



A Proactive Policy to Eliminate Viral Hepatitis Infection: Five-Year Results for the Subdistrict Model in Thailand

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Abstract

The objective of this study was to ascertain hepatitis B (HBV) and hepatitis C (HCV) infection rates in individuals toward the early initiation of treatment and prevention of developing hepatocellular carcinoma (HCC). This cross-sectional study was performed on 2084 participants from two subdistricts in Chiang Mai and Lampang provinces, northern Thailand. Screening for viral hepatitis in the general population was conducted at subdistrict health-promoting hospitals in Nong Pa Krang, in the suburb of Chiang Mai city, and Thoenburi, a subdistrict in the rural area of Lampang province, northern Thailand. Ninety-one (4.4%) participants tested positive for either HBV or HCV, with 3.3% of all participants infected with HBV and 1.1% infected with HCV. Treatment follow-up was 29.0% of HBV and 54.5% of HCV. A proactive approach to eliminate viral hepatitis can be carried out at the subdistrict level in Thailand. Success could increase participation in other subdistricts in a cascade-like manner by 2030. The identified factors of success are leadership by the local government supported by the Local Health Fund and Village Health Volunteers.

Keywords Hepatitis B · Hepatitis C · Hepatocellular carcinoma · Thailand

Introduction

Liver cancer was the sixth most common cancer worldwide and the fourth leading cause of cancer mortality in 2018, with approximately 841,000 new cases (9.3 cases per 100,000 person-years) and 782,000 deaths (8.5 deaths per 100,000 person-years) occurring annually, and is more common in men than in women [1–4]. The incidence of liver cancer is diverse in different countries, from 5.1 to 17.7 per 100,000 person-years [1]. The highest incidence rates of liver cancer were observed in Eastern Asia, South-Eastern Asia, Northern Africa, and Southern Africa [1, 3]. Infection with hepatitis C virus (HCV) or hepatitis B virus (HBV) is a major factor that can lead directly to hepatocellular carcinoma (HCC) that is related to other underlying liver diseases linked to the development of cirrhosis [5–7]. Globally, there are 240 million HBV-infected and 130 million HCV-infected individuals, and approximately 90% of HBV and 80% of HCV are unaware of their statuses [5, 7]. HBV, typically acquired at birth or in early childhood, remains a leading cause of HCC. In developed countries, the etiology is more likely to be HCV infection acquired later in life [7].

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In 2014, the World Health Assembly (the World Health Organization (WHO)) set the goal of eliminating viral hepatitis by 2030. Guidelines have been released for HBV prevention, treatment, care, and monitoring (Sustainable Development Goal Target 3.3 in 2015) [8, 9]. WHO also modeled local strategies in 2016 [10]. Unfortunately, as of 2017, only 20% of these infected patients have been diagnosed, and only 2% of infected people are being treated annually. Moreover, only nine countries are currently on track to achieve the WHO Hepatitis Elimination Target by 2030 [10]. Unless there is a massive increase in screening, diagnosis, and healthcare access, viral hepatitis will continue to spread, leading to an estimated 76 million infected and 18.1 million preventable deaths from viral hepatitis by 2030. In response, Thailand's authorities introduced the accessible subdistrict model in 2015 to fight against viral hepatitis as a primary concern for the Thai Healthcare Program [8].

In Thailand, the number of liver cancer has been increasing every year and has led to increased mortality. Chiang Mai and Lampang provinces have reported many liver cancer cases yearly [4, 8]. Therefore, to prevent an increase in liver cancer occurrences in the following year, we aim to estimate the incidence of hepatitis infection for early treatment to prevent the development of HCC.

Methods

Data Source

Two sub-districts in northern Thailand were selected for the preliminary model: Nong Pa Krang (NPK), a suburb in Chiang Mai city with a population of 7200, and a sub-district health-promoting hospital (SHPH) comprising of one doctor, five nurses, and eight health care personnel 25 village health volunteers (VHVs) and Thoenburi (TBR), a sub-district in the rural area of Lampang province with a population of 6656 and an SHPH comprising of, four nurse assistants and 18 VHVs. At NPK, 100 participants aged over 15 years old were screened each day over 2 weeks, resulting in 1084 participants, while 1000 participants aged 30–65 were screened at TBR. The project plan and local funding were approved by each of the sub-district mayors.

Data Collection

We conducted activities in four stages (Fig. 1). (1) Training: basic knowledge about viral hepatitis infection, as well as its prevention and screening, were conveyed to all healthcare personnel and VHVs by the physicians. (2) Promotion: subdistrict level capacity planning for the free hepatitis-screening program was promoted and endorsed by the mayor and the team at the SHPH before approaching the participants; those with liver

cancer evidence were excluded and referred for treatment. (3) Execution: HBV and HCV-infected individuals were identified. Participants negative for both HBV/HCV received information on healthcare. Simultaneously, those tested positive for either were sent to the provincial hospital to confirm HBV or HCV infection via the ELISA technique. Participants with a positive result were evaluated via HBV DNA viral load or HCV RNA viral load, blood chemistry, and liver ultrasonography before determining treatment according to Thailand's Treatment Guidelines of Hepatitis B and Hepatitis C [9]. (4) Monitoring: we monitored and followed up all participants by using history taking, physical examination, blood chemistry, viral load, and liver ultrasound to assess the efficacy of therapy and surveillance for HCC for five years.

Statistical Analysis

The HBV and HCV results and those for the initiation of treatment and follow-up were summarized using descriptive statistical analysis such as percentages. All analyses were performed using the STATA program.

Results

Data for the study were obtained from two subdistricts in Chiang Mai and Lampang, Thailand, in 2016. Initially, we trained 30 healthcare personnel and VHVs in NPK and TBR to screen for viral hepatitis infection. After training, all of the personnel were willing to participate in the study. The trained healthcare personnel and VHVs had sufficient knowledge for teaching, screening, and advising infected persons about transmission, detection, and therapy. Subsequently, 2084 participants registered to enroll for HBV/HCV screening according to the subdistrict level capacity. In this study, 91 (4.4%) participants tested positive for hepatitis infection: 44 (4.1%) and 14 (1.3%) for HBV and HCV, respectively in NPK, whereas in TBR, 25 (2.5%) and 8 (0.8%) participants were infected with HBV and HCV, respectively. Hence, totals of 69 (3.3%) and 22 (1.1%) had HBV and HCV infections, respectively (Table 1).

All HBV- infected and HCV-infected participants were directly referred to provincial hospitals regardless of their right to treatment. 29.0% of HBV and 54.5% of HCV-infected patients have received treatment since testing positive (Table 1). The treatment programs included pretreatment evaluation according to viral load, viral genotype, and ultrasound to check for cirrhosis. All of the patients were followed up with home visits by VHVs to monitor the treatment program. During 5 years of monitoring, all patients continued with treatment during the follow-up period, and none progressed to liver disease and HCC occurrence.

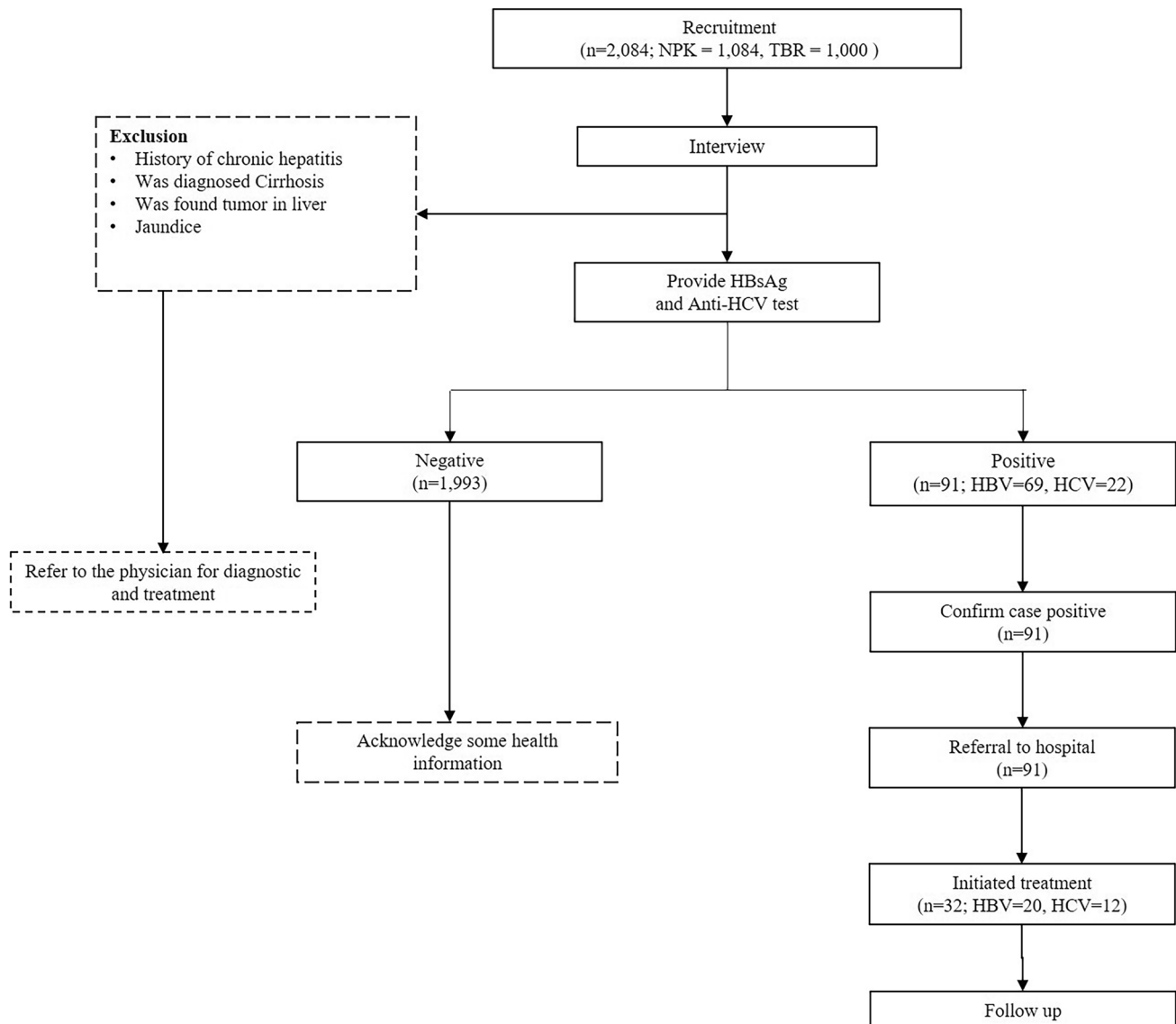


Fig. 1 Recruitment process

Discussion

This study demonstrated that screening the general population for viral hepatitis can be successfully carried out at the Thailand subdistrict level. The Local Health Fund supplied the budget used in this activity allocated to every subdistrict by the Thai National Health Security Office (NHSO) to be used together with the local government's budget to help to solve health problems in the area. The Local Health Fund is used at the discretion of the local government committee under the mayor's supervision or the leader of the local government. VHVs are very useful for disseminating information on and explaining the causes and consequences of viral hepatitis, including the necessity of follow-up and treatment. Indeed, the study's success depended on the

proactive approach of the leader of the local government, the Local Health Fund, and the VHVs. It is noteworthy that in the after-effects of this initiative, many other local governments have expressed their interest to have the screening carried out in their area voluntarily. In the present study, we detected 3.3% HBV-infected and 1.1% HCV-infected individuals. Afterward, VHVs did an excellent job following up the infected participants and initiating the treatment process for 29.0% of the HBV and 54.5% of the HCV cases. After five years of monitoring, none of the patients had progressed to liver disease or the occurrence of HCC.

HBV and HCV infection can both cause acute and/or chronic hepatitis, potentially leading to liver cancer development and, subsequently, death. HBV can be transmitted vertically, horizontally (e.g., child-to-child), sexually, or

Table 1 Characteristics of hepatitis B and hepatitis C infection among two subdistricts in Chiang Mai and Lampang provinces, northern Thailand ($n=2084$)

Characteristic ^a	All participants ($n=2084$)	Participants in NPK ($n=1084$)	Participants in TBR ($n=1000$)
Hepatitis B			
HBV infection			
No	2015 (96.7)	1040 (95.9)	975 (97.5)
Yes	69 (3.3)	44 (4.1)	25 (2.5)
Received HBV treatment ($n=69$)			
No	49 (71.0)	37 (84.1)	12 (48.0)
Yes	20 (29.0)	7 (15.9)	13 (52.0)
Follow-up HBV status (TBR only, $n=13$)			
Viral level decreasing	12 (92.3)	–	12 (92.3)
On treatment	1 (7.7)	–	1 (7.7)
Hepatitis C			
HCV infection			
No	2062 (98.9)	1070 (98.7)	992 (99.2)
Yes	22 (1.1)	14 (1.3)	8 (0.8)
Received HCV treatment ($n=22$)			
No	10 (45.5)	8 (57.1)	2 (25.0)
Yes	12 (54.5)	6 (42.9)	6 (75.0)
Follow-up HCV status (TBR only, $n=6$)			
Viral level decreasing	4 (66.7)	–	4 (66.7)
On treatment	2 (33.3)	–	2 (33.3)

HBV Hepatitis B, HCV Hepatitis C, NPK Nong Pa Krang, TBR Thoenburi

^aData presented as number (%) of participants for the categorical data

parenterally, while the predominant etiology for HCV is acquiring infection later on in life [5]. In this study, we still found that a large number of individuals tested were unaware of having a hepatitis infection, meaning that HBV and HCV infections possibly go undetected for many years and many infected people remain undiagnosed. This is consistent with previous studies, such as the prevalence of HBV infection in China remaining at approximately 10% [6]. HBV infections were almost entirely in the 20 and older age groups with a male-to-female ratio of 1.16:1, which is approximately the same as the male-to-female ratio of China's general population [6].

There are some limitations to our study. VHV are an essential source for finding new HBV or/and HCV positive cases among the general population via promoting the hepatitis free-screening program. Questionnaires need to be used to obtain more information on how hepatitis is acquired and spread. Therefore, there was a lack of necessary information to help develop a better setting for the VHV to interact with the general population, thereby discovering the actual

number of new infections. Nevertheless, the “Test and Treat” or the “Treat all” procedures proposed by the WHO and the Center for Disease Analysis Foundation are still under consideration to make use of them in the future. There is also the idea of screening adults born before the universal vaccination for HBV became available in 1992 and whether they are asymptomatic carriers or not via a rapid test as part of a routine physical checkup.

Conclusions

A proactive approach to eliminate viral hepatitis can be achieved at the subdistrict level, and this success could induce cascade-like participation by other subdistricts in time for 2030. The identified factors for success are.

1. Leadership of the local government,
2. Access to the local health fund,
3. Training of VHV.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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