

Prevalence and associated risks of hepatitis B and C infections among Injecting Drug Users (IDU) attending the Registered Drug Treatment Centers in Yangon, Mandalay, Myitkyina, Bamaw and Moekaung in 2007

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A cross-sectional study was conducted at Drug Treatment Centers in Yangon, Mandalay, and Kachin State. The objectives of this study were to determine the sero-prevalence of both individual and dual infection of hepatitis B and hepatitis C to assess their knowledge on hepatitis B and C infection and to find out associated risks of these two infections among IDUs attending drug treatment centers. Face-to-face interviews were conducted among 298 IDUs in all study areas during December 2007. The serology of HBsAg and Anti-HCV was assessed by WHO recognized test kits. The HBsAg positive rate was 8.1% each in Yangon and Mandalay Divisions, 11.4% in Moegaung, 3.2% in Bamaw and 11.9% in Myitkyina while the anti-HCV seropositive rate was 74.2% in Yangon, 66.3% in Mandalay, 88.6% in Moegaung, 93.5% in Bamaw and 86.9% in Myitkyina. Common associated risks were found to be tattooing (57%), ear piercing (54.7%), dental procedure (44.3%), and frequent injection for minor ailment (36.1%). More than half of IDUs attained high school education and 61.4% had their own business. Transmission through infected blood (74.7%) and contaminated syringe (86.9%) were identified as associated risks for both hepatitis B and C infection. Nearly 50% knew vaccination could prevent infection. Risk factors for Anti-HCV were needle sharing ($P=0.002$) and ear piercing ($p=0.023$). Health education towards harm reduction among IDUs should be promoted by target group counselling.

INTRODUCTION

The prevention of hepatitis B and C virus (HBV and HCV) infection is also of major public health concern. The infected individual carries a substantial risk of chronic liver disease of 5 to 10% in HBV, and more than 50% in HCV infection. Moreover, individuals infected with HBV, and to a lesser degree with HCV infection, may transmit the virus to their sexual partners, and in case of females to their offspring [1, 2]. Injecting drug users (IDUs)

are at high risk of acquiring parentally transmitted disease. For human immunodeficiency (HIV) infection a variety of more specific factors have been identified such as needle sharing, use of shooting galleries, cocaine use, or number of drug injecting sex partners [3, 4]. The overall prevalence of HCV infection in the general population is estimated to be between 1 and 2.4% but it is observed as 40-95% among IDUs [2]. Active drug users are considered as the primary source of new HCV infections. Little is known about data on occurrence

and possible associations between risk behavior among IDU, and HBV or HCV infection. Only few studies have been carried out on HBV and HCV transmission among institutionalized IDUs in which HBsAg positive rate was 11.4% and that of anti-HCV antibody was 94% [5]. According to these findings there is still a room for improvement in their knowledge and preventing practices among IDUs about these infections.

General objective

To find out prevalence, knowledge, and associated risks of hepatitis B and C infections among injecting drug users.

Specific objectives

1. To identify socio-demographic characteristics of injecting drug users (IDUs) attending drug treatment centers.
2. To determine the sero-prevalence of both individual and dual infection of hepatitis B, hepatitis C among injecting drug users (IDUs) attending drug treatment centers.
3. To assess their knowledge of hepatitis B and C infection as regards to mode of transmission, risks, prevention, and complications.
4. To find out associated risks of these two infections among injecting drug users (IDUs) attending drug treatment centers.

MATERIALS AND METHOD

Study design

Cross-sectional

Study population and study site

A total of 305 registered IDUs attending the Drug Treatment Centers of Yangon, Mandalay, Myitkyina, Moekaung and Bamaw.

Study period

September 2007 to February 2008.

Inclusion criteria

All injecting drug users who were willing to participate and gave consent

Exclusion criteria

IDUs without giving consent

Sample size and sampling procedure

All IDUs who fulfill the inclusion criteria were enrolled. And all the participants, who were willing to participate in the study were explained and asked to sign in written informed consent forms approved by institutional ethical review board.

Data collection method

A. Questionnaire survey

Face-to-face interviews were conducted by trained research assistants using pre-tested semi-structured questionnaire. The variables collected were socio-demographic (age, sex, education etc), knowledge related variables (mode of transmission, risks, prevention), risk behaviors and risks experienced.

B. Laboratory procedure

Serum specimen: Blood samples were obtained from all injecting drug users from the study areas. Informed consents were obtained from IDUs who agree to participate. Three milliliters of venous blood were drawn from the ante-cubital fossa under aseptic measures and centrifuged at 3,000 rpm and serum samples were transferred into Eppendorf tubes labeled with the code number of each subject. Sera samples were transported to Department of Medical Research (Lower Myanmar) on ice and stored at -20°C until testing.

Serological analyses were performed for hepatitis B virus marker (HBsAg), using one step HBsAg rapid test device (Standard Diagnostic Inc, BIOLINE, with sensitivity and specificity >99%) together with positive and negative controls.

Antibodies to hepatitis C virus were tested by one step anti-HCV rapid test device (Standard Diagnostic Inc, BIOLINE, with sensitivity 93% and specificity 99%) together with positive and negative controls.

Data entry and data analysis

Data were checked for incompleteness, errors and inconsistency in each and every day after data collection and before entry to computer.

Data were entered into computer software (Epi data 2.1) and cleaning was done before analysis. Data analysis was also done by computer software.

For univariate analysis - Continuous data were presented by mean \pm SD, and median (range), for that of category were shown by proportion or percentage. Bivariate category data were analyzed by χ^2 test, and set $p < 0.05$ as significant.

RESULTS

A total of three hundred and five IDUs were recruited from Yangon, Mandalay, Myitkyina, Moekaung, and Bamaw during the study period. Blood samples of six IDUs from Yangon and one IDU from Moekaung were not available because most of their veins were scleroses. Therefore, the analysis was only based on 298 IDUs.

The mean age of IDUs was found to be 29.49 ± 6.3 years. They started to use intravenous drug at the age of 22.7 ± 5.69 years. The median duration of using intravenous drug was 48 months and it ranged from one month to 336 months. Nearly a third of respondents (27.6%) were eldest sons. Of respondents, 53.7% were single and 54% could be able to study high school education. Sixty-one percent had their own business.

Table 1. Serological status of HBsAg and Anti-HCV among intravenous drug users

Study areas	No. of cases (%)	Both markers positive No. (%)	Anti-HCV positive No. (%)	HBsAg positive No. (%)
Yangon	62 (20.8)	3 (4.8)	46 (74.2)	5 (8.1)
Myitkyina	84 (28.2)	8 (9.5)	73 (86.9)	10 (11.9)
Moekaung	35 (11.7)	3 (8.5)	31 (88.6)	4 (11.4)
Bamaw	31 (10.4)	1 (3.2)	29 (93.5)	1 (3.2)
Mandalay	86 (28.9)	5 (5.8)	57 (66.3)	7 (8.1)
Total	298 (100)	20 (6.7)	236 (79.2)	27 (9.1)

Table 1 shows that the overall dual infection rate was found to be 6.7% (20/298). Highest dual infection was observed in Myitkyina (9.5%) and Moekaung (8.5%). Regarding overall single infection rate, 79.2% (236/298) were positive for HCV and 9.1% (27/298) were positive for HBsAg. The highest occurrence of anti-HCV positivity was found at 93.5% in Bamaw followed by 88.6% in Moekaung and 86.9% in Myitkyina. The HBsAg positive rates were 11.9% in Myitkyina and 11.4% in Moekaung whereas in Yangon and Mandalay both were 8.1%. Bamaw had the lowest positive rate (3.2%) in HBsAg among the study areas.

Table 2. Risk behaviors among respondents

Risk behaviors	No.	%
Smoking (n= 294)	287	97.6
Alcohol drinking (n= 294)	161	54.8
*Substance abuse (n=293)		
Opium	220	75.1
Dolotram	9	3.1
Heroin	285	97.3
Marijuana	144	49.1
Yarma	178	60.8
Diazepam	173	59
Codeine	166	56.7
Sosegon	137	46.8
Bupronorphine	26	8.9
Ketamine	8	2.7
Needle use (n= 285)		
Single	222	77.9
Two and more	63	22.1

* Allowed multiple responses

In Table 2, nearly all IDUs (97.6%) were smokers but only halves were drinking alcohol. Most of the substances which found to be abused were heroin (97.3%), opium (75.1%), Yarma (60.8%), and diazepam (59%). Only 22.1% of respondents shared needles during their injection.

One fourth of IDUs had experienced some surgical operations. Ear piercing and tattooing practices were found at 54.7% and 57% respectively (Table 3). More than 40% of IDUs had history of dental procedure (tooth extraction) during their life time. Use of injection during minor ailment was very frequently responded by 36.1% of IDUs. Not using condoms during sex with sex

workers was found in 11.5% of respondents. Twenty percent of respondents had past history of viral hepatitis. Most of IDUs (85.6%) did not receive hepatitis B vaccination.

Table 3. Distribution of risk of exposure experienced by the respondents

Exposure to risks (n=298)	No	%
History of blood transfusion	23	7.7
History of surgical operation	76	25.5
History of ear piercing	163	54.7
Tattooing	170	57
Sharing razor (n=295)	7	3.4
Sharing tooth brush	5	1.7
History of tooth extraction (n=297)	132	44.3
Family history of viral hepatitis	21	7
History of taking frequent injection	107	36.1
Sex with sex workers (n=295)	131	44
No condom use during sex with sex workers (n=130)	15	11.5
Past history of viral hepatitis (VH)	61	20.5
No history of HVB vaccination (n=297)	254	85.6

About 90% of respondents could identify persons having multiple sex partners and intravenous drug users were at risk of contracting hepatitis virus infection. About 53.5% recognized the health persons were also at risk. The respondents knew that sharing contaminated syringe and needle (92.3%), sex without using condom (89.9%), and blood transfusion (86.9%) were risk conditions for getting these viral infections. Concerning mode of transmission, through blood (74.7%) and through contaminated syringe and needle (86.9%) were commonly known methods. Mother-to-child (vertical transmission) transmission was reported by 70.5% of IDUs. Approximately half of respondents knew vaccination could prevent hepatitis infection. Being a carrier (82.7%), chronic hepatitis (74.5%), and cirrhosis (81.9%) were commonly known complications of these infections (not shown in table).

Duration of intravenous drug use was marginally related to HBsAg ($p=0.059$) infection status but it was significantly related to that of Anti-HCV (0.049).

Table 4. Association between selected risks experienced, risk behaviors and hepatitis serology statuses among IDUs

Variables	HBV		p value	Anti-HCV		P value
	+	-		+	-	
Duration of IV abuse (n=288)						
≤ 4 years	9 (6.2)	137 (93.8)	0.058	111 (76.0)	35 (24.0)	0.049
> 4 years	18 (12.8)	124 (87.2)		121 (85.2)	21 (14.8)	
Frequency of IV use (n=286)						
≤ 3 times	19 (9.1)	190 (90.9)	0.74	167 (79.9)	42 (20.1)	0.72
> 3 times	8 (10.4)	69 (89.6)		63 (81.8)	14 (18.2)	
Needle sharing (n=288)						
No	18 (8.0)	206 (92.0)	0.33	171 (76.3)	53 (23.7)	0.002
Two	4 (12.9)	27 (87.1)		28 (90.3)	3 (9.7)	
Three and more	5 (15.2)	28 (84.8)		33 (100)	0 (0)	
Ear piercing						
Yes	17 (10.4)	146 (89.6)	0.34	137 (84.0)	26 (16.0)	0.023
No	10 (7.4)	125 (92.6)		99 (73.3)	36 (26.7)	

Needle sharing ($p=0.002$) and ear piercing ($p=0.023$) were strongly related to HCV infection but not for HBV infection (Table 4).

DISCUSSION

A review of international studies suggests that 50%-95% of IDU populations are HCV infected [6]. Similar results were obtained from this study in which positive rate of HCV antibodies was observed at 66.3% in Mandalay and 93.5% in Bamaw. The present study found that the HCV antibodies positive rates were lower in the major cities such as Yangon (74.2%) and Mandalay (66.3%) as compared to Myitkina (86.9%), Moekaung (88.6%), and Bamaw (93.5%). HBsAg positive rates were also high in Myitkyina (11.9%) and Moekaung (11.4%) townships. Although there was variation in HBsAg positive rates among townships in the present study, the overall positive rate was a bit lower than previous study, by Myo Khin, 2004 (9.1% vs 11.4%) [5] but it remained relatively constant. The differences in socio-economic status such as education,

income, availability of health services and vaccination might contribute to lower rates of both HBV and HCV serological markers in Yangon and Mandalay.

The evidence of relationship between duration of injection drug use and seroprevalence of HCV in our study was consistent with the study of young injecting heroin users in Southern China, in 2004 [7] in which HCV prevalence continued to climb reaching over 90% within 4 years of injection use as compared to 70% within a year use. High HCV prevalence among IDU could reflect rapid transmission and that evidence was supported by low prevalence of hepatitis B virus among IDU. Another explanation for high HCV was that the more frequent persistence of HCV compared to that of HBV [8] after getting these infections. Previous study revealed that more than 90% of adults become non infectious after HBV infection, limiting the reservoir of transmission [9], in contrast, over 80% of HCV infections persist [10]. Thus, among IDUs there is a large reservoir of HCV infection from which new injection drug users are infected.

Meanwhile, the present study showed that needle sharing among IDUs was strongly related to HCV status and that was similar with Berlin study, in 1997 (22.1% vs. 22%) [6].

Although the seropositive rate of HCV was high, the reported number of IDUs who shared syringe in the present study was found to be low (only 22%). It might be due to under reporting of sharing syringe or possibility of alternative route of transmission other than needle sharing.

Some experts believe that the virus is not only spread by using intravenous drugs, but also by sharing the straws used to snort substances [11]. The IDUs in present study abused heroin (97.3%), opium (75.1%), Yarma (amphetamine) (60.8%), and diazepam (59%). Probably these were administered by inhalation with sharing practice of inhalation equipment or by

ingestion among drug users and that is the another possibility of high HCV in our IDUs. This has important implications for prevention where a pragmatic approach is necessary. It is not possible to entirely prevent the injection use of illicit drug. However, injection with contaminated equipment could be substantially reduced if sterile injection equipment was available. In addition to that harm reduction initiative, other preventive health education message should be expanded to cover all IDUs.

It has also been identified that body piercing is one of the possible mode of HCV transmission from the present study. It is in accordance with one study in which alcohol and other drugs use were the significant correlates of tattooing and body piercing [12]. Therefore, attention should be given to get awareness on using or sharing contaminated equipment used for such procedures or sharing earrings carried out by professional and non-professional works of body cosmetic procedure for the preventive aspect of this infection.

Although the reported knowledge of risks, mode of transmission, prevention, and complication seem to be high, the HCV seroprevalence among IDUs was quite alarming high. In addition to that giving the associated morbidity and mortality and lack of an HCV vaccine, efforts to prevent HCV infection must be intensified and focused on reducing injection drug use, practices involving the sharing of drug use equipment. Besides promoting behavioral change and harm reduction among established users, responsible health personnel need to consider seriously for establishment of prevention campaigns that address the risk of HCV infection.

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