

## Serodetection of Hepatitis C Virus Infection among HIV Patients in Mingalardon Specialist Hospital

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Coinfection with hepatitis C virus in HIV-infected individuals results in increased hepatic complications. In the era of antiretroviral therapy, liver-related death among HIV patients is the most prevalent non-AIDS related cause. HIV and HCV share common pathways of mode of transmission. The aim of this study was to detect hepatitis C in HIV patients and to find out the coinfection rate in HIV patients from Mingalardon Specialist Hospital. The study was done at Molecular Technology Applications Division at Department of Medical Research from January 2016 to December 2016. A total of 150 participants including 83 males and 67 females were studied. Blood samples were tested for anti-HCV by enzyme-linked immunosorbent assay (ELISA) method. Anti-HCV was positive in 15 (9 males, 6 females) and the prevalence rate was found to be 10%. Anti-HCV positivity was found (33.3%, 5/15 each) in 19-29 years and 30-39 years followed by (26.7%, 4/15) in 40-49 years age group. Among HCV-coinfected patients, 80% (n=12) were reported as low level education; 20% (n=3) as high level education and more common in urban (53.3%, 8/15) than rural area (46.7%, 7/15). Coinfection with HCV was in statistically significant association ( $p < 0.05$ ) with IVDU history (57.1%, 8/14). Out of 52 patients with history of skin piercing, anti-HCV was detected in 17.3% (n=9). Among HCV-coinfected patients, mean CD4 count was 493.87 cells/mm<sup>3</sup>. No HCV coinfection was encountered in patients with CD4 count  $< 200$  cells/mm<sup>3</sup>. The present study demonstrated that HCV coinfection was more common in male, residents from urban area, married people, low education and history of body piercing practice. The findings of this study would be indicative of a portion of hepatitis C coinfection among HIV patients in Myanmar.

*Keywords:* Anti-HCV, Coinfection, HIV, Seroprevalence, ELISA

### INTRODUCTION

Viral hepatitis C infection occurs commonly among HIV-infected individuals, with approximately 25% of HIV-infected persons worldwide estimated to have concurrent chronic HCV infection. Complications related to HIV/HCV coinfection are becoming an increasing important issue. As improvements in HIV treatment have reduced the number of deaths due to opportunistic illness, liver disease has become a leading cause of

hospitalization and death in people with HIV/AIDS.<sup>1</sup>

The rate of HIV/HCV coinfection differs from country to country. This may be attributable to their common transmission routes and social, economic, and cultural factors. For HIV and HCV, the most common

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DOI: <https://doi.org/10.34299/mhsrj.00976>

transmission routes are exposure to blood and injection drug use (IDU). In the developed countries such as the United States, Australia, and many European countries, IDU is the dominant route of HCV transmission. However, the transmission is attributed to unsafe therapeutic injections worldwide and in India.<sup>2</sup> A Myanmar study done by Thet Nwe Oo<sup>3</sup> reported that coinfection with HCV was 19% in people living with HIV. In Vietnam study, 724 HIV patients were tested for HCV infection. Of these, 35.4% (n=256) were positive for HCV infection.<sup>4</sup>

A study of 42,648 HIV-infected patients in Sub-Saharan Africa revealed that HIV/HCV coinfection prevalence rate was 5.73%.<sup>5</sup> Coinfection with HCV complicates the clinical course of HIV and may also adversely affect the treatment of HIV infection. This research will detect hepatitis C virus among HIV patients in Mingalardon Specialist Hospital. This research will contribute existing information on hepatitis C coinfection in HIV patients and this will in turn reduce morbidity and mortality from antiretroviral drug-associated hepatotoxicity among coinfecting patients.

## MATERIALS AND METHODS

This study was a cross-sectional, laboratory-based descriptive study in which blood samples from HIV-infected patients were collected from outpatient department of Mingalardon Specialist Hospital. The study period was from January 2016 to December 2016. Laboratory examination was done at Molecular Technology Applications Division at Department of Medical Research. A total of 150 HIV-positive patients were included in this study. Blood samples in aliquot tubes were centrifuged for 10 minutes at 2000 rpm for serum separation. After centrifugation, the serum was transferred into another sterile aliquot tube with transfer disposable pipettes and then kept in a -20°C deep freezer before testing. According to the manufacturer's instructions, anti-HCV ELISA was done by using HCV ELISA 3.0 test kit, Standard

Diagnostics Inc., Republic of Korea. Data collected from the proforma was entered and analyzed by using computerized statistical software SPSS (Statistical Package for Social Science Version 16).

### *Ethical consideration*

This study was carried out after taking approval from Ethical Research Committee of University of Medicine 2.

## RESULTS

The mean age of the patients was 35.3 years with the youngest patient of 19 years old and the eldest of 77 years. Socio-demographic characteristics of the patients like sex, residence, marital status and education status were categorized and described (Table 1).

Table 1. Distribution of characteristics among HCV-coinfecting group (n=150)

	HCV coinfection	No HCV coinfection
	Frequency (%)	Frequency (%)
<b>Sex</b>		
Male	9(10.8)	74(89.2)
Female	6(9.0)	61(91.0)
<b>Residence</b>		
Urban	8(10.1)	71(89.9)
Suburban/ Rural	7(9.86)	64(90.14)
<b>Marital status</b>		
Single	3(8.3)	33(91.7)
Married	8(12.1)	58(87.9)
Divorced/ Widowed	4(8.3)	44(91.7)
<b>Education</b>		
Low	12(11.4)	93(88.6)
High	3(6.7)	42(93.3)

Anti-HCV was found in 10% (n=15) of HIV patients. Anti-HCV positivity was found (33.3%, 5/15 each) in age group 19-29 years and 30-39 years age group followed by 40-49 years age group (26.7%, 4/15). Only one anti-HCV positive case was found in 50-59 years age group and no anti-HCV was detected in more than 60 years age group (Fig. 1).

In a total of 143 HIV-positive patients who had heterosexual behavior, 9.79% (n=14) were HCV positive. Among the homosexual patients (n=5) in this study, only 20% (n=1)

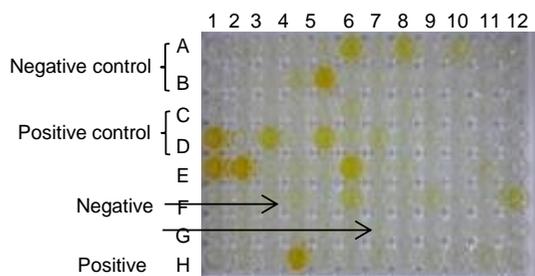


Fig. 1. HCV ELISA test for anti-HCV detection

had HCV coinfection. No HCV Ab was found in the HIV patients who gave no response of their sexual behavior (n=2).

In the present study, anti-HCV was detected in 8(57.1%) of 14 HIV patients who had history of intravenous drug use (IVDU). Among HIV patients who had partner history of IVDU (n=11), only 1(9.1%) was anti-HCV positive. Among the HIV patients who had blood transfusion history (n=16), 12.5% (n=2) was found to be anti-HCV positive. There was no HCV-seropositive case in HIV patients who had partner of blood transfusion history (n=15). Fifty-two HIV patients who had skin piercing history, HCV coinfection was detected in 17.3% (n=9).

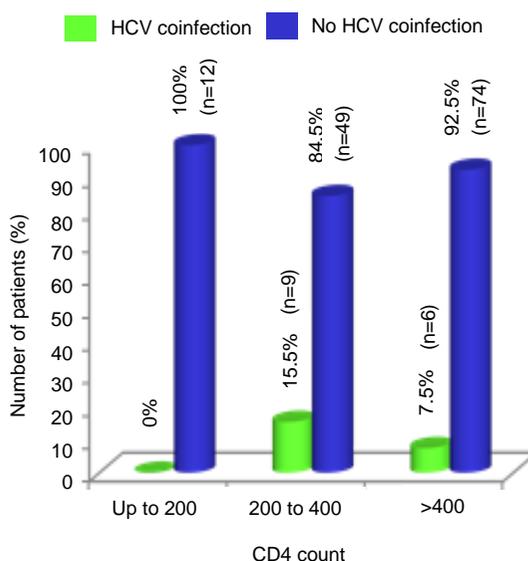


Fig. 2. CD4 count in HCV coinfection

The mean CD4 count encountered in this study was 488.7 cell/mm<sup>3</sup>, minimum 26 cell/mm<sup>3</sup> and maximum 1136 cell/mm<sup>3</sup>.

Among HCV-coinfected patients, mean CD4 count was 493.87 cell/mm<sup>3</sup>. There was no HCV coinfection encountered in patients with less than 200 cell/mm<sup>3</sup> CD4 count. In this study, 15.5% (n=9) of the 58 patients with CD4 count 200 to 400 cell/mm<sup>3</sup> and 7.5% (n=6) of 80 patients with >400 cell/mm<sup>3</sup> were HCV coinfection (Figure 2).

## DISCUSSION

The overall prevalence of HCV/HIV coinfection ranges from 1.2% to 98.5% in South and Southeast Asia.<sup>6</sup> In this study, of 150 tested HIV-positive patients, 55.3% (83/150) were male and 44.7% (67/150) were female patients. In Myanmar, the highest prevalence rate of HIV infection was found to be in the population aged 15- 49 years group.<sup>7</sup> Increased incidence of HIV infection among young adults may be due to increased sexual activity of that age group. HIV seropositivity was higher in male patients than female patients and this might be due to sexual promiscuous and life style of sexually active people, primarily men.

The present study found that the prevalence of HCV co-infection in HIV-infected patients was 10% (15/150). The prevalence of HCV infection in HIV-infected patients in this study was rather higher than that had been reported, 5% of HCV coinfection in 11,032 HIV-infected patients in Mandalay during 2012.<sup>8</sup> This prevalence difference may be due to difference in test principle and diversity in study group. The previous study done by Sai Ko Ko Zaw, *et al.*<sup>8</sup> used rapid test strips to detect anti-HCV antibodies whereas 3<sup>rd</sup> generation ELISA in this study.

In 2007, 100 cases of HIV-positive patients from Yangon General Hospital and New Yangon General Hospital, Myanmar were tested for anti-HCV antibody and it was found that 19% of HIV patients were positive for anti-HCV by RPHA method (SERODIA).<sup>3</sup> One study done in Asia-Pacific Region found that HCV coinfection was approximately 10%.<sup>9</sup> In the present

study, the result was similar to that of the study done in Kenya (Nairobi) in which 10.3% HCV coinfection in total tested 300 HIV-infected individuals.<sup>10</sup>

This study found 10.8% (9/83) HCV coinfection in HIV-positive men and 9% (6/67) in HIV-positive women. The gender distribution of the present study was coincided with other studies. Many papers stated that majority of HCV coinfection in HIV-positive men were higher than the HIV-positive women. In the study done by Huy, *et al.*<sup>4</sup>, male and female prevalence was 9.5% and 1.2%, respectively, in Vietnam. The gender distribution of HCV coinfection in this study may be due to the fact that men are more likely to have multiple sex partners and practice of unprotected sex due to the polygamous nature of their relationship and IVDU in Myanmar.

In this study, HCV coinfection was relatively common in married (12.1%) than single (8.3%). Among the HCV-coinfected HIV patients, 80% had low level of education. Of 15 HCV-coinfected patients, 53.3% live in urban and the others (46.7%) live in rural area. In another study done in Nigeria by Mabayoje<sup>11</sup>, of 280 HIV-positive patients, the positivity rate of HCV-coinfection was higher in married (66.1%) than single (27.9%) and majority of HCV-coinfected patients had low level of education (62.5%).

High HCV coinfection in urban area may be due to increased population, level of standard of living (eg. from urban slum area), individual sexual behavior and also young age (working age group) population who come from different district areas. Although it has been accepted that sexual transmission of HCV is low, the number of married HIV patients was relatively high in HCV seropositivity than single in this study. The results from socio-demographics factor from this study may differ from those of other studies due to diversity of study population and geographic areas.

In the present study, the rate of HCV coinfection in HIV patients was higher among heterosexual (93.3%) than homo-

sexual HIV patients (6.6%). Regarding the sexual behavior of HCV-coinfected HIV patients, 23.2% had homosexual behavior in the study done by Anderson, *et al.*<sup>12</sup> in the HIV Atlanta cohort study.

Moreover, a study done in Malaysia by Tan, *et al.*<sup>13</sup> in 2004 reported that 4.4% of homosexual men had HCV coinfection. Most of the papers reported that HCV coinfection rate was higher in homosexual men. Sexual preference that was not associated with HCV co-infection in the present study may be due to a very small population of homosexual participants and general population of HIV-infected patients in Myanmar.

According to the results from this study, only 12.5% (n=2) was observed anti-HCV antibody positive among 16 patients of having blood transfusion history. Transfusion of blood products had been a leading cause of transmission of HCV; however, due to improved screening, transmission through transfusions has decreased in most developed countries.<sup>14</sup>

In this study, of 14 HIV patients with IVDU history, 64.3% (n=9) were anti-HCV positive. The rate of HCV coinfection in HIV patients was significantly associated with IVDU history ( $p < 0.05$ ). Many papers described that there was strong association with IVDU and HCV coinfection. In the present study, among the patients who had history of skin piercing (n=52), HCV coinfection was detected in 17.3% (n=13). Another study done in Mekelle Hospital, Ethiopia found that the prevalence of HCV coinfection was 8.6% in HIV patients who had skin piercing procedures.<sup>15</sup> Thet Nwe Oo<sup>3</sup> study from Myanmar reported that anti-HCV was detected in 20.5% of the HIV patients who had skin piercing history.

Skin piercing history in relation to HCV was different in various studies. It may depend on the status of tattooer or the person who make skin piercing to other people. The risk was higher if the skin piercing was done by non-professional than professional. This may probably associate with improperly sterilized

needles and non-sterile non-disposable equipment. Therefore, presence and frequency of risk factors may be responsible for variation of anti-HCV positivity in different parts of Myanmar.

In this study, the mean CD4 count (488.7 cells/mm<sup>3</sup>) was found in HIV-HCV-coinfected study participants. There was no HCV coinfection encountered in patients with less than 200 cells/mm<sup>3</sup> CD4 count. Among HIV pregnant mothers in Ghana in 2013, HCV coinfection prevalence was 4.1% and no HCV coinfection was detected under CD4 count 350 cells/mm<sup>3</sup>.<sup>16</sup> The CD4 count result from the present study was compatible with these findings. Wondimeneh, *et al.*<sup>17</sup> also found that HIV/HCV coinfection did not result in a significant reduction in the CD4 in HIV- infected persons in Ethiopia.

Immunosuppression from HIV infection may impair antibody formation, and false-negative HCV antibody tests have been reported in individuals co-infected with HIV. HCV RNA testing should be performed in anti-HCV negative, HIV-infected patients, especially those with CD4 cell count less than 200 cells/mm.<sup>3, 18</sup>

Coinfection with human immunodeficiency virus (HIV) and hepatitis C virus is common since both infections share similar route of transmission. Given the attention to HIV, it is more likely that HCV will be neglected and such neglect can result in irreversible cirrhosis and hepatocarcinoma. It is clear that HCV screening should be conducted as soon as an HIV-positive test is confirmed. This permits coinfection to be treated appropriately, quality care provided, and further disease progress prevented. Proper management of HIV-HCV coinfection is critical and can be highly effective in disease control. Prevention and control strategies should be implemented comprehensively to ensure their maximal effectiveness.

There were some limitations in this study. It was cross-sectional study and cannot establish relationship between the time of exposure and subsequent infection. Moreover, HCV coinfection status was based on anti-HCV antibodies rather than HCV RNA detection.

The patients are in immunocompromised condition so that the rate of indeterminate or false negative antibodies results may be high. Nonetheless, this study can be implied approximate data of serodetection of HCV in HIV patients in Myanmar.

#### *Competing interests*

The authors declare that they have no competing interests.

### **ACKNOWLEDGEMENT**

We would like to express our sincere gratitude to Dr. Kyaw Zin Thant, Director-General and Dr. Hlaing Myat Thu, Deputy Director-General, Department of Medical Research for allowing us to do research at the Department of Medical Research. We are also indebted to Dr. Win Thura, Associate Professor, Department of Preventive and Social Medicine, University of Medicine 2 who helped in diverse ways during the data analysis. We would like to thank Dr. Ko Ko Aung, Medical superintendent from Mingalardon Specialist Hospital, for his permission to collect specimens from the patients at the hospital. We also wish to extend a deep gratitude to Daw Ohnmar Lwin, Research Scientist of Molecular Application Research Division for her technical support and all the staffs from Molecular Application Research Division for helping us during this study. Last but not the least, we would also like to mention our heartfelt thanks to all patients who gave their consent willingly to participate in this study.

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