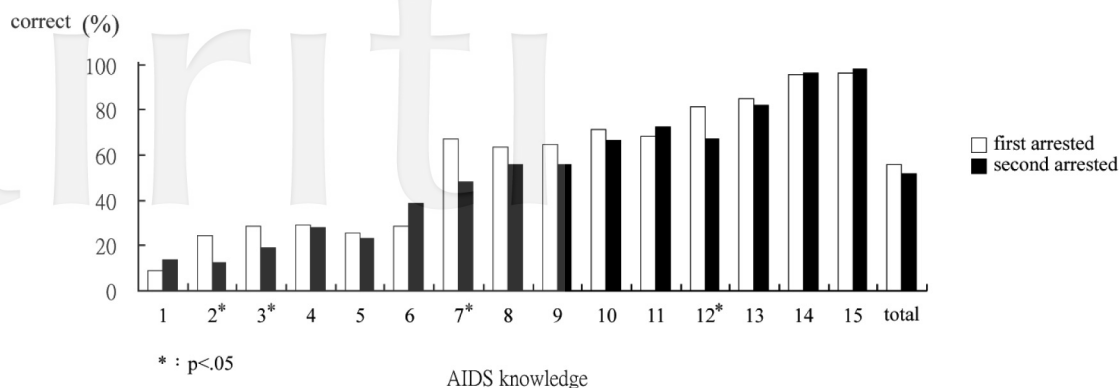


Fig. 2. Proportion of Respondents Answering Correctly on AIDS Knowledge Quiz among Repeat-Arrested Drug Users, Taoyuan, July 2006 to February 2008 (n=153). Please Refer to Table 1 for Each Item of the AIDS Knowledge Quiz

Discussion

During the first two years of the HRP (July 2006 – February 2008), the Public Health Bureau of Taoyuan used a quiz to assess arrested drug addicts' knowledge about AIDS prevention. Drug addicts scored an average of 52.1% (95%CI=51.4%-52.8%), lower than that of previous surveys (71.7%-85.5%)^[19-21]. However, previous surveys were usually made up of only true/false items^[19-20], making it easier for people to guess, whereas the one used by the Public Health Bureau of Taoyuan was multiple choice. This difference made it difficult to compare results with other studies. The scores were not significantly affected by gender ($P=.1070$), age ($P=.2337$), or HIV status ($P=.2615$). This result was the same as other studies^[22].

Before 2005, drug addicts did not know that sharing 'pen-washing' or water dilutions could transmit HIV^[23]. This study, conducted during the first two years of implementation of the HRP, found that 95.0% of the respondents knew that pen-washing water and diluted liquid can transmit HIV (item 14), similar to an inmate study (89.3%)^[24]. The correct rate for this item remained stable throughout the study period (data not shown). Another item about route of infection (item 13) was answered correctly in 82.4% of the respondents. Clearly, most drug addicts in Taiwan are now aware that sharing pen-washing water, dilution liquid, and

drug injectors can transmit HIV, indicating that the HRP had effectively promoted and supplied information on safer drug injections.

In contrast to their extensive knowledge about HIV transmission, item 8, which was about activities preventing HIV infection, was answered correctly by only 55.7% of the respondents. The fact that 31.3% of the respondents chose the option 'taking medication to prevent contracting HIV' (data not shown) demonstrated that drug users still have erroneous information about how HIV can be prevented. Because there is no vaccine to prevent HIV infection or medication to cure AIDS^[25], we suggest these wrong perceptions be corrected in future HRP.

The rate of correct answers to item 4, which is about the incubation period of HIV, was much lower (24.6%) than that of Lee's army study (71%)^[26]. This difference may have been because of the difference in response options^[27]. We used multiple choice and Lee's study used true/false choice^[26]. The window period of HIV (item 6) and incubation period (item 4) had very low correct answer rates. In the quiz, we educated the respondents about the difference in incubation period and the window period by describing their meaning so that random guessing could be avoided. The low correct rates in these two items were understandable because the choices involved numbers and this information was not provided in our education leaflet. Nevertheless, the information

about the incubation period and the window period for HIV was included in our AIDS education leaflet after March 2008.

Low correct rates were also seen in the questions about the early symptoms of HIV/AIDS (16.1%) (item 2) and treating HIV/AIDS (20.2%) (item 3). As most respondents in our study had not had HIV/AIDS, we speculate that they might not have paid particular attention to these matters. Feucht, Stephens, & Gibbs pointed out that the first step in controlling HIV transmission is to improve drug users' knowledge about early symptoms of HIV/AIDS^[28], so we added this information to our AIDS education leaflet after March 2008.

The question about HIV testing services being provided by the government (item 1) received the lowest correct rate (11.0%) in our study. This percentage was also lower than that of grade 7-12 students^[21]. Lee's study showed that 51.5% of sex consumers wrongly perceived that they could find out whether they were infected with HIV by donating blood^[29]. A possible explanation for this misconception is that drug addicts are a marginalized group^[30] and tend not to trust the services offered by the government. How to educate this group on this aspect and offer them a screening HIV channel they can trust is a challenge and deserves more effort by the government.

One of the more troubling findings of our results is that the AIDS knowledge among police-arrested drug users did not increase either over time or among repeat offenders. Poor timing or environment can partly explain this lack of improvement in AIDS knowledge over time or among repeat offenders in our sample. According to the contractors who delivered the quiz to the arrested addicts at the police station, many drug users were still under the influence of the addictive drugs when they were arrested. Some drug users were also interrogated about the details of their offense by the police at the same time. Another problem is that the police station was sometimes very noisy when a group of drug users was arrested together. Some drug users just threw away the AIDS education leaflet while they were still in the police station.

In Taiwan, users of or traders in addictive

drugs who are arrested by police are required to receive education about prevention of HIV and other sexually transmitted diseases according to the Taiwan Regulations Governing Lecture on the Prevention and Control of HIV and Other Sexually Transmitted Diseases Act which became effective in 2008^[17]. We suggest that gathering these arrested drug users together at some other time or in a different setting to distribute HIV/AIDS prevention information may be a possible solution. Another possibility is using multimedia for education on a website. Seidner et al. showed that there was no difference in an increase of AIDS knowledge for either interactive videodisc or a didactic class among homeless and substance dependent persons^[31].

Limitations

There are several limitations in the present study. First, the quiz used in this study did not address the behavior of sharing needles, syringes pen-washing water and diluted solution. However, we did have a surrogate of this behavior that asked whether sharing 'pen-washing' water or dilution before injecting drugs can transmit HIV (item 14). The high correction rate (95%) of this item remained stable over time implying that drug users had learned about the dangerous behavior of sharing diluted liquid, washing water, needles/syringes and these behaviors' connection to contracting HIV. Nevertheless, we suggest arrested drug users' behaviors of sharing needles/syringes, washing water, and diluted liquid while injecting drugs should be asked directly. Second, the drug users in our sample were not limited to users who injected drugs but also included those who swallowed or snorted the drugs. Unfortunately, we did not collect information about each user's method of administering drugs in our quiz. Third, the level of consciousness of the drug users was not recorded at the time of administering the quiz. Fourth, the study sample was younger than the arrested population. According to the contractor who collected the data, younger drug users were more willing to take the quiz while older drug addicts tended to use various excuses (illiterate or farsighted) to refuse or simply did not cooperate. Nevertheless, age had little effect on AIDS

knowledge and would not bias the results of this study.

Conclusion

Between July 2006 and February 2008, the mean correct proportion of AIDS prevention knowledge among police-arrested drug users in Taoyuan was only 52.1% (95% CI=51.4%-52.8%). The monthly proportion of correct answers did not increase over time. Most respondents (95.0%) answered correctly on the questions about pen-washing water and diluted liquid can transmit HIV, and this correct rate remained stable throughout the study period, indicating a good effect of the HRP about promoting and supplying information on safer drug injections. For repeat-arrested drug users (n=153), their AIDS knowledge was even worse at the second arrest than the first arrest ($P < .0001$). For arrested drug users, simply giving out a leaflet about AIDS prevention is insufficient and different education methods is worth a try.

Acknowledgements

We highly appreciate the financial support from the Public Health Bureau, Taoyuan County Government (GMRPD170031), and Ministry of Education (EMRPD170101).

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桃園地區警方查獲藥癮者之愛滋知識：實施減害計畫的首二年

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背景：2004年，台灣愛滋疫情在靜脈藥癮者爆發，原因是靜脈藥癮者共用針具、洗滌水及稀釋液。2006年7月起全國實施減害計畫。桃園縣政府衛生局自2006年7月起對縣內被警方查獲的藥癮者，進行愛滋知識測驗卷調查，以瞭解藥癮者的愛滋知識程度。在填寫測驗卷後，提供愛滋預防衛教單張及減害計畫的訊息，希望對被警方查獲的藥癮者本人及藉由藥癮族群間的網絡，提供正確的愛滋預防知識及減害計畫的訊息。

目的：調查桃園地區實施減害計畫第一、二年的警方查獲藥癮者之愛滋知識，評估衛教單張對於提升藥癮者的愛滋知識的成效。

方法：依時間列出愛滋知識的答對率(%)、95%信賴區間，及比較不同時間查獲相同藥癮者的愛滋知識。

結果：2006年7月至2008年2月有效樣本數共1828份，藥癮者愛滋知識平均答對比例為52.1% (95%信賴區間=51.4%-52.8%)。愛滋知識答對率在實施減害計畫的首兩年期間變化不大。絕大部份藥癮者(95%)能答對洗筆水、稀釋液可傳播愛滋病毒，又此題的答對率在研究期間變化不大。對於被警方重覆查獲的藥癮者(n=153)，其第二次被警方查獲的愛滋知識分數卻顯著低於第一次的分數($P < .0001$)。

結論：本研究結果顯示減害計畫的首二年絕大部份藥癮者都知道洗筆水、稀釋液可傳播愛滋病毒，顯示減害計畫在宣導安全注射藥物訊息的成效。對警方查獲藥癮者，只給予愛滋預防衛教單張是不足夠，可嘗試不同衛教方法。

關鍵詞：愛滋知識、警方查獲藥癮者、減害計畫

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