

International Journal of Medical Science and Current Research (IJMSCR) Available online at: www.ijmscr.com Volume 4, Issue 3, Page No: 167-172 May-June 2021



Co-transmission of HBV and HCV in HIV Infected Non- Brothel based Female Sex Workers in India

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Type of Publication: Original Research Paper Conflicts of Interest: Nil

ABSTRACT ABSTRACT

Background: The prevalence of HIV, HBV, HCV amongst various high risk groups is known to be high. However, mention of co-infections among FSW without any history of exposure through parenteral route in them is negligible. This study reports high prevalence of triple infection among Female Sex Workers of Nagaland, India and the risk factors associated with the acquisition of multiple infections in the presence or absence of drug injecting behavior.

Materials and Methods: Respondent Driven Sampling technique was applied to recruit the FSWs for the study. Centers were setup for conducting behavioral interviews and biological sample collection among the study subjects.

Results: Of 426 FSWs recruited 94.4% (n=24) denied injecting drugs. The prevalence of HIV, HBV, HCV was 12.2%, 35.5% and 30 7.4% respectively. HIV infection was strongly associated with HBV and HCV (p=0.000) among these 402 FSWs. Women who were married (p=0.000), in the profession for more than 5 years (p=0.02), experienced condom breakage (p=0.03) or were taking oral drugs (0.001) were associated with increased risk of being triply infected.

Conclusion: Female sex workers act as a bridge population for HIV transmission in high IDU prevalent areas. High prevalence of triple infection among them warrants public health attention.

Keywords: Triple infection, Female sex worker, Injecting drug user, HIV, HBV, HCV

INTRODUCTION

Blood borne viral infections like HIV, HBV, HCV can also be transmitted sexually and their prevalence amongst various high-risk groups such as Female Sex Workers (FSW), Injecting Drug Users (IDUs), Male having sex with male (MSM) and STI clinic attendees is high^[1-3]. Though transmission of HIV and HBV through sexual route is established yet reports regarding transmission of HCV primarily through sexual route especially among Female Sex Workers (FSW) are few. Some reports suggest an increased efficiency of transmission of HCV through sexual route in the presence of accompanying HIV infection^[4,5].

International Journal of Medical Science and Current Research | May-June 2021 | Vol 4 | Issue 3

There are various studies indicating the prevalence of these viruses in the FSWs but mention of co-infections in them is negligible. Both the hepatitis viruses cause acute hepatitis and chronic liver disease. Co infection by these increases the morbidity and the condition worsens with concurrent HIV infection. It therefore becomes imperative to understand the dynamics of transmission for better clinical outcome. The risk of developing chronic carrier state and disseminating the infection in to the community also cannot be underestimated.

Nagaland in the North east of India is known for high prevalence of HIV contributed mainly due to drug injecting practices. However, unorganized sex trade is also high here. Sex workers also contribute significantly to the burden of HIV infection and many of the FSWs are either IDUs themselves or entertain the IDU clientele. Therefore, the overall presence and transmission of compound infection in such licentious population pose a threat to its customers in the absence of safe sexual practices.

This study reports high prevalence of triple infection (HIV, HBV, HCV) among FSWs of this region and the risk factors associated with the acquisition of multiple infections in the presence or absence of drug injecting behaviour.

MATERIALS AND METHODS:

This study was carried out among the FSWs in the Dimapur district of Nagaland from February through April 2006. Respondent Driven Sampling (RDS) technique was applied to recruit 428 respondents for the study. RDS centers were setup for conducting behavioral interviews and biological sample collection among the study subjects. Female Sex Worker was defined as female 18 years or older, who had sex with men in exchange of cash at least once in the past one month. Predesigned and pretested questionnaires were used to capture data on their demographic profile, sexual practices and other high risk behaviour. The study followed a 'Linked Anonymous' strategy to maintain confidentiality of behavioral and biological data provided by every individual respondent. Informed consent was taken from all participants. The project was cleared by the Institutional Ethical Committee of Regional Medical Research Centre for Northeast (ICMR). Blood samples were collected for laboratory diagnosis. Serum was stored at -70°C till tested. Serum samples were tested for HCV antibody by a commercially available HCV4.0 ELISA (Murex Biotech S.A.). Participants were considered positive when the sera were repeatedly positive by Recombinant Immunoblot Assay (Chiron RIBA 3.0 SIA). Antibodies to HIV was tested by

Microlisa-HIV (J Mitra & Co. India.) and confirmed by Genedia HIV1/2 ELISA3.0 from (Green Cross Life Science Corp). Participants were considered HBV infected when there was presence of either HBsAg (Murex Biotech S.A.) or Anti HBc or both.

Statistical significance with different risk variables were obtained using Pearson's Chi square test. Odds ratio and their 95% confidence interval were documented to indicate magnitude and directions of associations. Analysis was performed using SPSS10.0 statistical software.

RESULTS:

A total of 428 eligible female sex workers were recruited. Compliance for behavioral interview and biological sample was (99.5%). The mean age of the participants was 25.6 (SD±6.65) years. Two hundred and forty-nine (61%) FSW's were literate. About one-third (35%) were never married, a similar proportion were currently married (36%) and the rest were either divorced/separated/deserted or widowed. Forty percent reported of started selling sex from the age of 18 to 21 years while 133 (31%) did so when they were 17 years or below. As for the length of sex work nearly a third (29.8%) were into sex work for more than 6 years and 20% of the respondents got into sex work less than a year ago. They were all non-brothel-based sex workers. The median length of sex work was 4years and median number of clients per day was 2. Almost all the respondents had both occasional and regular clients in the past one month and about one half had experienced receptive anal sex with their clients. Condom use at last sex with the occasional clients was 41% and 13.3% with the regular clients. About 67% of respondents reported symptoms of STI.

Seroprevalence and associations of non IDU-FSWs

Out of 426 FSWs recruited 402 (94.4%) denied injecting drugs but 83 (20.6%) consumed oral drugs. However, 24 (5.6%) reported being IDUs and of them 22 (91.7%) also took drugs orally. Among the 402 participants who were primarily FSW's the total prevalence of HIV, HBV, HCV were 49 (12.2%), 143 (35.5%) and30 (7.4%) respectively. Anti HBc was present among 139(34.6%) while HBsAg in 10 (2.5%). Of this, 6 (2.7%) FSWs had both HBsAg and Anti HBc. Therefore, the total no. of HBV infection came to 35.5%. Percentages of lone and multiple infections are shown in Table 1.

HIV infection was strongly associated with HBV (p=0.000) and HCV (p=0.000) among these 402 FSWs. Univariate analysis (Table 2) showed that sex workers who made their

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sexual debut at less than 15 yrs (p=0.008), were more than 25 yrs of age at the time of interview (p=0.004) or were illiterate (p=0.000) were at higher risk of acquiring co infection than their colleagues. Association was also seen among women who were married (p=0.000) and were in the profession for more than 5 years (p=0.02).

FSWs who experienced condom breakage (p=0.03) or were taking oral drugs (0.001) were associated with increased risk of being triply infected. Subjects practicing anal sex (p=0.06) almost reached statistical significance. However, factors like age at start of selling sex (p=0.1), current living situation i.e. with or without partner (p=0.49), taking alcoholic drinks (p=0.9), selling sex for drugs (p=0.2), condom usage (p=0.6) were not significantly associated with acquiring co- infections.

Seroprevalence and associations of IDU-FSWs

Of the 24 FSWs who were also IDUs, the infection rate was 37.5% (n=9), 41.6% (n=10) and 45.8% (n=11) for HIV, HBV and HCV respectively though HBsAg was not present in any of them. Table 3 shows the prevalence rates among them.

DISCUSSION:

The results of the present study brings to light and reaffirms the fact that infection with any of the blood borne virus isolated or together is high among the FSWs of this region. This fact gains greater importance when the FSWs also indulge in the practice of injecting drugs. Our results highlights that those FSWs who are also IDUs are at much higher risk of acquiring co-infection than their counterpart.

This study was carried out in one of the high HIV prevalent states of India where the burden of HIV is chiefly attributed to injecting drug abuse. This is what makes the FSWs of the region unique as they are mainly exposed to a clientele who are IDUs, thereby increasing the risk of transmission of infections which are primarily acquired parenterally like HCV (authors' unpublished data). The intermingling between these two high risk groups probably lead to increased Drug use (oral or injecting), oral consumption of drugs, alcohol abuse etc since they begin to identify with each other. Such habits definitely lead towards unsafe sexual behaviors and have an impact on the HIV-HBV-HCV transmission dynamics. Bi-risk behavior in the same individual therefore is a matter of concern in this part of the country. Although various studies have recorded the prevalence of HIV, HBV and HCV infections but these are mostly among STD clinic attendees^[4,6,7] or in slum community^[8]. Those presenting reports on FSWs ^[9-11] still

do not focus on triple infection and hence the knowledge about multiple infection remain restricted. We assume this is the first study reporting HIV-HBV-HCV co infection among the FSWs from India as well as other countries.

In a study among the 586 IDU-FSWs^[9] heavily involved in the use of drugs and alcohol the prevalence of HIV, HBV and HCV were found to be higher than our findings. This could be ascribed to the larger sample size as well as the place where the study was conducted (Centre for Drug and Alcohol Studies, University of Delamore, Florida, US.). This possibly could have led to recruiting FSWs who were all into Drug and alcohol abuse. However, the presence of triple infection in this group is not mentioned.

Thomas et al.^[12] have reported prevalence of these infections among STD clinic attendees of Baltimore who denied drug injecting behaviour. HIV-HCV and HBV-HCV co- infection were found to be highly prevalent in this group. The study group here differed from our participant profile.

A study from India by Singh et al.^[4] among STD clinic attendees has reported prevalence of triple infection in them. Their findings are comparable to our study though the cohort varies.

The hepatitis viruses are known for causing chronic liver disease and high morbid conditions. Therefore, presence of HBV/HCV or both with HIV adds to the disease burden and brings down the quality of life. All these facts together direct towards introducing better surveillance and management strategies to check the spread of infection to the community and bring up the quality of life in the highrisk groups as well. High prevalence of HBV infection also indicates towards intervention for HBV vaccination among FSWs in our region.

Efficiency of transmission of HBV and HCV are increased in the presence of HIV^[13]. Therefore, these co-infected FSWs pose a threat in that they being the link population could easily percolate the infection to the community thus increasing the graveness of HIV epidemic and HBV/HCV secondarily.

Source(s) of support: The Bill & Melinda Gates Foundation (BMGF)

Conflict of interest: No conflict of interest.

Ethical clearance: Obtained.

Consent of the patient: Both verbal and written consent was obtained from the patient. **Contribution of authors:** "We declare that this work was done by

the authors named in this article with equal contributions."

Markers	Numbers	Percentages
HIV	12	2.9%
HBV	104	25.8%
HCV	9	2.2%
HIV+HBV	22	5.5%
HIV+HCV	4	1%
HCV+HBV	6	1.5%
HIV+HBV+HCV	11	2.7%

Table 1 Seroprevalence among 402 non IDU- FSWs

Table 2 Results of Univariate analysis showing association of multiple infections with various demographic, sexual behavioral variables among the 402 non IDU- FSWs

Variables	Odds Ratio (OR)	p-value
Age -		
<25 yrs	1	
>25 yrs	1.8	.004
Literacy -		
Literate	1	
Illiterate	2.3	0.000
First sexual exposure -		
<15 yrs	1.73	
>15 yrs	1	0.008
Age at first selling sex -		
<18 yrs	1	
>18 yrs	1.4	0.106
Duration of sex work -		
<5 yrs	1	
>5 yrs	1.64	0.025

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Ever married		
Unmarried	1	
Married	2.96	0.000
Current living situation		
Without partner	1	
With partner	1.5	0.490
Oral drugs		
No	1	
Yes	2.3	0.001
Sold sex for drug		
No	1	
Yes	1.7	0.2
Anal sex		
No	1	
Yes	1.5	0.06
HBV	1	
	4.6	0.000
HCV	1	
	9.9	0.000

Table 3 Seroprevalence among the 24 IDU-FSWs

Marker	Number	Percentage
HIV	3 (9)	12.5% (57.5%)
HBV	4 (10)	16.6% (41.6%)
HCV	3 (11)	12.5% (45.8%)
HIV+HBV	0	0%
HIV+HCV	2	8.3%
HCV+HBV	2	8.3%
HIV+HBV+HCV	4	16.6%

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