ปัจจัยที่มีความสัมพันธ์ต่อการติดเชื้อร่วมของไวรัสตับอักเสบบีและหรือ ไวรัสตับอักเสบซี ในผู้ป่วยกลุ่มชนชาติพันธุ์ที่ติดเชื้อเอชไอวี พื้นที่ภาคเหนือตอนบน พ.ศ. 2557

จตุพงศ์ สิงหราไชย วท.ด.*, เด่นพงษ์ วงศ์วิจิตร ส.ด.*, สิรินันท์ สุวรรณาภรณ์ ส.ม. *,
วิภพ สุทธนะ วท.ด.*, ปิยะนุช พูลวิวัฒน์ วท.บ. **, มลฑา เพ็ชรสุวรรณ ส.ม. ****,
วรัญญา ศรีแสง ส.บ.*,เพ็ญโพยม สัญฐาน ส.บ. ***, จตุพร พันธะเกษม ส.บ.*

บทคัดย่อ

ความเป็นมา

โรคเอดส์และการติดเชื้อเอชไอวี เป็นปัญหาที่สำคัญทางด้านสาธารณสุขของโลก ในปี พ.ศ. 2558 องค์การอนามัยโลกได้ประมาณการว่า มีจำนวนผู้ติดเชื้อเอชไอวี ราว 36.7 ล้านคน เป็นผู้ป่วยติดเชื้อรายใหม่ จำนวน 2.1 ล้านคน และยังพบว่า ผู้ติดเชื้อเอชไอวีมีอุบัติการณ์การติดเชื้อร่วมกับเชื้อไวรัสตับ อักเสบบีและไวรัสตับอักเสบซีเพิ่มขึ้นโดยเฉพาะกลุ่มชนชาติพันธุ์เป็นอีกกลุ่มหนึ่งที่มีความเสี่ยงต่อการติดเชื้อร่วมของไวรัสตับอักเสบบีและไวรัสตับอักเสบซีมากกว่ากลุ่มคนทั่วไป การติดเชื้อร่วมจะเป็นปัจจัยเร่งทำให้เกิดโรคเอดส์ในระยะแสดงอาการได้เร็วมากยิ่งขึ้น

วัตถุประสงค์

เพื่อศึกษาความชุกและปัจจัยที่มีความสัมพันธ์ต่อการติดเชื้อร่วมของไวรัสตับอักเสบบีและหรือ ไวรัสตับอักเสบซี ในผู้ป่วยกลุ่มชนชาติพันธุ์ที่ติดเชื้อเอชไอวี ในพื้นที่ภาคเหนือตอนบน พ.ศ. 2557

ระเบียบวิธีการศึกษา

รูปแบบในการศึกษาคือ Case-Control Study Design (Hospital Based) โดยกลุ่มประชากรที่ศึกษาเป็นกลุ่มชนชาติพันธุ์ ผู้ติดเชื้อเอชไอวีที่เข้ารับการรักษาในคลินิค Antiretroviral (ARV) ในโรงพยาบาลชุมชน โรงพยาบาลจังหวัด ในพื้นที่จังหวัดเชียงราย จังหวัดเชียงใหม่ และจังหวัดพะเยา จำนวน 31 แห่ง เก็บรวบรวมข้อมูลตั้งแต่เดือนกุมภาพันธ์ ปี พ.ศ. 2557 ถึง เดือนตุลาคม ปี พ.ศ. 2558 โดยใช้แบบสอบถาม และเก็บตัวอย่างเลือดจำนวน 5 ซีซี เพื่อตรวจหาการติดเชื้อร่วมทางห้องปฏิบัติการ หลังจากทราบผลการตรวจการติดเชื้อ HBV และ HCV กลุ่มตัวอย่างจะแบ่งออกเป็น 2 กลุ่ม คือ 1) Case Group ได้แก่ ประชากรชนชาติพันธุ์ที่ติดเชื้อไวรัส HIV/AIDS และติดเชื้อ HBV หรือ HCV หรือ ติดเชื้อทั้ง HBV และ HCV 2) Control Group คือ ประชากรชนชาติพันธุ์ที่ติดเชื้อไวรัส HIV/AIDS แต่ไม่ติดเชื้อ ทั้ง HBV and HCV สถิติที่ใช้ในการวิเคราะห์ข้อมูล คือ สถิติเชิงพรรณนา ได้แก่ ความถี่ ร้อยละ และสถิติเชิงอนุมาน ได้แก่ Chi-square และ Simple and Multiple Logistic Regression

ผลการศึกษา

ผลการศึกษาพบว่า จำนวนผู้ติดเชื้อเอชไอวีที่เป็นกลุ่มตัวอย่างในการศึกษาครั้งนี้มี จำนวน 353 คน มีอายุระหว่าง 30 - 43 ปี ร้อยละ 47.1 เป็นเพศหญิง ร้อยละ 74.1 เป็นชนเผ่าลาหู่และกะเหรี่ยง ร้อยละ 37.8 และ 26.5 ตามลำดับ ความชุกของการติดเชื้อร่วมของผู้ติดเชื้อเอชไอวี และเชื้อไวรัสตับอักเสบบี พบ ร้อยละ 17.28 และความชุกของการติดเชื้อร่วมของผู้ติดเชื้อเอชไอวีและเชื้อไวรัสตับอักเสบซี พบ ร้อยละ 9.92 และความชุกของการติดเชื้อร่วมของผู้ติดเชื้อเอชไอวี และเชื้อ HBV หรือ HCV หรือ ติดเชื้อทั้ง HBV และ HCV พบ ร้อยละ 26.35 ปัจจัยที่มีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติต่อการติดเชื้อร่วมของผู้ติดเชื้อเอชไอวีและเชื้อ HBV และหรือ HCV ได้แก่ เพศ การใช้สารเสพติด ระดับ CD4 และระยะเวลาการติดเชื้อเอชไอวี ($p<0.05$)

สรุปและข้อเสนอแนะ

ปัจจัยที่มีความสัมพันธ์กับการติดเชื้อร่วมทั้ง 4 ปัจจัย ในกลุ่มชนชาติพันธุ์ ในพื้นที่ภาคเหนือตอนบน สามารถสรุปเป็นข้อเสนอแนะเป็นมาตรการในการการป้องกันการติดเชื้อไวรัสร่วม ดังนี้ การให้สุขศึกษาแก่กลุ่มผู้ป่วยที่ติดเชื้อเอชไอวีและเอดส์โดยเฉพาะในเพศชาย ให้หลีกเลี่ยงการใช้สารเสพติดชนิดที่ต้องใช้เข็มฉีดเข้าเส้นเลือด และเพิ่มเนื้อหาสาระในโปรแกรมสุขศึกษาในคลินิก ARV ในโรงพยาบาลทุกแห่งถึงปัจจัยที่มีความสัมพันธ์ต่อการติดเชื้อร่วมแก่ผู้ป่วยอย่างต่อเนื่องและสม่ำเสมอทั้งผู้ป่วยรายเก่าและรายใหม่ นอกจากนี้ควรส่งเสริม และสร้างความตระหนักให้กับผู้ป่วยเอชไอวีรายใหม่ให้เข้ารับการตรวจการติดเชื้อไวรัสตับอักเสบร่วมทุกราย

คำสำคัญ

เอชไอวี เอดส์ การติดเชื้อร่วม ไวรัสตับอักเสบบี ไวรัสตับอักเสบซี ชนชาติพันธุ์ ภาคเหนือตอนบนประเทศไทย

*สาขาวิชาสาธารณสุขศาสตร์ สำนักวิชาวิทยาศาสตร์สุขภาพ มหาวิทยาลัยแม่ฟ้าหลวง จังหวัดเชียงราย ประเทศไทย
**โรงพยาบาลมหาวิทยาลัยแม่ฟ้าหลวง จังหวัดเชียงราย ประเทศไทย
***กองโรคป้องกันด้วยวัคซีน กรมควบคุมโรค กระทรวงสาธารณสุข ประเทศไทย
****วิทยาลัยนอร์ทเทิร์น อำเภอเมือง จังหวัดตาก ประเทศไทย

THE ASSOCIATED FACTORS OF HBV AND/OR HCV CO-INFECTION IN HILL TRIBE HIV INFECTION PATIENTS IN THE NORTHERN REGION, THAILAND, 2015

Chatubhong Singharachai Ph.D.*, Denpong Wongwichit Ph.D.*, Sirinan Suwanaporn M.P.H.*,
Wipob Suttana Ph.D.*, Piyanut Poolviwat B.Sc. **, Month Phetsuwan M.P.H.****,
Warunya Srisang B.P.H.*,Penpayom Suntharn B.P.H.***, Chatuporn Phantakasaem B.P.H.*

ABSTRACT

BACKGROUND

HIV infection and AIDS are the major public health problems in the world. In 2015, World Health Organization (WHO) estimates that 36.7 million people are infected with HIV, and around 2.1 million people are the new cases. Moreover the trend of co-infection among HIV/AIDS and Hepatitis B virus and Hepatitis C virus were rapidly increasing especially in the Hill tribe in the northern region of Thailand. The co-infection was accelerated disease progression reciprocally.

OBJECTIVES

This study was investigated the prevalence and the associated factors with HBV and/or HCV co-infection with HIV in hill tribe in northern region, Thailand, 2015.

METHODS

A case-control study research design was conducted through hospital-based at antiretroviral clinic. Thirty one of fifty one hospitals in the Phayao, Chiang Mai and Chiang Rai province were recruited in this study. The collection data period was provided since February 2015 to October 2016. The validity and reliability questionnaires and 5 cc. blood were collected in all participants. Cases were the HIV infection of hill tribe patients who HBV and/or HCV co-infection with. HBV and HCV infection were confirmed by having one or more positive tests for HBV and HCV serology. Controls were those with all negative tests for HBV and HCV. The descriptive statistics (frequency, percentage, mean) and non-parametric statistics (chi-square) and parametric (simple and multiple logistic Regression) statistic were used to analyze for answering the research question and the objectives of this study.

RESULTS

Three hundred and fifty-three participants were age 47.1% of 30-43 years old, 74.1% of females, 37.8% of Lahu and 26.5% of Karen. The prevalence rate of HBV and HIV co-infection was 17.28% and of HCV and HIV co-infection were 9.92, while the prevalence rate of HBV and/or HCV co-infection with HIV was 26.35%. Moreover, the multiple logistic regression was found gender, addictive substance, CD4 level and period of HIV infection significantly of co-infection ($p<0.05$).

CONCLUSIONS AND DISSCUSSIONS

According to the associated factors of Co-infection, the recommendation should provide the prevention and control approach which 1) to provide the health education program into the hill tribe patients for stopping the addictive substance use especially injection drug users (IDUs), 2) to add new finding of the associated factors of co-infection in the health education program and should provide into the participants in all ARV clinic and 3) all cases newly diagnosed with HIV should be screened for all hepatitis co-infection. Additionally, a general promotion and awareness campaign for viral hepatitis testing is necessary.

KEYWORDS

Hill tribe, Co-infection, HBV, HCV, HIV/AIDS, Northern Thailand, Associated factors

*School of Health Science, Mae Fah Luang University, Chiang Rai, Thailand

**Mae Fah Luang University Hospital, Chiang Rai, Thailand

***Division of Vaccine Preventable Diseases, Department of Disease Control, Ministry of Public Health, Thailand

****Northern College, Muang District, Tak province, Thailand

INTRODUCTION

The epidemic of HIV/AIDS remains public health problem significantly. In 2016, the average 36.7 million (30.8–42.9 million) people were living with HIV globally, 2.1 million people were the newly infected and 1.1 million people were died caused of HIV[1]. Hepatitis B and C virus (HBV or HCV) co-infection has been a major cause of progression to severe liver damage adding complexity to the setting of HIV infection. Patient with HIV who are co-infected with HBV or HCV are at risk of antiretroviral (ARV)-associated hepatotoxicity and long-term liver damage[2, 3]. HBV or HCV co-infection with HIV is commonly found because of the shared routes of transmission.

HIV and HBV are blood borne viruses transmitted primarily through sexual intercourse and injection drug use. Globally, the prevalence of HBsAg was 7.4% in HIV-infected persons or burden reported around 2.73 million of HIV–HBsAg co-infected persons. As for HCV, route of infection is most commonly associated with unsafe injection practices. HIV patients, in particular Injection Drug Used (IDUs) and Men, who have sex with men (MSM), are at increased risk of HCV infection. Two point three million persons are co-infected in HIV and HCV[4]. Besides, the estimate of burden of HBV-HCV co-infection was 2.6 million and great burden was reported in the African and South East Asia Regions[5].

In Thailand, the epidemic of HIV was estimated 7,816 new HIV infections, 20,492 AIDS related deaths, and 445,504 persons living with HIV at the end of 2014. Females accounted for 39% of total adult [6]. co-infection in HIV patients was founded 8.7% of HBV co-infected and 7.8% of HCV co-infected. Persons who IDUS were associated with both HBV and HCV co-infection ($p < 0.001$) and Significant of gender, particularly in male, was associated ($p= 0.002$). The infection are rapidly increased in the risk group of MSM and IDUs[7]. Closely in 2015, the study was estimated 11.4% of HBV and 7.6% of HCV coinfection in the HIV-infected patients. Furthermore, the influencing factors of HBV and HCV positive related with age, gender, and CD4 count [8, 9].

Populations of ethnic group or hill tribe group are greatest living in the northern Thailand. In 2009, these groups were reported 600,000 people living in Thailand including 6 main tribal (Akha, Lahu, Lisu, Karen, Hmong/ Miao, and Mien/Yao). Studies of Apidechkul, the HIV among hill tribe were the most of female, tribe in Lahu and Karen, and aged 26-35 years. They were indicated ARV program only half that effected in survival10. However, the study of co-infectious of HIV and other problems, particularly HBV and HCV was limit in this group and a still increasing prevalence. This study aims to assess the situation and prevalence of HBV and HCV co-infection with HIV/AIDS among hill tribe groups and analyze associated factors. Therefore the enhancing the surveillance and targeted prevention of viral hepatitis including improved disease prevention, safer sex and efficiency healthcare delivery disease prevention should provide to the hill tribe group.

MATERIALS AND METHODS

This study conducted a case-control study in the Antiretroviral (ARV) Clinic in 31 of 51 hospitals where were purposive selected and willing to participate from Chiang Rai, Chiang Mai, and Phoyao province. In Chiang Rai province were 11 districts including Mae Chan, Mae Sai, Weing Chiang Rung, Phan, Mae Suai, Wiang Pa Pao, Khun Tan, Chiang Khong, Weing Chai, Mae Laos, Phaya Meng Rai. As for Chiang Mai province, districts were 14 including of San Kamphaeng, San Sai, Saraphi, Chom Thong, San Pa Tong, Doi Tao, Doi Saket, Hang Dong, Fang, Phrao, Mae Taeng, Hot, Omkoi and Doi Lo. The last of Phayao province, there are 6 districts including Chiang Come, Pong, Chun, Chiang muan, Dok Khamtai, and Mae Jai. Samples were selected by a hospital-based in hill tribe people who have diagnosed with HIV infection until 2015. As for cases, they were patients who HBV co-infection, HCV co-infection with HIV infected, confirmed by having one or more positive tests for HBsAg and Anti-HCV serology. Controls were those with HIV mono-infection. Six tribe groups (Akha, Lahu, Lisu, Karen, Hmong/Miao, Mien/Yao) were included and lived in area setting at least one year. We separated who got severe or complication of diseases.

Sample size calculation used an alpha at 5.0% and 80.0% for the power of the test. Two hundred and thirty five cases were yielded (plus 10.0% to account for loss to follow up). Proportion between case and control calculated in 59 cases and 176 controls. All participants were selected from the lists of HIV patients at ARV clinic from the target hospitals by purposive selecting technique. Only those who had met criteria were recruited into the study.

Via a questionnaire on the day of blood sampling, we interviewed on a structured questionnaire (including socio-demographic characteristics, medical history, risk behaviors and sexual behaviors). Socio-demographics were age, gender, marital status, religions, and area of residence, number of family members, education level, occupational and monthly income. We collected medical history; for instance, history of blood transfusion, hemodialysis, jaundice, HBV and HCV vaccination, use of ARV drugs, recent CD4 cell count, length of HIV infection and presence of any comorbidity. Risk behavior were interviewed about history of intra drug use, history of drug abuse throwing inhalation or orally, tattooing, piercing, alcohol use, and smoking. Moreover, sexual behaviors interviewing asked questions, in particular, ages at first sexual intercourse, sexual orientation, history of sexual transmitted diseases, history of commercial sex work, number of sexual partners, history of oral and anal sex of the use of condoms. Questionnaire was validated by three external experts before used. Score adjust was less than 0.5 in the Item Objective Congruence Index method. The reliability was tested among 30 patients with test-retest reliability method before use in the field with a Cornbrash's alpha of 0.81. The data was complete collected by questionnaire and in 5 milliliters of venous blood samples from each subject.

All process sets at ARV clinic in hospital. Lab results was tested the hepatitis B surface antigen (HBsAg) and hepatitis C antibody (anti-HCV) by ELISA test and Anti-HIV by ELISA HIV-1. HBsAg and HCV Ab+ were detected by NIBSC 00/588; WHO 2nd International Standard for HBsAg, subtype adw2, genotype A; UI/mL with 99.9% specificity and 99.8% sensitivity[11] and hepatitis C antibody (Anti-HCV) by cobase 411 analyzer, Elecsys® 2010 analyzer: 4.2 - 5.2 % with100.0% sensitivity and 99.6% hospitalized patients clinical specificity[12].

Fist statistical analysis was used descriptive, in particular, frequencies, percentages, means, and standard deviations to describe the general characteristics of the participants. Then, associated factors of HBV and /or HCV with HIV co-infection was used univariate to identify at α = 0.05. The last analysis was all significant variables in model for multiple logistic regression analysis to identify the associated factors of HBV and/or HCV with HIV co-infection by controlling all possible confounding factors.

This study was approved by the Ethics in Human Research Committee of Mae Fah Luang University (No. 5/2557). Permission of performing the study was also obtained from the Provincial Chief of Public Health Office for Phayao, Chiang Mai and Chiang Rai. All participants must be informed about the research and could ask any questions until they are not doubt about the study. Then, they signed an informed consent form before answering the questionnaires and collecting blood samples.

RESULTS

Table 1 The general characteristics of HIV/AIDS patients among hill tribe group in the Northern region of Thailand, 2015

Characteristics	Total	Provinces			P-value
	n (%)	Phayao n (%)	Chiang Mai n (%)	Chiang Rai n (%)	
All Subjects (Hill tribe)	**353 (100)**	**14 (4.0)**	**175 (49.6)**	**164 (46.5)**	**0.00***
Sex					
- Male	92 (26.1)	4 (28.6)	45 (25.7)	43 (26.2)	0.97
- Female	261 (73.9)	10 (71.4)	130 (74.3)	121 (73.8)	
Age					
- 16-29	112(29.9)	25 (29.8)	62 (36.5)	25 (20.8)	0.13
- 30-43	176 (47.1	36 (42.9)	74 (43.5)	66 (55.0)	
- 44-57	74 (19.8)	19 (22.6)	30 (17.6)	25 (20.8)	
- 58-71	12 (3.2)	4(4.8)	4(2.4)	4 (3.3)	
Occupational					
- Agriculturist	127 (36.0)	127 (36.0)	52 (29.7)	68 (41.5)	0.01*
- Employee	189 (53.5)	189 (53.5)	108 (61.7)	76 (46.3)	
- Merchant	16 (4.5)	16 (4.5)	9 (5.1)	5 (3.0)	
- Unemployed	21 (5.9)	21 (5.9)	6 (3.4)	15 (9.1)	
Education					
- Illiterate	236 (66.9)	236 (66.9)	119 (68.0)	110 (67.1)	0.23a
- Primary School	91 (25.8)	91 (25.8)	47 (26.9)	38 (23.2)	
- Secondary School	26 (7.4)	26 (7.4)	9 (5.1)	16 (9.8)	
Income					
- 500-25,500	333 (89.0)	333 (89.0)	149 (87.6)	106 (88.3)	0.18
- 25,501-50,500	35 (9.4)	35 (9.4)	20 (11.8)	11 (9.2)	
- 50,501 – 75,500	1 (0.3)	1 (0.3)	0 (0.0)	0 (0.0)	
- 75,501- 100,500	5 (1.3)	5 (1.3)	1 (0.6)	3 (2.5)	
Hill Tribe Group					
- Akha	63 (17.8)	63 (17.8)	8 (4.6)	51 (31.1)	0.00*
- Karen	93 (26.3)	93 (26.3)	91 (52.0)	2 (1.2)	
- Lisu	21 (5.9)	21 (5.9)	13 (7.4)	8 (4.9)	
- Yao	19 (5.4)	19 (5.4)	0 (0.0)	12 (7.3)	
- Hmong	23 (6.5)	23 (6.5)	8 (4.6)	14 (8.5)	
- Lahu	134 (38.0)	134 (38.0)	55 (31.4)	77 (47.0)	

Table 1 (Continued)

Characteristics	Total n (%)	Provinces			P-value
		Phayao n (%)	Chiang Mai n (%)	Chiang Rai n (%)	
Religion					
- Buddhism	181 (51.3)	13 (92.9)	93 (53.1)	75 (45.7)	0.01*
- Christianity	163 (46.2)	1 (7.1)	80 (45.7)	82 (50.0)	
- Islam	2 (0.6)	0 (0.0)	1 (0.6)	1 (0.6)	
- Forest Spirit / Ghost Grandparents / Ancestor	7 (2.0)	0 (0.0)	1 (0.6)	6 (3.7)	
Family Status					
- Single	29 (8.2)	3 (21.4)	9 (5.1)	17 (10.4)	0.09
- Couple	236 (66.9)	11 (78.6)	117 (66.9)	108 (65.9)	
- Widow	59 (16.7)	0 (0.0)	36 (20.6)	23 (14.0)	
- Divorce	19 (5.4)	0 (0.0)	7 (4.0)	12 (7.3)	
- Separated	10 (2.8)	0 (0.0)	6 (3.4)	4 (2.4)	
Age range of 1st sexual intercourse					
- 10-18	225 (63.7)	11 (78.6)	104 (59.4)	110 (67.1)	0.52
- 19-27	111 (31.4)	3 (21.4)	61 (34.9)	47 (28.7)	
- 28-36	17 (4.8)	0 (0.0)	10 (5.7)	7 (4.3)	
Number of partner					
- No partner	186 (49.7)	44 (52.4)	81 (47.6)	61 (50.8)	0.84
- 1 person	120 (32.1)	28 (33.3)	55 (32.4)	37 (30.8)	
- >= 2 persons	68 (18.2)	12 (14.3)	34 (0.0)	22 (18.3)	
Condom uses					
- Not used	118 (33.4)	1 (7.1)	58 (33.1)	59 (36.0)	.089
- Always used	235 (66.6)	13 (92.9)	117 (66.9)	105 (64.0)	
Addictive substanc					
- Not used	313 (88.7)	13 (92.9)	150 (85.7)	150 (91.5)	0.22
- Used	40 (11.3)	1 (7.1)	25 (14.3)	14 (8.5)	
Smoking Behavior					
- No smoking	237 (67.1)	7 (50.0)	103 (58.9)	127 (77.4)	0.001*
- Smoking	116 (32.9)	7 (50.0)	72 (41.1)	37 (22.6)	
Tattoo					
- No	311 (88.1)	13 (92.9)	150 (85.7)	148 (90.2)	0.37
- Yes	42 (11.9)	1 (7.1)	25 (14.3)	16 (9.8)	

Table 1 (Continued)

Characteristics	Total	Provinces			P-value
	n (%)	Phayao n (%)	Chiang Mai n (%)	Chiang Rai n (%)	
Ear piercing					
- No	129 (36.5)	5 (35.7)	70 (40.0)	54 (32.9)	0.40
- Yes	224 (63.5)	9 (64.3)	105 (60.0)	110 (67.1)	
CD4 Level					
- <=250	295 (83.8)	13 (92.9)	150 (85.7)	132 (81.0)	0.32
- >250	57 (16.2)	1 (7.1)	25 (14.3)	31 (19.0)	
Length of HIV Infection					
- 1-8 yrs	205 (58.1)	4 (28.6)	100 (57.1)	101 (61.6)	0.06
- 9-16 yrs	135 (38.2)	10(71.4)	70 (40.0)	55 (33.5)	
- 17-24 yrs	13 (3.7)	0 (0.0)	5 (2.9)	8 (4.9)	
Length of taking ARV Drug					
- 1-4 yrs	136 (39.4)	2 (15.4)	70 (40.7)	64 (40.0)	0.02*
- 5-8 yrs	106 (30.7)	2 (15.4)	48 (27.9)	56 (35.0)	
- >=9 yrs	103 (29.9)	9 (69.2)	54 (31.4)	40 (25.0)	

Three hundred and fifty five of HIV registered patients among hill tribe group participants completed the questionnaire from 31 hospitals in Phayao, Chiang Mai, Chiang Rai province, who were recruited based on the inclusion criteria. The majority was found participants in Chiang Mai and Chiang Rai Provinces. There are 14 cases in Phayao, 175 cases in Chiang Mai, and 164 cases in Chiang Rai. They are the most of female in 261 (73.9%) cases who were registered in ARV clinics. Participants ranged in age from 16-71 years and the most of age group presented from 30-43 years. Moreover, they were an employee (53.5%), un-education (66.9%), low income per month (89.0%). In this study, two large tribe group was (38.0%) and Karen (26.3%). Buddhism was respected around 51.3%. Participant's statuses were 66.5% of couple. Besides, risk behaviors of this group showed 66.6% always used condom, 88.7% not used addictive substance, and 67.1% nonsmoking. As for Thai language skill used, they can speak Thai approximately 92.6%, 50.7% can write, 46.7% can read. Others factors related with 11.9% of tattoo, 63.5% of Ear piercing, 63.7% of 10- 18 years old of the 1st sexual intercourse and 18.2% of sample who have partner more than 1 person. In the other hand, medical history reported 83.8% of CD4 Level lower or equal 250, 58.1% in length 1-8 duration years of HIV infection and 39.4% in 1-4 duration years of taking ARV Drug (Table1).

Table 2 The general characteristics of co-infected of HBs Ag positive and HCV Ab+ positive with HIV infected among hill tribe group in the Northern region of Thailand, 2015.

Characteristics	Total n (%)	HBsAg+ n (%)	HCV Ab+ n (%)	Cases (HBsAg+and/orHCV Ab+) n (%)
All Subjects	**353 (100)**	**61 (17.28)**	**35 (9.92)**	**93 (26.35)**
Gender				
- Male	92 (26.1)	19 (31.1)	18 (51.4)	36 (38.7)
- Female	261 (73.9)	42 (68.9)	17 (48.6)	57 (61.3)
Age				
- <=30	38 (10.8)	8 (13.1)	3 (8.6)	11 (11.8)
- 31-49	259 (73.4)	44 (72.1)	26 (74.3)	68 (73.1)
- 31-49	56 (15.9)	9 (14.8)	6 (17.1)	14 (15.1)
Occupational				
- Agriculturist	127 (36.0)	25 (41.0)	12 (34.3)	35 (37.6)
- Employee	189 (53.5)	28 (45.9)	21 (60.0)	48 (51.6)
- Merchant	16 (4.5)	4 (6.6)	2 (5.7)	6 (6.5)
- Unemployed	21 (5.9)	4 (6.6)	0 (0.0)	4 (4.3)
Education				
- Non education	236 (66.9)	36 (59.0)	26 (74.3)	61 (65.6)
- Primary School	91 (25.8)	16 (26.2)	7 (20.0)	22 (23.7)
- Secondary School	26 (7.4)	9 (14.8)	2 (5.7)	10 (10.8)
Income				
- 1000-51000 Baht	192 (54.4)	34 (55.7)	19 (54.3)	52 (55.9)
- 51001-101000 Baht	161 (45.6)	27 (44.3)	16 (45.7)	41 (44.1)
Hill Tribe Group				
- Akha	63 (17.8)	10 (16.4)	3 (8.6)	13 (14.0)
- Karen	93 (26.3)	13 (21.3)	11 (31.4)	23 (24.7)
- Lisu	21 (5.9)	2 (3.3)	2 (5.7)	4 (4.3)
- Yao	19 (5.4)	2 (3.3)	2 (5.7)	4 (4.3)
- Hmong	23 (6.5)	6 (9.8)	4 (11.4)	9 (9.7)
- Lahu	134 (38.0)	28 (45.9)	13 (37.1)	40 (43.0)
Religion				
- Buddhism	181 (51.3)	30 (49.2)	19 (54.3)	48 (51.6)
- Christianity	163 (46.2)	28 (45.9)	16 (45.7)	42 (45.2)
- Islam	2 (0.6)	1 (1.6)	0 (0.0)	1 (1.1)
- Forest spirit / ghost grandparents / ancestor	7 (2.0)	2 (3.3)	0 (0.0)	2 (2.2)

Table 2 (Continued)

Characteristics	Total n (%)	HBsAg+ n (%)	HCV Ab+ n (%)	Cases (HBsAg+and/orHCV Ab+) n (%)
Family Status				
- Single	29 (8.2)	2 (3.3)	3 (8.6)	5 (5.4)
- Couple	236 (66.9)	39 (63.9)	25 (71.4)	62 (66.7)
- Widow	59 (16.7)	12 (19.7)	5 (14.3)	16 (17.2)
- Divorce	19 (5.4)	6 (9.8)	1 (2.9)	7 (7.5)
- Separated	10 (2.8)	2 (3.3)	1 (2.9)	3 (3.2)
Age at first sexual intercourse				
- 10-18	225 (63.7)	37 (60.7)	21 (60.0)	56 (60.2)
- 19-27	111 (31.4)	21 (34.4)	12 (34.3)	33 (35.5)
- 28-36	17 (4.8)	3 (4.9)	2 (5.7)	4 (4.3)
Number of partner				
- No have partner	114 (32.3)	21 (34.4)	11 (31.4)	31 (33.3)
- Have partner >= 1 persons	239 (67.7)	40 (65.6)	24 (68.6)	62 (66.7)
Condom use				
- Not used	118 (33.4)	40 (65.6)	28 (80.0)	66 (71.0)
- Always used	235 (66.6)	21 (34.4)	7 (20.0)	27 (29.0)
Addictive substance				
- Not used	313 (88.7)	8 (13.1)	9 (25.7)	17 (18.3)
- Always used	40 (11.3)	53 (86.9)	26 (74.3)	76 (81.7)
Smoking				
- No smoking	237 (67.1)	23 (37.7)	20 (57.1)	42 (45.2)
- Smoking	116 (32.9)	38 (62.3)	15 (42.9)	51 (54.8)
Tattoo				
- No	311 (88.1)	54 (88.5)	29 (82.9)	80 (86.0)
- Yes	42 (11.9)	7 (11.5)	6 (17.1)	13 (14.0)
Ear piercing				
- No	129 (36.5)	23 (37.7)	20 (57.1)	43 (46.2)
- Yes	224 (63.5)	38 (62.3)	15 (42.9)	50 (53.8)
CD 4 Level				
- <=250	57 (16.2)	16 (26.7)	7 (20.0%)	23 (25.0)
- >250	295 (83.8)	44 (73.3)	28 (80.0%)	69 (75.0)
Missing 1 case				
Length of HIV Infection (Missing 1 case)				
- 1-8 years	205 (58.1)	42 (68.9)	22 (62.9)	63 (67.7)
- 9-16 years	135 (38.2)	16 (26.2)	11 (31.4)	25 (26.9)
- 17-24 years	13 (3.7)	3 (4.9)	2 (5.7)	5 (5.4)

Table 2 (Continued)

Characteristics	Total n (%)	HBsAg+ n (%)	HCV Ab+ n (%)	Cases (HBsAg+and/orHCV Ab+) n (%)
Length of ARV Drug Receive				
- 1-4 years	136 (39.4)	28 (47.5)	18 (51.4)	44 (48.4)
- 5-8 years	106 (30.7)	14 (23.7)	10 (28.6)	24 (26.4)
- >=9 years	103 (29.9)	17 (28.8)	7 (0.0)	23 (5.3)
Knowledge Level				
- Low level	33 (9.3)	4 (6.6)	5 (14.3)	8 (8.6)
- Moderate level	184 (52.1)	36 (59.0)	18 (51.4)	53 (57.0)
- High Level	136 (38.5)	21 (34.4)	12 (34.3)	32 (34.4)
Attitude Level				
- Low level	44 (12.5)	9 (14.8)	5 (14.3)	14 (15.1)
- Moderate level	200 (56.7)	37 (60.7)	19 (54.3)	54 (58.1)
- High Level	109 (30.9)	15 (24.6)	11 (31.4)	25 (26.9)
Practice Level				
- Low level	46 (13.0)	5 (8.2)	4 (11.4)	9 (9.7)
- Moderate level	187 (53.0)	37 (60.7)	19 (54.3)	54 (58.1)
- High Level	120 (34.0)	19 (31.1)	12 (34.3)	30 (32.3)

The main results of HBs Ag positive and HCV Ab+ positive with HIV infected among hill tribe group were 17.28% (61/353) and 9.92% (35/353) respectively. In addition to the prevalence of HBs Ag positive and/or HCV Ab+ positive with HIV infected, they were 26.35% or 93 cases. The most cases were Lahu group (43.0%). Risk behavior factors finding in cases presented unused condom (71.0%), used addictive substance (81.7%), smoking (54.8%), tattoo (14.0%), eye piercing (53.8%), CD4 level equal and less than 250 (25.0%), 1-8 years duration of HIV infection (58.1%), 1-4 years duration of ARV drug (48.4%). Furthermore, part of knowledge, attitude, and practice of cases were showed moderate level of knowledge (57.0%), attitude (58.1%), and practice (58.1%) respectively (Table 2).

The simple logistic regression with a significant level of α at 0.05 results were presented 5 factors significantly association with HBV and/or HCV co-infection with HIV patients. There were gender, addictive substance, smoking, CD4 Level, length of HIV Infection. Male had the risk of co-infection 2.30 times (OR = 2.30, CI = 1.49-3.53) than female. Smoking behavior in the cases had the risk of co-infection 2.07 times (OR = 2.07, 95% CI =1.37-3.12) higher than no smoking behavior. Participants who always used addictive substance, showed the risk of co-infection 2.31 times (OR = 2.31, 95% CI = 1.31-4.07) higher than who not used. Moreover, the significance of CD4 level equal or less than 250 associated with the risk of co-infection 2.22 times (OR = 2.22, 95% CI = 1.35-3.65) and the risk of co-infection had 0.51 times (OR = 0.51, 95% CI = 0.33-0.79) of 9 to 16 years duration of HIV Infected (Table 3).

Table 3 Simple logistic regression of factors associated of HBV and/or HCV co-infection with HIV among hill tribe patients in the Northern region of Thailand, 2015.

Characteristics	HBV and/or HCV infection		Crude OR	P-value
	No	Yes		
	n (%)	n (%)	(90% CI)	
Gender				
- Male	56 (60.9)	36 (39.1)	2.30 (1.49-3.53)	0.001*
- Female	204 (78.2)	57 (21.8)	1.00	
Addictive substance				
- Not used	237 (75.7)	76 (24.3)	1.00	
- Always used	23 (57.5)	17 (42.5)	2.31 (1.31-4.07)	0.02*
Smoking Behavior				
- No smoking	186 (78.5)	51 (21.5)	1.00	
- Smoking	74 (63.8)	42 (36.2)	2.07 (1.37-3.12)	0.004*
CD4 Level (Missing 1 case)				
- <=250	34 (59.6)	23 (40.4)	2.22 (1.35-3.65)	0.009*
- >250	226 (76.6)	69 (23.4)	1.00	
Period of HIV Infection (Missing 1 case)				
- 1-8 years	142 (69.3)	63 (30.7)	1.00	
- 9-16 years	110 (81.5)	25 (18.5)	0.51 (0.33-0.79)	0.013*
- 17-24 years	8 (61.5)	5 (38.5)	1.41 (0.53-3.72)	0.561

Multiple logistic regressions at a significant α level of 0.05, after controlling for all possible confounding factors, five factors were found significantly association with co-infection. First, male had the risk of co-infection 2.17 times (OR = 2.17, 95% CI = 1.26-3.74). Second, High risk in who always used substance effected the risk of co-infection 2.61 times (OR = 2.61, 95% CI = 1.25-5.43). Third, Second to last, the results associated with CD4 level equal or less than 250 at 2.00 times (OR = 2.00, 95% CI = 1.04-3.81) when compared with participants who had CD4 level more than 250. Finally, the participants who diagnosed HIV duration in 9 to 16 years, they had the risk of co-infection 0.54 (OR = 0.54, 95% CI = 0.31-0.95) more than duration of 1 to 8 years (Table 4).

CONCLUSIONS AND DISSCUSSIONS

In this study, the total cases of HIV infection in hill tribe in the northern region were 353 participants who were registered ARV clinic and willing to participate in 31 hospitals in Phayao, Chiang Mai and Chiang Rai province, Thailand in 2015. The prevalence rate of HBV/HIV co-infection and HCV/HIV co-infection were 17.28% (61/353) and 9.92% (35/353) respectively. Moreover, the prevalence rate of HBV and/or HCV with HIV co-infection was 93 (26.35%).

These finding were closely the global situation in 2010 which were reported 10% of the global prevalence of hepatitis B virus (HBV) co-infection with HIV positive [13] and also found 55.3% of co-infection with at least one of HBV, HCV, or syphilis with HIV positive[14]

Table 4 Multiple logistic regression of the affecting factors of HBV and/or HCV among the hill tribe HIV/AIDS patients.

Characteristics	HBV and/or HCV infection		Adjusted OR (90% CI)	P-value
	No n (%)	Yes n (%)		
Gender				
- Male	56 (60.9)	36 (39.1)	2.17 (1.26-3.74)	0.005*
- Female	204 (78.2)	57 (21.8)	1.00	
Addictive substance				
- Not used	237 (75.7)	76 (24.3)	1.00	
- Always used	23 (57.5)	17 (42.5)	2.61 (1.25-5.43)	0.01*
CD4 Level				
- <=250	34 (59.6)	23 (40.4)	2.00 (1.04-3.81)	0.036*
- >250	226 (76.6)	69 (23.4)	1.00	
Period of HIV Infection				
- 1-8 yrs	142 (69.3)	63 (30.7)	1.00	
- 9-16 yrs	110 (81.5)	25 (18.5)	0.54 (0.31-0.95)	0.033*
- 17-24 yrs	8 (61.5)	5 (38.5)	1.66 (0.50-5.52)	0.41

Moreover, 16.6% were infected with two of these agents, and 2.4% were positive for all three. Moreover, the prevalence of HBV co-infection in this study was higher than the study of Linda Aurpibul et al., which the prevalence rate of HBV/HIV co-infected was found 3.3% and the protective antibody against HBV was found in 18% of population and was significant higher among adolescents who received hepatitis B revaccination after receiving antiretroviral therapy 93% vs. 6% [15]. HBV and HIV co-infection are common due to shared routes of transmission. In areas of low endemicity, such as North America, Australia and Europe, HBV and HIV infection are usually acquired in adulthood through sexual or percutaneous transmission. In those areas, the prevalence of chronic co-infection is around 5-7% among HIV-infected individuals[16]. In countries with intermediate and high HBV endemicity, the main routes of transmission of HBV are prenatal or in early childhood[17-19].

This study, the participants was the residents of Chiang Mai province 49.6% (175/353), Chiang Rai 46.5% (164/353) and Phayao 4.0% (14/353). The majority of the participants were Lahu, Buddhism, 30-43 year old, employee, Illiterate, income <25,500 baht/ month, couple, 10-18 year old of 1st sexual intercourse, have not partner, CD4<=250, 1-8 years of length of HIV infection, 1-4 years of taking ARV Drug. Moreover, the assessment of knowledge, attitude and practice in the participant were moderate level.

The prevalence rate of HIV and HCV co-infection in this study was found 9.92% that closely the study in southern Brazil[20] that was confirmed co-infection rate in MSM 3.51% of HIV infected patients who have attended a tertiary care academic hospital in Southern Brazil until 2014. The different of the associated factors of HCV and HIV co-infection between two studies were high frequency of drug use and lately investigations for the detection of co-infection. The prevalence of HBV/HIV and HCV/HIV were found 12.57% and 4.81% respectively, while the HBV/HCV/HIV co-intervention was only 0.28%.

The associated factors of HBV and/or HCV with HIV co-infection among hill tribe in the northern region, Thailand in 2015 were gender, addictive substance, speaking skill of Thai language, CD4 level and duration of HIV infection. Nevertheless, previous study al., found age and number of lifetime male sexual partners were associated with HBV infection and lifetime injection drug use with HCV infection[21]. Previous study found the prevalence of triple co-infections was very low and close to zero in the general population, health care workers and street children; while it peaked to 1.25% (95% CI: 0.00–3.01) in people who inject drugs. Patients who received multiple transfusions and prisoners had a low prevalence as 0.01% and 0.28%, not statistically different from the prevalence in the general population. Those finding were similarly this study which found 0.8% of triple co-infections in hill tribe, but they found in people who inject drug [22].

Previous study attempted to estimate the sera prevalence and identify risk factors associated with hepatitis B and/or C co-infections in HIV-infected individuals from five regions of Cameroon by screening 531 HIV infected subjects for the presence of HBV surface antigen (HBsAg) and antibodies to HCV (HCVAb) in Iran. They found HBsAg but not HCV-Ab positivity was linked to age, lower CD4 count and residing in an urban rather than in a rural setting. Age was the different associated factor with co-infection when compare this study[23]. Dual infection with HBV and HIV was present in 76.9% of HIV positive subjects. All HIV-positive cases were also positive for HCV Ab.

The confirming associated factors of HBV and/or HCV with HIV co-infection in hill tribe in the northern region, Thailand in 2015 were gender, addictive substance, CD4 level and period of HIV infection. In term of gender between male and female, the association of co-infection was found male have the chance of co-infection more than female 2.17 times (CI= 1.26-3.74), because male have the risk behaviors of co-infection significantly different female such as condom use, tattoo, self tattoo, ear piercing ($p<0.05$). Addictive substance behaviors especially in the IDUs group were the highest chance of co-infection of HIV and HBV and/or HCV, because there were the same routes of infection. Stopping IDUs should provide urgent approach in the hill tribe. HIV-infected cases should be early diagnosed for hepatitis coinfection, provided ART and specific antiviral therapy. Finally, the prevention and control approach of co-infection should 1) provide the health education program into the hill tribe of HIV patients for stopping the addictive substance use especially injection drug users (IDUs), 2) add new finding of the associated factors of co-infection into the health education program and should directly communicate to the participants in all ARV clinic and 3) all cases newly diagnosed with HIV should be screened for all hepatitis co-infection. Additionally, a general promotion and awareness campaign for viral hepatitis testing is necessary.

REFERENCES

1. WHO. HIV/AIDS Fact sheet. 2017.

2. Qurishi N, Kreuzberg C, Lüchters G, Effenberger W, Kupfer B, Sauerbruch T, et al. Effect of antiretroviral therapy on liver-related mortality in patients with HIV and hepatitis C virus coinfection. Lancet. 2003;362(9397): 1708-13.

3. Shepard CW, Finelli L, Alter MJ. Global epidemiology of hepatitis C virus infection. Lancet Infect Dis. 2005;5(9):558-67.

4. Ishizaki Azumi, Holten van Judith, Hess Sarah, Bulterys Marc , Wiktor Stefan, Ball Andrew, et al. WHO guidelines on hepatitis B and C testing. Geneva, Switzerland: World Health Organiation; 2017.

5. WHO. HIV and hepatitis coinfections. 2017.

6. National AIDS Committee. Thailand AIDS response progress report reporting Period: Fiscal Year of 2014. 2015:7.

7. Sungkanuparph S, Vibhagool A, Manosuthi W, Kiertiburanakul S, Atamasirikul K, Aumkhyan A, et al. Prevalence of hepatitis B virus and hepatitis C virus co-infection with human immunodeficiency virus in Thai patients: a tertiary-care-based study. J Med Assoc Thai. 2004;87(11):1349-54.

8. Akekawatchai C, Sretapanya W, Pipatsatitpong D, Chuenchit T. Hepatitis B or C virus coinfection in and risks for transaminitis in human immunodeficiency virus - infected Thais on combined antiretroviral therapy. Asian Biomedicine. 2015;9(3):353-61.

9. Chen M, Wong WW, Law MG, Kiertiburanakul S, Yunihastuti E, Merati TP, et al. Hepatitis B and C co-Infection in HIV patients from the TREAT Asia HIV observational database: analysis of risk factors and survival. PLoS One. 2016;11(3):e0150512.

10. Apidechkul T. HIV/AIDS survival rate among hill tribe population in Northern Thailand. Siriraj Med J. 2011;63(16): 200-4.

11. Muhlbacher A, Weber B, Burgisser P, Eiras A, Cabrera J, Louisirirotchanakul S, et al. Multicenter study of a new fully automated HBsAg screening assay with enhanced sensitivity for the detection of HBV mutants. Med Microbiol Immunol. 2008;197(1): 55-64.

12. Esteban JI, Van Helden J, Alborino F, Bürgisser P, Cellerai C, Pantaleo G, et al. Multicenter evaluation of the Elecsys® anti-HCV II assay for the diagnosis of hepatitis C virus infection. J Med Virol. 2013;58(8):1362-8.

13. Soriano V, Vispo E, Labarga P, Medrano J, Barreiro P.Viral hepatitis and HIV coinfection. Antivir. Res. 2010; 85(1): 303-15.

14. Klaus J, Michael T, Claus-Thomas B, Ramona S, Claudia K, Dieter M, et al. High Prevalence and High Incidence of co-infection with Hepatitis B, Hepatitis C, and Syphilis and Low Rate of Effective Vaccination against Hepatitis B in HIVPositive Men Who Have Sex with Men with Known Date of HIV Seroconversion in Germany. PLoS ONE. 2015; 10(11): e01425.

15. Aurpibul L, Lumbiganon P, Kolasaraksa P, Hansudewechakul R, Sa-Nguanmoo P, Taeprasert P, et al. HIV and hepatitis B co-infection among prenatally HIV-infected Thai adolescents. Pediatr Infect Dis J. 2012; 31(9): 943–947.

16. Alter MJ. Epidemiology of viral hepatitis and HIV co infection. J Hepatol 2006;44(1 Suppl):S6-9.

17. Lee HC, Ko NY, Lee NY, Chang CM, Ko WC. Seroprevalence of viral hepatitis and sexually transmitted disease among adults with recently diagnosed HIV infection in southern Taiwan, 2000-5: upsurge in hepatitis C virus infections among injection drug users. J Formos Med Assoc. 2008; 107(5): 404-11.

18. Nyirenda M, Beadsworth MB, Stephany P, Hart C, Hart JJ, Munthali C, et al. Prevalence of infection with hepatitis B and C virus and coinfection with HIV in medical inpatients in Malawi. J Infect 2008; 57(1): 72-7.

19. Diop-Ndiaye H, Toure-Kane C, Etard JF, Lo G, Diaw P, Ngom-Gueye PM, et al. Hepatitis B seroprevalence and delta virus in HIV-1 Senegalese patients at HAART initiation (retrospective study). J Med Virol. 2008; 80(8): 1332-6.

20. Roboni SM, Tuon FF, Beleto NC, Demeneck H, Oliveira A, Largura D, et al. Human immunodeficiency virus and hepatitis C virus/ hepatitis B virus coinfection in Southern Brazil: clinical and epidemiological evaluation. Braz J Infect Dis. 2014; 18(6): 664–668.

21. Ramis SM, Liu J, Loutfy MR, Tharao W, Rebbapragada A, Huibner S, et al. Prevalence of sexually transmitted viral and bacterial infections in HIV-positive and HIV negative men who have sex with men in Toronto. PLoS one. 2016; 11(7): e0158090.
22. Bagheri Amiri, Mostafavi E, Mirzazadeh A. HIV, HBV and HCV co-infection prevalence in Iran - a systematic review and meta analysis. PLoS One. 2016; 11(3): e0151946.
23. Noubiap JJ, Aka PV, Nantack AJ, Agyingi LA, Ngai JN, Nyambi PN. Hepatitis B and C co-infections in some HIV positive populations in Cameroon, West Central Africa: analysis of samples collected over more than a decade. PLoS One; 10(9): e0137375.