

HIGH HEPATITIS C SEROPREVALENCE IN THAI INTRAVENOUS DRUG ABUSERS AND QUALITATIVE RISK ANALYSIS

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Abstract. One of the high risk groups of hepatitis C virus infection is intravenous drug abusers (IVDAs). The study of HCV seroprevalence and some qualitative risk factors in this target group can be valuable for prevention of the infection. During June to October 1992, a cross-sectional study of 150 intravenous male drug abusers seeking medical treatment at Phranangkhla and Rajavithi Hospitals was conducted. Blood specimens were collected for determining anti-HCV antibody by EIA. An in-depth interview was carried out searching for some qualitative risk factors in anti-HCV positive and negative IVDAs. It was found that 95.33% of studied IVDAs were positive for anti-HCV antibody. There was no significant difference between the prevalence of anti-HCV and their ages ($p > 0.05$). The antibody prevalence tended to be higher with the longer duration of drug use. The positive rate of IVDAs who had injected more than 8 years was significantly higher than that of IVDAs who had injected less than 2 years (100% and 85.71), $p = 0.004$. Alanine amino-transferase (ALT) levels and anti-HIV antibodies were determined. IVDAs with higher levels of anti-HCV had higher percentages of ALT abnormality and anti-HIV positive rates. Data from in-depth interview showed that the longer duration of imprisonment, tattoo/ear piercing, extramarital relations without using condoms, the longer duration of drug use and needle/syringe sharing were potential risk factors for HCV infection in this target group.

INTRODUCTION

Viral hepatitis is a major public health problem. It occurs in every age group, but most patients are children and young adults. At first we interested in hepatitis A and B viruses. Hepatitis C virus (HCV) is associated with post-transfusion hepatitis (Choo *et al*, 1989; Feinstone, 1990). Many studies have shown that HCV is a major causative agent for post-transfusion non-A non-B hepatitis (Esteban *et al*, 1990). The seriousness of this infection is that it develops into chronic hepatitis in about 50-70% of cases, of which 40% are chronic active hepatitis; there is often gradual progression of chronic hepatitis to liver cirrhosis and hepatocellular carcinoma (Kiyosawa *et al*, 1991; Albert *et al*, 1992; Hadziyannis *et al*, 1993). At present, there is no special prevention or effective drugs for HCV infection, besides health education for avoidance of the risk factors. In Thailand, one of the high risk groups is intravenous drug abusers (IVDAs). They may spread the infection to other persons due to their poor health behaviors (Luksamijarulkul *et al*, 1995). This study examined HCV antibody prevalence and some qualitative risk factors in some groups of IVDAs, knowledge of which is valuable for HCV prevention and control.

MATERIALS AND METHODS

Study design

This was a cross-sectional study of 150 intravenous male drug abusers selected with their permission from IVDAs seeking for medical treatment at Phranangkhla and Rajavithi Hospitals during June to October 1992. Blood specimens of 150 IVDAs were collected for detecting anti-HCV antibody by using Abbott enzyme immunoassay (EIA) second generation. The cut-off value of optical density for anti-HCV positive was 0.664. After the laboratory results, the IVDAs were divided into 2 groups, the anti-HCV positive group and the anti-HCV negative group. An in-depth interview technique was used for determining some qualitative risk factors in some individuals of the anti-HCV positive group and some of the negative group.

Data analysis

Data in this study were expressed by using percentage, mean and other descriptive statistics. The proportional Z test was applied for significant difference between HCV antibody positive rates of

two groups. The critical level of $\alpha = 0.05$ was used for statistical significance.

RESULTS

General characteristics of 150 studied IVDAs

Most (52.67%) were 25-34 years of age. The mean age was 30.89 ± 6.47 years. There were nearly equal numbers of married and separated or single individuals. About 41% studied in secondary school. Twenty-two percent were unemployed and 45.33% had incomes of 3,000-5,999 baht per month. The mean of those who had income was 3,912.67 baht (Table 1).

Table 1

General characteristics of 150 intravenous male drug abusers (IVDAs).

| General characteristics | | Percentages |
|-------------------------|---------------------------------|-------------|
| Age (years)* | 15-24 | 17.33 |
| | 25-34 | 52.67 |
| | 35-44 | 27.33 |
| | ≥ 45 | 2.67 |
| Marital status | Married | 48.67 |
| | Single or separated | 51.33 |
| Education | Primary school | 34.67 |
| | Secondary school | 41.33 |
| | Vocational education and higher | 24.00 |
| | Unemployed | 22.00 |
| Occupation | Employee | 44.67 |
| | Private business | 24.00 |
| | Other | 9.33 |
| | | |
| Income/month** (bahts) | No income | 24.67 |
| | < 3,000 | 12.67 |
| | 3,000 - 5,999 | 45.33 |
| | ≥ 6,000 | 17.33 |

* Mean age was 30.89 years

** Mean income/month especially who had income was 3,912.67 baht

Prevalence of anti-HCV antibody in 150 IVDAs

Of a total of 150 IVDAs, 143 (95.33%) were seropositive for anti-HCV by EIA. There was no significant difference between the prevalence of anti-HCV and the age of IVDAs by proportional Z test ($p > 0.05$) (Table 2). When we classified IVDAs by the duration of drug injection, the prevalence rate tended to be higher with the longer duration of drug injection. The IVDAs who had injected drugs for less than 2 years had the lowest anti-HCV prevalence (85.71%) and the IVDAs who had injected for more than 8 years had the highest prevalence (100%). There was a statistically significant difference between these 2 groups ($p = 0.004$) (Table 3).

Alanine aminotransferase (ALT) levels were determined in 150 studied IVDAs (143 anti-HCV positive and 7 anti-HCV negative individuals). The results showed that the higher level anti-HCV antibody individuals had the higher percentage of ALT abnormality (Table 4), but this was not a significant difference ($p > 0.05$).

Of 150 IVDAs, 116 were tested for anti-HIV antibody. It was found that 44.95% of 109 IVDAs who had anti-HCV were positive for anti-HIV and 28.57% of 7 IVDAs who had no anti-HCV were positive for anti-HIV. The anti-HCV positive group had a higher percentage of anti-HIV antibodies than the anti-HCV negative group, but it was not a significant by proportional Z test ($p > 0.05$) (Table 5).

Table 2

HCV antibody prevalence in 150 studied IVDAs by age.

| Age (years) | No. of tested | Prevalence of anti-HCV* | |
|-------------|---------------|-------------------------|-------|
| | | No. | % |
| 15-24 | 26 | 24 | 92.31 |
| 25-34 | 79 | 76 | 96.20 |
| ≥ 35 | 45 | 43 | 95.56 |
| Total | 150 | 143 | 95.33 |

* There was no statistically significant difference between the prevalence of anti-HCV in each age group of studied IVDAs by proportional Z test ($p > 0.05$).

Table 3
HCV antibody prevalence in 150 studied IVDAs
by years of drug injection.

| Years of injection | No. of tested | Prevalence of Anti-HCV | |
|--------------------|---------------|------------------------|---------|
| | | No. | % |
| < 2 | 28 | 24 | 85.71* |
| 2-5 | 48 | 46 | 95.83 |
| 5-8 | 25 | 24 | 96.00 |
| > 8 | 49 | 49 | 100.00* |
| Total | 150 | 143 | 95.33 |

* Significant difference by proportional Z test ($p=0.004$).
Another proportions were not significant ($p > 0.05$).

Table 4
Results of alanine aminotransferase (ALT) and
anti-HCV antibody level in 150 IVDAs.

| Level of Anti-HCV | No. of tested | Results of abnormal ALT ($> 40\text{U/ml}$) | |
|--|---------------|--|-------|
| | | No. | % |
| Negative ($\text{OD} < 0.66$) | 7 | 1 | 14.29 |
| Low to moderate ($\text{OD} = 0.66-1.32$) | 21 | 3 | 14.29 |
| High level ($\text{OD} \geq 1.33$) | 122 | 29 | 23.77 |
| Total | 150 | 33* | 22.00 |

* Mean of abnormal ALT group was 68.2 U/ml (range = 41 - 143 U/ml).
There was no significant difference between results of abnormal ALT and levels of anti-HCV ($p > 0.05$).

Qualitative analysis of HCV risk factors

Data from the in-depth interview of 4 anti-HCV positive and 4 anti-HCV negative IVDAs showed that the positive group had a lower education standard than the negative group. The IVDAs with anti-HCV antibody had lived in prison longer than the IVDAs without anti-HCV. Three positive individuals were tattooed and/or ear pierced versus 2 cases in the negative group. All of the positive

IVDAs had extramarital relations without using condoms. Some cases thought that the clean and well dressed prostitutes were safe from diseases. Two negative IVDAs denied having extramarital relations. All IVDAs used drugs more than twice a day, except the fourth negative individual. Six of them (4 positive and 2 negative IVDAs) had used heroin injection for more than 2 years. All positive cases shared needles and syringes with other drug abusers, whereas only 2 negative IVDAs used shared needles and syringes. Six of 8 IVDAs didn't know the causative agent of hepatitis, the route of transmission, the signs and symptoms, or the method of prevention. They didn't care for their health. The summary of HCV risk factors analysed by qualitative techniques is shown in Table 5.

DISCUSSION

Presence of anti-HCV antibody is one of the indicators of HCV infection. Several methods have been used to detect anti-HCV (Poovorawan *et al*, 1994). The second generation EIA is the most popular and is considered useful for screening of anti-HCV because of its high sensitivity and specificity. This study showed high prevalence of HCV infection in IVDAs seeking entry to a methadone program in two hospitals (95.33%). There was a higher prevalence rate than previous studies reported, such as 53-81% in Taiwan (Lee *et al*, 1991; Chen *et al*, 1991), 43% in Japan (Hishioka, 1991), 42-85% in USA (Alter *et al*, 1990; Donahue *et al*, 1991), 80% in Sweden (Widell *et al*, 1991) and 64% in Thailand (Chainuvati *et al*, 1991). Those previous prevalence rates were the results of using the first generation EIA that had lower sensitivity and specificity than the second generation test.

HCV infected IVDAs in this study showed slight to moderate elevations of serum ALT values. It is possible that IVDAs with anti-HCV may be in the steady stage of chronic persistent hepatitis, as described by Tsuji and Shimonura, (1994). A previous study showed that if the HCV patients are infected with HBV, they will have serious liver damage and will develop liver cirrhosis or liver carcinoma in a shorter time frame than HCV infection only (Chen *et al*, 1990). Moreover, a study in Japan showed that alcohol has a harmful effect on persistent HCV infection (Tanikawa, 1994).

The high prevalence of exposure to HCV in this

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Table 5
Results of positive anti-HIV antibody in 116 studied IVDAs.

| Results of anti-HCV | No. of tested | Results of positive anti-HIV | |
|---------------------|---------------|------------------------------|--------|
| | | No. | % |
| Negative | 7 | 2 | 28.57* |
| Positive | 109 | 49 | 44.95* |
| Total | 116 | 51 | 43.97 |

* No statistically significant difference by proportional Z test ($p > 0.05$)

Table 6
Factors related to HCV antibody positivity in 8 IVDAs (from in-depth interview).

| Factors | Positive group | | | | Negative group | | | |
|--|----------------|----|----|----|----------------|----|----|----|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Age (years) | 31 | 26 | 28 | 28 | 29 | 23 | 20 | 32 |
| Marital status | | | | | | | | |
| married | + | | + | + | + | | | + |
| single/separated | | + | | | | + | + | |
| Education | P | P | P | P | P | U | S | P |
| Used to imprison ≥ 1 year | + | + | | + | | | | |
| < 1 year | | | | | + | + | | + |
| Contact with jaundice case | | | | + | | | | |
| Sharing blade | + | + | + | + | + | + | + | + |
| Tattoo/ear piercing | + | + | + | + | + | - | + | - |
| Extramarital relations without condom | + | + | + | + | + | - | - | + |
| Frequency of drug abusing | | | | | | | | |
| per day ≥ 2 times | + | + | + | + | + | + | + | |
| < 2 times | | | | | | | | + |
| Duration of drug injection | | | | | | | | |
| ≥ 2 years | + | + | + | + | + | | | + |
| < 2 years | | | | | | + | + | |
| Needle and syringe sharing | + | + | + | + | + | + | - | - |
| Needle cleaning: uncleaning | + | + | + | + | + | | | |
| boiling | | | | | | + | | |
| Knowledge about viral hepatitis prevention | | | | | | | | |
| unknown | + | + | + | + | + | | | + |
| knew | | | | | | + | + | |

- or blank means NO

P = Primary school; S = Secondary school; U = University

group suggested that the spread of the virus by parenteral drug use should be widespread and may be a significant public health problem in Thailand. Another study in Thai IVDAs about health behavior, knowledge and attitudes to viral hepatitis showed that about 75% of IVDAs had a history of having extramarital relations without using condoms and almost 70% believed that it was an ordinary practice of man to have sexual enjoyment with prostitutes (Luksamijarulkul *et al*, 1995), similar to the qualitative data presented in this study. HCV may be spread to other persons, especially female sex workers via sexual contact and may be spread to the general population, similar to HIV infection. Recently, many AIDS/HIV prevention and control programs have been developed. Health education that includes face-to-face instruction about viral hepatitis should be integrated into AIDS/HIV education programs, because this should result in more behavioral impact than separate group education (Nichols, 1994).

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