Original Article

Seroprevalence of Hepatitis B and C Virus Infections and Related Risk Factors of Hepatitis B Virus Infection among Newly Diagnosed Tuberculosis Patients at National Tuberculosis Program (Central), Mandalay Office, Myanmar

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Objective: To study the seroprevalence of hepatitis B and C virus infections and related risk factors of hepatitis B virus infection among newly diagnosed tuberculosis patients.

Materials and Methods: This cross-sectional descriptive study was done at Outpatient Department (OPD), National Tuberculosis Program (Central), Mandalay Office from 1st May 2019 to 31st August 2019. A total of 200 newly diagnosed patients were tested for HBsAg and anti-HCV and knowledge, attitude, and preventive practice against hepatitis B were interviewed using pre-tested, structured questionnaires.

Results: In this study, hepatitis B or C prevalence was 9.5% (95%CI:5.43 to 13.57) and prevalence of HBsAg was 4.5% (95%CI:1.6 to 7.4), and anti-HCV was 5% (95%CI:1.95 to 8.05) among newly diagnosed tuberculosis patients. Prevalence is higher in the age above 40 years, and male patients, and low education levels, resided in other cities. Generally, 93% of patients had a good attitude, but 55.5% had poor knowledge of hepatitis B infection. Knowledge level was statistically significantly associated with the education level of patients ($\chi 2=20.418$, p value= <0.001). Histories of taking injections without necessary and dental procedures un-screening were risk factors for the occurrence of HBsAg.

Conclusion: The prevalence of hepatitis was high among newly diagnosed tuberculosis patients. All TB patients should be screened for hepatitis before starting anti-TB treatment. Nationwide health education programs for hepatitis should be promoted according to the education status of patients.

Keywords: Hepatitis B, Hepatitis C, Risk factors, Seroprevalence, Tuberculosis

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INTRODUCTION

More than 1 million people die each year from diseases caused by hepatitis B & C. Most of those infected persons do not know they have such an infection, increasing the risk of developing severe liver disease and transmitting the infection to others [1]. In 2017, World Health Organization (WHO) released a report that the global burden of hepatitis B (HBV) and C (HCV) were the leading causes of all hepatitis-related deaths. A large number of these were due to chronic liver disease and hepatocellular carcinoma [2]. Among them, only 1 in 10 had received a diagnosis and was aware of their infection. Hepatitis B causes 60 to 80 percent of primary liver cancer cases. Although hepatitis B is a vaccine-preventable disease, many people became infected before the hepatitis B vaccine was widely available [3]. Globally, an estimated 130–170 million persons (2%–3% of the world's population) are living with hepatitis C virus (HCV) infection. Each year, >350 000 die of HCV-related conditions, including cirrhosis and liver cancer [4].

In South-East Asia Region, WHO estimated that 39 million people live with chronic hepatitis B and 10 million people live with chronic hepatitis C. Mortality due to viral hepatitis is increasing with time, while that due to TB, HIV, and malaria is declining [5]. Early detection, prevention, and treatment of hepatitis B and C infection and associated diseases are necessary for low-income countries with an intermediate or high endemicity level [6]. In Myanmar, a national survey for hepatitis B and C screening in eighteen townships was conducted in 2015. The prevalence of hepatitis B and C in the general population is 6.5%, and 2.7%. But in Yangon Region, it is 12.3% and 2%. In Mandalay Region is 7.5% and 7.2% [7]. The country faces some major challenges in providing adequate screening and treatment for hepatitis [8]. The preventive measures, effective screening of those infections, and early treatment are important to consider and perform to reduce transmission [9].

Tuberculosis is one of the deadliest infectious diseases in the world. And TB is a major public health problem in Myanmar and is included in 30 highest TB burden countries in the world, 11th position global, 4th position in WHO SEAR. According to a global TB report [10], the current incidence of TB in Myanmar is 358(263-466) per 100,000 populations. Most of the drugs used in tuberculosis are hepatotoxic. Group of patients at increased risk of infection with hepatitis B or C viral infections are also at risk of infection with TB, largely because they live in regions of the world that are endemic to both infections. This makes a particular challenge for clinical management and warrants extra clinical vigilance. Drug-induced liver injury with elevation of aminotransferases is three- to six-fold higher in persons coinfected with HBV, HCV or HIV who are receiving anti-tuberculosis drugs, due to hepatotoxicity with isoniazid, rifampicin and pyrazinamide [11]. So, special caution should be exercised when administering these anti- TB drugs to patients with co-existing hepatitis B or hepatitis C viral infection [12].

The incidence of chronic hepatitis B among young adults is declining in Asia. But in older adults born before the vaccination era, vulnerable groups of people may unknowingly be chronically infected with or be susceptible to acquiring hepatitis B or hepatitis C and remain at risk for developing cirrhosis or liver cancer. To reduce mortality related to chronic viral hepatitis, all countries will be needed an enabling political environment with sufficient resources to facilitate reaching the hepatitis elimination goals set for 2030. Increased efforts to improve public awareness and listen to the voices of those affected by viral hepatitis will also be important to reduce stigma and discrimination [13]. The World Health Organization (WHO) has global goals for eliminating viral hepatitis infections. These goals include reducing 90% of new infections and 65% of deaths from viral hepatitis infections worldwide by 2030 [14]. To achieve these reductions, accessing early diagnosis, treatment, and prevention of transmission are important. To save lives, improve clinical outcomes of persons living with chronic hepatitis; reduce hepatitis B or hepatitis C incidence and transmission, and stigma due to disease, policymakers and implementers in LMICs face the practical challenges due to resource limitations [15]; infection, increasing the risk of developing severe liver disease and transmitting the infection to others [16]. There is no study on the seroprevalence, knowledge, attitude, and preventive practice of hepatitis B and C infection among tuberculosis patients in Myanmar. By knowing the HBsAg and anti- HCV status early and giving effective treatment, the risk of liver dysfunction can be reduced. The information from this study will provide the National Tuberculosis Program for better management in tuberculosis treatment. So, the main objective of this study is to find the seroprevalence of hepatitis B and C virus infections and related risk factors of hepatitis B virus infection among newly diagnosed tuberculosis patients.

MATERIALS AND METHODS

Study Design, study population and study period

A newly diagnosed 200 cases of tuberculosis from the Outpatient Department (OPD), National Tuberculosis Program (Central), Mandalay Office, during the period of 1st May 2019 to 31st August 2019 were included in the study. This study used a cross-sectional descriptive design. The University of Medicine, Mandalay's Institutional review panels, was approached to take the approval for the study. Patients the age of fifty years old and above and of any race were included in the study. The study was conducted by designing the questionnaire comprising of queries based on seroprevalence of hepatitis B and C virus infections and related risk factors of hepatitis B virus infection among newly diagnosed tuberculosis patients.

Research manuscripts reporting large datasets that are deposited in a publicly available database should specify where the data have been deposited and provide the relevant accession numbers. If the accession numbers have not yet been obtained at the time of submission, please state that they will be provided during review. They must be provided prior to publication.

Intervention studies involving animals or humans, and other studies that require ethical approval, must list the authority that provided approval and the corresponding ethical approval code.

Research Instrument

Participants were interviewed face to face by using pre-tested, structured questionnaires by the researcher. Survey Questionnaires consist of 4 sections; A – Socio-demographic characteristics of tuberculosis patients, which has eight questions regarding age, sex, marital status, residence, education, occupation, family members, and family income of tuberculosis patients; B – Questions regarding knowledge about hepatitis B virus infection which was also having eight questions regarding on hepatitis B infection. Multiple response questions and True/False questions were asked. The questions regarding knowledge of hepatitis B infection will consist of the cause of hepatitis B, mode of transmission, signs, and symptoms, consequences of the infection, prevention, and treatment of hepatitis B. The total scores are categorized into the poor and good levels as follows; ≤ 70% of the total score as "poor knowledge", >70% of the total score as "good knowledge"; C – Questions regarding the attitude towards hepatitis B virus infection which were having 9 questions regarding attitude towards hepatitis B infection among tuberculosis patients. The questions were with negative statements and positive statements and rated as 5-point Likert scale. The questions consisted of attitude on hepatitis B and HB/TB co-existing infections regarding screening, prevention, and treatment. The total scores are categorized into negative and positive attitudes as follows; ≤ 60% of the total score as "negative attitude", > 60% of the total score as "positive attitude"; and D – Questions regarding the preventive practice against hepatitis B virus infection which 3 questions on preventive practice against hepatitis B infection about screening, vaccination, avoiding injection without necessary and history of risk factors for transmission. The answers were stated in "Yes" or "No" on preventive practice.

Data collection procedure

Data were collected by using this questionnaire. Outpatient department, NTP (Central), Mandalay Office is open on weekdays, office hours. From newly diagnosed tuberculosis patients, the first fifteen patients were selected consecutively every week according to inclusion criteria. Therefore, a maximum of 60 patients were studied within one month of the study period. First, the permission was taken from NTP (Central), Mandalay Office. Before conducting the research, structured questionnaires were pre-tested with a sample of 20 tuberculosis patients at Tuberculosis Hospital, Patheingyi. Cronbach's alpha was 0.77. Then all eligible patients were explained the study, objectives, and procedures. Then written informed consent was taken. After getting consent, firstly, the patients were interviewed face to face by using pre-tested, structured questionnaires by the researcher. For HBsAg and anti-HCV testing, code number, name, age, and date of specimen collection will be recorded first. Under the aseptic condition, 3 ml of blood were collected by venipuncture using sterile needles and syringes and transferred into sterile plain tubes. Then the tubes will be labeled with person's name, age, sex, and date & time of collection and sent to National Health Laboratory. If the test results were positive, post-test counseling was done and informed to TB MO and referred to Mandalay General Hospital, Liver unit for further management. HBsAg negative patients were advised to take vaccination against HBV infection. Post-test counseling was done in the private room.

Data processing and analysis

Data was collected by using pre-tested, structured questionnaires and results of the blood tests. After that, proper scoring and coding were made manually. After checking the data, data entry was done by using Microsoft Excel 2010. Data summarization for description was done by showing frequency distribution tables.

Table 1. Socio-Demographic Characteristics with Prevalance of HBsAg and Anti-HCV among newly diagnosed tuberculosis patients.

Socio-Demographic Characteristics		HBsAg			Anti-HCV		
		Positive n (%)	Negative n (%)	χ2, p-value	Positive n (%)	Negative n (%)	χ2, p-value
Age (years)	<40	4 (3.9)	99 (96.1)	0.188, 0.742*	4 (3.9)	99 (96.1)	0.557, 0.528*
	≥ 40	5 (5.2)	92 (94.8)		6 (6.2)	91 (93.8)	
Sex	Male	5 (2.5)	108 (54.0)	0.003, 1.00*	7 (3.5)	106 (53.0)	0.781, 0.518*
	Female	4 (2.0)	83 (41.5)		3 (1.5)	84 (42.0)	
Residents	Mandalay city	2 (1.0)	80 (40.0)	1.374, 0.313*	6 (3.0)	76 (38.0)	1.571, 0.323*
	Other cities	7 (3.5)	111 (55.5)		4 (2.0)	114 (57.0)	
Marital Status	Single	3 (1.5)	46 (23)	0.398, 0.691*	1 (0.5)	48 (24.0)	1.196, 0.456*
	Married	6 (3.0)	144 (72)		9 (4.5)	141(70.5)	
	Divorced	1 (0.5)	0 (0.0)		0 (0.0)	1 (0.5)	
Education	Illiterate	0 (0.0)	5 (2.5)	1.285, 0.603*	0 (0.0)	5 (2.5)	0.04, 1.00*
	Read and write	1 (0.5)	7 (3.5)		0 (0.0)	8 (4.0)	
	Primary School	2 (1.0)	53 (26.5)		2 (1.0)	53 (26.5)	
	Middle School	4 (2.0)	75 (37.5)		4 (2.0)	75 (37.5)	
	High School	2 (1.0)	27 (13.5)		2 (1.0)	27 (13.5)	
	University	0 (0.0)	6 (3.0)		0 (0.0)	6 (3.0)	
	Graduate	0 (0.0)	18 (9.0)		2 (1.0)	16 (8.0)	
Occupation	Unemployed/Dependent	0 (0.0)	16 (8.0)	0.819, 1.00*	1 (0.5)	15 (7.5)	0.057, 0.574*
	Employed	8 (4.0)	171 (85.5)		9 (4.5)	170 (85.0)	
	Retired	1 (0.5)	4 (2.0)		0 (0.0)	5 (2.5)	
Household Income per capita in Kyats	≤ 90000	5 (2.5)	67 (33.5)	1.561, 0.288*	2 (1.0)	70 (35.0)	1.170, 0.335*
	>90000	4 (2.0)	124 (62)		8 (4.0)	120 (60)	

* Fisher's Exact p-value

Statistical analysis was performed by using statistical software Stata version 14. To describe the age, mean and standard deviation are used. Sex, address, marital status, occupation, income, education, knowledge level, attitude level, preventive practice, and seroprevalence of HBsAg and anti-HCV were shown by frequency and percentage. The association between socio-demographic characteristics and knowledge, attitude, preventive practice, the occurrence of HBsAg and anti-HCV, and the association of preventive practice with HBsAg status were determined by Chi- square test. If the Chi-square test assumption does not meet, Fisher's exact test was used. The statistical significance level was denoted as 0.05.

RESULTS

Socio-demographic characteristics with Prevalence of HBsAg and Anti-HCV among newly diagnosed tuberculosis patients

Most of the patients were belonged to age >40 with 47% and least patients were belonged to age ≤ 20 with 9%. The ages of the patients ranged from 15 to 84 years with a mean of 41 years and SD of 15.803. Above 40 years were 47% and only 9% were ≤20 years. Among the study patients, 56.5% were male and 58% of patients were living in other cities. Middle school education was 39.5% and primary school education 27.5%. Nearly 90% have

Table 2. Socio-Demographic Characteristics with knowledge and attitude towards HBsAg and Anti-HCV among newly diagnosed tuberculosis patients.

Socio-Demographic Characteristics		Knowledge			Attitude		
		Good n (%)	Poor n (%)	χ2, p-value	Positive n (%)	Negative n (%)	χ2, p-value
Age (years)	<40	47(45.6)	56(54.4)	0.110,	92(89.3)	11(10.7)	4.417,
	≥ 40	42(43.3)	55(56.7)	0.74	94(96.9)	3(3.1)	**0.036**
Sex	Male	55(48.7)	58(51.3)	4.903,	104(92.0)	9(8.0)	0.371,
	Female	31(35.6)	56(64.4)	**0.027**	31(94.3)	5(5.7)	0.542
Residents	Mandalay city	42(51.2)	40(48.8)	1.031,	75(91.5)	7(8.5)	0.504,
	Other cities	69(58.5)	49(41.5)	0.310	111(94.1)	7(5.9)	0.478
Marital Status	Single	18(36.7)	31(63.3)	1.585,	43(87.8)	6(12.2)	2.742,
	Married/Divorced	71(47.0)	80(53.0)	0.208	143(94.7)	8(5.3)	0.112*
Education	≤High school	68(38.6)	108(61.4)	20.418,	162(92.0)	14(8.0)	2.053,
	>High school	21(87.5)	3(12.5)	**<0.001**	24(100.0)	0(0.0)	0.227
Occupation	Employed/ Retired	82(44.6)	102(55.4)	0.004,	172(93.5)	12(6.5)	0.808,
	Unemployed	7(43.8)	9(56.3)	0.95	14(87.5)	2(12.5)	0.310*
Household Income per capita in Kyats	≤ 90000	21(29.2)	51(70.8)	10.710,	66(91.7)	6(8.3)	0.307,
	>90000	68(53.1)	60(46.9)	**0.001**	120(93.8)	8(6.3)	0.579

* Fisher's Exact p-value

been employed. And more than half had a household income per capita >90000 kyats.

The prevalence of HBsAg and Anti-HCV among newly diagnosed tuberculosis patients is shown in Table 1. Only 4.5% (95%CI: 1.6% to7.4%) patients were positive in HBsAg and 5% (95%CI: 1.9% to 8%) positive patients with Anti-HCV while maximum patients were negative in both HBsAg and Anti-HCV in this study. The occurrence of Hepatitis B or C among newly diagnosed tuberculosis patients was 9.5% (95%CI: 5.4% to 13.5%).

The occurrence of HBsAg and anti-HCV by socio-demographic characteristics among newly diagnosed tuberculosis patients are shown in Table 1. Hepatitis B prevalence was 2.5%, and C was 3% among the age group above 40 years, and in the male gender, it was 2.5% for B and 3% for C. Hepatitis C prevalence was high in Mandalay city (3%), but Hepatitis B prevalence was high in other cities (3.5%). Both Hepatitis B and C prevalence was high in the employed group, 4% for B and 4.5% for C.

Knowledge, Attitude and Preventive Practice on Hepatitis infection among newly diagnosed tuberculosis patients

Among 200 patients, 78% were unaware that hepatitis B was caused by a virus. However, 87% were aware that the condition was contagious. Except for the loss of appetite and yellowish skin and sclera, most patients did not accurately answer questions about hepatitis B symptoms. In terms of complications, most patients could appropriately answer. Most patients answered wrong when asked about the route of transmission, which is that hugging and sharing meals, bowls, or utensils can transmit the sickness. Sixty percent of the patients were unaware that hepatitis B was curable. Ninety-eight percent of patients were aware that a blood test might be performed to detect hepatitis B. More than three-quarters of the patients (81.5%) were already aware that hepatitis B might be avoided by getting vaccinated. After that, the level of knowledge was put into two groups: those with less than 70% of the total score and those with more than 70% of the total score. The knowledge level of 200 patients was 44.5% good and 55.5% bad.

Regarding the attitude on hepatitis B, 96% believed that having hepatitis B made tuberculosis worse. Negative attitudes toward knowing one's hepatitis B status and attitudes toward a vaccination to prevent the

Table 3a. Socio-Demographic Characteristics with knowledge, attitude and preventive practice towards HBsAg and Anti-HCV among Newly Diagnosed Tuberculosis Patients.

Socio-Demographic Characteristics	Screening of hepatitis B			Vaccination against hepatitis B			Avoid injection without necessary		
	Yes n (%)	No n (%)	χ2, p-value	Yes n (%)	No n (%)	χ2, p-value	Yes n (%)	No n (%)	χ2, p-value
Age (years)									
<40	14(13.6)	89(86.4)	1.303,	9(8.7)	94(91.3)	0.469,	68(66.0)	35(34.0)	7.049,
≥ 40	19(19.6)	78(80.4)	0.254	6(6.2)	91(93.8)	0.493	46(47.4)	51(52.6)	**0.008**
Sex									
Male	22(19.5)	91(80.5)	1.662,	10(8.8)	103(91.2)	0.682,	57(50.4)	56(49.6)	4.557,
Female	11(12.6)	76(87.4)	0.197	5(5.7)	82(94.3)	0.409	57(65.5)	30(34.5)	**0.033**
Residents									
Mandalay city	18(22.0)	64(78.0)	2.998,	9(11.0)	73(89.0)	2.420,	48(58.5)	34(41.5)	1.34,
Other cities	15(12.7)	103(87.3)	0.083	6(5.1)	112(94.9)	0.120	66(55.9)	52(44.1)	0.714
Marital Status									
Single	6(12.2)	43(87.8)	0.853,	4(8.2)	45(91.8)	0.041,	29(59.2)	20(40.8)	0.126,
Married/ Divorced	27(17.9)	124(82.1)	0.356	11(7.3)	140(92.7)	0.764*	85(56.3)	66(43.7)	0.722
Education									
≤High school	26(14.8)	150(85.2)	3.176,	9(5.1)	167(94.9)	12.039,	92(52.3)	84(47.7)	13.372,
>High school	7(29.2)	17(70.8)	0.084*	6(25.0)	18(75.0)	**0.004***	22(91.7)	2(8.3)	**<0.001**
Occupation									
Employed/ Retired	31(16.8)	153(83.2)	0.202, 1.00*	15(8.2)	169(91.8)	1.410, 0.615*	103(56.0)	81(44.0)	0.98, 0.322
Unemployed	2(12.5)	14(87.5)		0(0.0)	16(100.0)		11(68.8)	5(31.3)	
Household Income per capita in Kyats									
≤ 90000	10(13.9)	62(86.1)	0.557,	1(1.4)	71(98.6)	6.056,	36(50.0)	36(50.0)	2.249,
>90000	23(18.0)	105(82.0)	0.456	14(10.9)	114(89.1)	**0.014**	78(60.9)	50(39.1)	0.134

* Fisher's Exact p-value

disease were 72.5 % and 73.5 %, respectively. Patients were enthusiastic about not sharing razors, needles, or blades, as well as having their screenings, vaccinations, and future treatment completed. If HBsAg was found to be positive, most patients (93.5%) showed a positive attitude toward self-care. Then, attitude status was classified as negative attitude if less than 60% of the total score and positive attitude if more than 60% of the entire score. Most patients (93%) had a good attitude about hepatitis B virus infection, with only a few individuals (7%) having a negative attitude.

In terms of preventative practice, 83.5% of 200 patients had not been checked for HBsAg, and 92.5% had not received the vaccination. Almost all the patients (99%) had no history of blood transfusion, 84.5% of tattooing, and 53.5% of dental procedures. None of the patients shared a toothbrush, and 57% of the patients took injections when they were not necessary.

Socio-demographic characteristics and knowledge, attitude towards Hepatitis B Infection

Table 2 shows the relationship between socio-demographic characteristics and knowledge as well as an attitude about hepatitis B infection. There was a statistically significant relationship between hepatitis B knowledge level and gender (p value=0.027), an education level (p value=0.001), and income (p value=0.001). There was also a statistically significant relationship between age groups of 40 years and

Table 3b. Socio-Demographic Characteristics with knowledge, attitude and preventive practice towards HBsAg and Anti-HCV among Newly Diagnosed Tuberculosis Patients.

Socio-Demographic Characteristics	History of Blood Transfusion			History of Dental Procedures			History of getting tattooing		
	Yes n (%)	No n (%)	χ2, p-value	Yes n (%)	No n (%)	χ2, p-value	Yes n (%)	No n (%)	χ2, p-value
Age (years)									
<40	2(1.9)	101(98.1)	1.903,	33(32.0)	70(68.0)	17.852,	16(15.5)	87(84.5)	0.00,
≥ 40	0(0.0)	97(100.0)	0.498*	60(61.9)	37(38.1)	**<0.001**	15(15.5)	82(84.5)	0.989
Sex									
Male	1(0.9)	112(99.1)	0.035,	58(51.3)	55(48.7)	2.433,	31(27.4)	82(72.6)	28.245,
Female	1(1.1)	86(98.9)	1.0*	35(40.2)	52(59.8)	0.119	0(0.0)	87(100.0)	**<0.001**
Residents									
Mandalay city	1(1.2)	81(98.8)	0.053,	31(37.8)	51(62.2)	4.224,	11(13.4)	71(86.6)	0.461,
Other cities	1(0.8)	117(99.2)	1.0*	62(52.5)	56(47.5)	**0.04**	20(16.9)	98(83.1)	0.497
Marital Status									
Single	0(0.0)	49(100.0)	0.656,	16(32.7)	33(67.3)	5.002,	8(16.3)	41(83.7)	0.034,
Married/ Divorced	2(1.3)	149(98.7)	1.0*	77(51.0)	74(49.0)	**0.025**	23(15.2)	128(84.8)	0.854
Education									
≤High school	2(1.1)	174(98.9)	0.275,	90(51.1)	86(48.9)	12.673,	30(17.0)	146(83.0)	2.675,
>High school	0(0.0)	24(100.0)	1.0*	3(12.5)	21(87.5)	**<0.001**	1(4.2)	23(95.8)	0.135*
Occupation									
Employed/ Retired	1(0.5)	183(99.5)	4.842,	91(49.5)	93(50.5)	8.081,	31(16.8)	153(83.2)	3.190,
Unemployed	1(6.3)	15(93.8)	0.154*	2(12.5)	14(87.5)	**0.004**	0(0.0)	16(100.0)	0.140*
Household Income per capita in Kyats									
≤ 90000	0(0.0)	72(100.0)	1.136,	40(55.6)	32(44.4)	3.708,	12(16.7)	60(83.3)	0.117,
>90000	2(1.6)	126(98.4)	0.537*	53(41.4)	75(58.6)	0.054	19(14.8)	109(85.2)	0.732

* Fisher's Exact p-value

attitude toward hepatitis B infection (p-value =.036). Other socio-demographic factors of patients were found to have no statistically significant association.

Socio-demographic characteristics and preventive practices towards Hepatitis B Infection

The association between socio-demographic variables and preventative practice against Hepatitis B infection among newly diagnosed tuberculosis patients was examined (see Tables 3a and 3b). There was a statistically significant link between getting a Hepatitis B vaccine and a person's level of education (p = 0.004) and household income (p = 0.014). There was also a statistically significant association between patients receiving unnecessary injections and their age group (p value=0.008), gender (p value=0.033), and education level (p value=0.001). There was no statistically significant relationship found between blood transfusion history and socio-demographic variables. There were statistically significant associations between dental procedure history and age group (p-value = 0.001), residents (p value = 0.04), marital status (p-value = 0.025), education level (p-value = 0.001), and occupation (p-value = 0.004). There was also a statistically significant relationship between gender and tattooing history (p value =.001). The result showed that female taking tattooing was uncommon in Myanmar society.

Table 4. Association between preventive practice and occurrence of HBsAg among newly diagnosed tuberculosis patients.

Preventive Practices	HBsAg		$\chi 2$	p-value
	Positive n (%)	Negative n (%)		
Screening of hepatitis B				
Yes	4(44.4)	29(15.2)	5.341	**0.043***
No	5(55.6)	162(84.8)		
Vaccination against hepatitis B				
Yes	0(0.0)	15(7.9)	0.764	1.00*
No	9(100.0)	176(92.1)		
Avoid injection without necessary				
Yes	1(11.1)	113(59.2)	8.097	**0.006***
No	8(88.9)	78(40.8)		
History of Blood Transfusion				
Yes	0(0.0)	2(1.0)	0.095	1.00*
No	9(100.0)	189(99.0)		
History of Dental Procedures				
Yes	8(88.9)	85(44.5)	6.807	**0.013***
No	1(11.1)	106(55.5)		
History of getting tattooing				
Yes	2(22.2)	29(15.2)	0.325	0.632*
No	7(77.8)	162(84.8)		

* Fisher's Exact p-value

Association between preventive practices and occurrence of HBsAg among newly diagnosed tuberculosis patients

Regarding preventive practice against hepatitis B infection, there was also a statistically significant association between the occurrence of HBsAg and screening (p-value = 0.043), taking unnecessary injections (p value= 0.006), and history of dental procedure (p value=0.013). There was no association with vaccination, blood transfusion, tattooing, and occurrence of HBsAg (see Table 4).

DISCUSSION

A cross-sectional study of 200 newly diagnosed tuberculosis patients was tested for HBsAg and anti-HCV, and their knowledge, attitude, and preventive practice against hepatitis B were assessed. In this study group, ages ranging from 15 to 84 years were assessed. The mean age was 41 years (SD=15.803). More than half of the patients were male, not from Mandalay, and under high school education.

In Myanmar, according to the National and Regional Survey for hepatitis B and C [9], hepatitis B prevalence was 6.5%, and hepatitis C prevalence was 2.7% and 2 persons had both. In this study, hepatitis B prevalence among newly diagnosed tuberculosis patients was lower than the average prevalence in Myanmar. But hepatitis C prevalence was higher than the average prevalence. Hepatitis B has occurred high percentage among the age group above 40 years, male gender, patients living outside the Mandalay, and low education level. This occurrence was the same for hepatitis C except for residents in which more common in Mandalay.

Our study's findings emphasized the need for hepatitis testing and prompt action. Because more than half of the patients lacked knowledge, although most patients had a positive attitude toward hepatitis B infection. The findings were similar to those of a community-based cross-sectional survey of hepatitis B knowledge and awareness among Malaysian households [17], which found that 36.9% of participants had strong understanding of hepatitis B. In the current study, whereas more than four fifths of the patients (87%) were aware that hepatitis B is a contagious disease, more than three quarters of the patients (78%) were unaware that hepatitis B is caused by a virus. Most patients accurately identified how hepatitis B was transmitted. Our findings

were comparable to those of research conducted in Asian communities in British Columbia [18]. In the current study, most patients were aware that hepatitis B could induce liver malfunction, cirrhosis of the liver, liver cancer, and chronic hepatitis. However, three-fifths (60%) of patients were unaware that lung cancer is not a complication of hepatitis B. Knowledge level was a statistically significant association with gender, education level, and income in this study.

Regarding the attitude towards hepatitis B, almost all (96%) of patients believed that having hepatitis B made tuberculosis worse, three quarters (72.5%) were afraid of knowing their hepatitis B status, and 73.5% of patients did not believe that vaccination could prevent hepatitis B. Except for the age group, there was no statistically significant link between socio-demographic factors and the way people with hepatitis B felt. Generally, almost all the patients had a positive attitude towards hepatitis B infection. Having a good attitude and improving their education status and health knowledge would affect good preventive practice against hepatitis B infection.

According to Vicky et al., hepatitis B knowledge and practices among Chinese immigrants to the United States [19], 48% of study participants had received hepatitis B screening, and 31% had received hepatitis B immunization. More than half of the patients in our study received unnecessary injections. These findings could be related to the patients' educational level and level of health knowledge. The findings revealed that, despite being aware of the risk of infection from needles and surgical procedures, the participants were unable to adhere to the principles. No patients in this study shared a toothbrush. There were statistically significant associations between socio-demographic characteristics and risk factors such as vaccination, avoiding unnecessary injections, dental procedures, and tattooing. Previous research [19] found lower results than ours. There was no statistically significant relationship discovered. It could be because patients in Mandalay were more easily accessible than patients who did not live in Mandalay. A statistically significant link was found between education level and household income and getting vaccinated against hepatitis B.

In a survey of internet users in Taif, Saudi Arabia [20], 42.4% had received hepatitis vaccination as part of premarital screening. Age, gender, and education level were statistically associated with unnecessary injections in this study. Injections were commonly used by people under the age of forty and by women. By education level, 57% of patients used to take injections, with 46% having completed high school and 11% have completed college. These findings could be attributed to patient age, gender, and health education. A dental operation was performed on 61.9% of study patients over the age of 40. It could be the cause of the high prevalence of HBsAg in people over the age of 40. In terms of education, 93 out of 200 patients (46.5%) had a history of dental procedures, and 45% were in high school or below. It was discovered that the lower the education level, the more patients engaged in risky procedures to spread the diseases. In this study, no female patients were tattooed. It could be related to Myanmar culture, where female tattooing is uncommon, and HBsAg is more prevalent in men. This study found a statistically significant link between HBsAg and screening, injections, and dental procedures.

According to a 2015 Myanmar National and Regional Hepatitis B and C survey [9], anti-HCV positivity was associated with male gender, age >50 years, blood transfusion, dental treatment, and surgery. However, no risk variables were linked to HBsAg. Only four of the nine HBsAg-positive patients in the current study had previously undergone screening. Only 29 of 191 HBsAg negative patients had previously been screened for HBsAg, and four-fifths of the patients had never been screened. It could be related to disease awareness, disease prevention, and disease treatment. In terms of injections, 8 out of 9 HBsAg-positive patients used to take them without need. In this study, the prevalence of hepatitis B was high among patients who received unnecessary injections, and a statistically significant association was discovered. It could be due to the patients' educational status and a lack of health knowledge. A study of knowledge, attitudes and the prevalence of Hepatitis B and C seromarkers among Tehran barbers [21] discovered that a history of finger-cuts with needles, blades, and scissors was more likely to be positive for HBsAg. Eight out of nine HBsAg-positive patients had a history of dental procedures. Although the occurrence may vary depending on the type of dental procedure used, a statistically significant association was discovered.

This study has some strengths. To begin, the prevalence of hepatitis B and C in that specific population of newly diagnosed tuberculosis patients could be determined. Second, tuberculosis patients with hepatitis B or C were identified before beginning anti-TB treatment. As a result, these co-infected patients would be referred to the liver unit for additional treatment. Third, this study included hepatitis B patients' knowledge, attitudes, and preventive practices. As a result, basic knowledge of patients' risk factors for hepatitis B could be assessed and preventive measures implemented in public health management. However,

this study had some limitations. Only newly diagnosed tuberculosis patients had blood tests. This study did not include all tuberculosis patients, including those who had relapsed, those who had been treated, and those who were currently taking anti-TB drugs. Furthermore, occult HBV infection could not be determined. As a result, the prevalence may be underestimated.

CONCLUSION

Only newly diagnosed tuberculosis patients had high hepatitis B or C prevalence, not all TB patients. All TB patients should get hepatitis B and C tests. All tuberculosis patients should get health education regarding tuberculosis and hepatitis B. Thus, patients' health knowledge would improve. Health education should inform patients about the availability and efficacy of vaccinations and urge hepatitis B vaccination. Health education should include avoiding unnecessary injections and getting the hepatitis B vaccine before dental work. Public health campaigns should target less educated people and provide health education at different levels. TB patients with hepatitis B or C are more prone to develop liver failure and have poor outcomes.

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