

Review Article

Risk of Hepatitis C Virus Infection among Selected Thai Population

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Abstract

Hepatitis C Virus infection remains a large health care burden in the world. Estimating the infection rate is difficult, especially-asymptomatic or chronic infections. Prevalence rates widely vary in different populations, and from region to region including Thailand. Evidences support that injecting drug use leads to transmitting the virus through-out a given population. Articles had been reviewed related anti-HCV prevalence, risk factors, and potential risk reduction interventions of HCV transmission in various Thai populations including the general population, blood donors, health care workers, patients with STDs, female sex workers, and Injecting Drug Users (IDUs). This article showed that the highest prevalence was found among IDUs. Most studies on risk factors among selected Thai populations found similar risk factors including a history of IDU, receiving unscreened blood or blood screened with less sensitive anti-HCV kits, unsafe injection from non-medical personnel, sharing razors or toothbrushes, and unsafe sex. Prevention should target those at risk and involve providing education, reducing risk by counseling, screening HCV, and care and counseling concerning addiction.

Keywords: Hepatitis C infection; Anti-HCV; Thai selected groups; Risk factors; Risk reduction

Introduction

Hepatitis C Virus (HCV) infection is one of important blood-borne diseases remaining a large global burden. Almost 3% of the world population or an estimated 170 million people are living with HCV [1,2]. The infection is a leading cause of chronic hepatitis and primary Hepatocellular Carcinoma (HCC), one of the most common cancers in Asian countries and Sub-Saharan Africa [3-6]. About 5 million people living with HCV have co-morbid HIV, which is associated with accelerated liver disease and decreased responsiveness to interferon treatment [2-4,7]. In some countries, HCV infection was the highest risk factor for HCC [4-6], and the disease may contribute to faster progression and higher incidence rates of liver cirrhosis and HCC among patients with HIV-co-infection than patients without HIV-co-infection [4,6-8].

According to related studies in Thailand, the prevalence of anti-HCV has variably been estimated between 1.5% and 4.5% in the general population and blood donors depending on regions of the study [9-13]. The predominant route of HCV transmission is *via* the parenteral route, especially injecting drug use, unhygienic tattooing or ear piercing and receiving unscreened blood, blood products and donated organs and the minority is contacting the virus through sexual intercourse [2,10,11,13,14]. Preventive measures for HCV

transmission and reduction of the burden of liver diseases and HCC should emphasize in avoiding and reducing injecting drug use, the screening of blood, blood products and donated organs, using sterile dental and medical instruments, practicing safe sex, and awareness of some potential risk behaviors, such as, tattooing, and sharing toothbrushes or razors among family members [2,8,14-16]. However, risk factors of HCV transmission in developing countries including Thailand probably differ from those in developed countries. This review was conducted to search anti-HCV prevalence, risk factors, and suggested potential risk reduction measures of HCV transmission among Thai selected groups. This was valuable to develop or improve some risk reduction interventions in different target groups.

Methods

The review focused on published articles from Thailand. Online literature search of articles or review articles published in the peer-reviewed journals using PubMed for indexed articles and website of Google scholar were carried out. The main keywords referred to specific infectious agents in Thai selected groups, such as HCV, Thailand as well as types of target groups, such as blood donors, female sex workers, injecting drug users (IDUs), and patients with STDs. The review was limited to articles and review articles regarding risk of infection and risk factors for HCV infection in Thai selected groups published from 1995 to 2016. A total of 24 articles were included; however, only 17 research articles were reviewed and 7 general articles were excluded.

Prevalence in Thai selected groups

General population: A study in premarital check-ups for individuals and general married couples demonstrated 1.2% of anti-HCV prevalence [16]. Another recent study on HCV infection, evidenced from the 2014 national survey, found 0.9% anti-HCV positive individuals among 5,964 Thai who had health check-up at an OPD of several hospitals in Thailand [17]. Data from married couples in a western province showed 1.3% patients with positive HCV

Citation: Luksamijarulkul P, Luksamijarulkul N. Risk of Hepatitis C Virus Infection among Selected Thai Population. *Dentist*. 2018; 1(1): 1002.

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Publisher Name: Medtext Publications LLC

Manuscript compiled: December 31st, 2018

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antibodies [15]. Additionally, 2 studies among Thai men (young men and middle aged and older males) revealed that the overall prevalence of HCV infection among young Thai men was 2.2% [18] and that in middle aged and older males was only 0.5% (Table 1) [13].

Blood donors: Among Thai blood donors, the seroprevalence of HCV infection varies from region to region, from about 1% in Bangkok to 5.6% in the north and northeast regions (Table 1) [9,11,19,20]. A study in northeast Thailand demonstrated a high prevalence of anti-HCV of 5.6%. The prevalence was significantly higher among male than among female donors (6.5% vs. 0.9%; $p < 0.0001$). Moreover, the prevalence increased with age in both sexes and reached a peak at 31 to 40 years and then decreased gradually [9].

Health care workers: Health Care Workers (HCWs), especially individuals working in intensive care units, hemodialysis units, obstetrics and gynecology wards, clinical laboratory rooms and dental clinics who take care of patients with HCV, both symptomatic and asymptomatic carriers, should be aware of the risk of HCV likely HBV infection [21-24]. A related study on risk factors for HCV among dentists using a case-control design found that dental surgery was one of the major risk factors for anti-HCV positivity [24]. However, studies on HCV or prevalence of anti-HCV antibodies among Thai HCWs are limited, only a few studies are available, e.g., the study of Pilakasiri et al. [25] and Noppakunwong et al. [26]. Data from the first study demonstrated that only 0.5% of army nursing students were positive for the anti-HCV antibody [25]. Another study in voluntary Medical First Responders (MFRs) in the fifth public health region of Thailand showed that only 1 individual from 269 MFRs was positive for anti-HCV (0.4%) (Table 1). However, although, 65.4% had a history of blood or secretion exposure and 42.4% had a history of needle stick and sharp injury while working in the previous year [26].

Patients with STDs and female sex workers: Although the major route of HCV transmission is parenteral, sexual contact transmission is considered to play an important role in the HCV transmission [10,27-29]. Several studies conducted among Female Sex Workers (FSWs) revealed a significantly higher prevalence of HCV than among the general population and blood donors [27,29]. In Thailand, this target is one of the high risk groups for HIV and HCV infections with 30% to 40% of anti-HIV positivity, 6.7% to 9.5% of HCV infection and about 3.3% of both infections [8,28]. Clients of FSWs including patients with STDs have an increased chance of acquiring HIV or HCV when condoms are not used every time in sexual relations [28,30]. Details of anti-HCV prevalence in these target groups are

shown in Table 1. However, some FSWs and patients with STDs had a history of injecting drug use comprising the most important risk factor for HCV infection. This probably affected the higher prevalence of anti-HCV among FSWs and patients with STDs.

Injecting drug users: One of predominant modes of HCV transmission in many developing countries including Thailand is injecting drug use [31-36]. China has the highest estimated number of IDUs with HCV [33]. The US has an estimated 60% anti-HCV positivity, 62% in Ireland [1,2,33,35], and 80% to 95.3% in Thailand (Table 1) [32,34]. A study conducted among Thai IDUs seeking entry to a hospital methadone program found a high prevalence of anti-HCV positivity (95.3%) [31]. These positive HCV infections showed slight to moderate elevations of serum ALT values. Therefore, these IDUs, positive for anti-HCV, probably are associated with chronic HCV infection.

Risks and risk factors for HCV infection in Thai selected groups

Most studies on risks and risk factors among in selected groups of Thai populations found similar risk factors. Several studies identified that a history of IDU, receiving unscreened blood or blood screened with the less sensitive anti-HCV kits, unsafe injection from non-medical personnel, sharing of razors or toothbrushes and unsafe sex were independent risk factors for HCV seropositivity [11,13,20,27,30,32,33]. A history of IDU was the most important risk factor for HCV infection. These risk factors were consistent with related reports from Australia, England and the US where 50% to 90% of IDUs had HCV [1,2,32,33]. Therefore, excluding blood from donors with a history of IDU, especially when a sensitive HCV screening test is unavailable in some areas of the world is extremely important.

A history of previously receiving blood and blood products was significantly related to HCV infection [1,2,11,13,16]. Most risky blood and blood products are unscreened or screened with low sensitivity anti-HCV screening test kits. Studies from many countries have shown that unsafe injections both from health-care and non-medical personnel was another risk factor in some developing countries [1,2,27] due to inadequately sterilized equipment and unsafe practices (including re-use of contaminated glass syringes, re-use of needles, administration at home by nonprofessionals, and sharing instruments among family members). Sharing of razors or toothbrushes may be a problem in poorly educated individuals with low socio-economic status. Finally, unsafe sex was another risk factor for HCV infection

Table 1: Prevalence of anti-HCV antibody and significant risk factors for HCV infection in selected Thai groups.

Groups	% of Anti-HCV [Reference]	Significant risk factors or potential risk factors [Reference]
General population (such as, pre-marital check-up individuals, married couples, general Thai men, and officers)	0.5-2.2 [13,15,16,17,18]	History of extramarital sex without using condom, history of IDU, and history of jaundice [13,15,16,18]
Blood donors	1.0-5.6 [9,11,19,20]	Low education, laborer or agriculture worker, history of receiving blood, history of IDU, history of sharing of razors, history of unsafe injection, history of extramarital sex without condom use [11,20]
Health care workers and medical first responders	0.4-0.5 [25,26]	History of receiving blood, history of needle stick [25,26]
Patients with STDs and female sex workers	6.7-9.5 [8,27,28]	Domicile (northeast), low education, history of jaundice, history of sex service, history of IDU, duration of working in commercial sex services \geq 4 years, having a tattoo, history of STDs [20,27,28,30]
Injecting drug users	80-95.3 [32,33,34]	History of imprisonment, history of extramarital sex without using condom, duration of IDU [32,33]

Remarks: IDU=Injecting drug use; STD=Sexually transmitted diseases.

although the sexual contact was considered a minor route [20,27,28]. Additionally, alcohol consumption was an indirect risk behavior for seeking sexual services, and after consumption, the subject was more prone to have extramarital sex relations without use of condoms [37,38]. Focusing on a related study, which developed a risk screening form for HCV infection among Thai blood donors, the form included 4 predictors (low educational level, occupation as laborer, having a history of receiving blood, and injecting drug use) with 77.1% specificity and 61.3% sensitivity when the cut-off score was ≥ 6 [11]. Having a history of IDU was the most important risk factor with a score of 4. Blood donors with a score ≥ 6 were considered a potential risk for HCV; and therefore, they should not donate blood. This risk screening form could be applied to pre-marital health screening where the subjects do not want blood testing. Details of risk factors in Thai selected groups are presented in Table 1.

Suggested risk reduction interventions in Thai selected groups

Primary prevention of hepatitis C should emphasize in reducing transmission of the virus. Prevention should target those at risk of acquiring the virus and involve providing education, reducing risk by counseling, screening HCV, and care and counseling for addiction. Once patients are positive for HCV, they need to be counseled to reduce the risk of HCV transmission to others and alcohol consumption. Interventions to prevent HCV transmission among IDUs should be integrated with HIV reduction. They should emphasize in increasing access to sterile syringes, the use of drug treatment to reduce needle use and decreasing the risk of contacting HCV and HIV [1,2,14,16,32]. Effective interventions should include

media campaigns, blood testing and counseling, and syringe exchange programs for IDUs. WHO [39] recommended the use of life skill education including self-awareness, empathy, critical thinking, communication and interpersonal relationship, decision making, problem solving to avoid drug injection and delaying premarital or extramarital sex relations, which are both risk behaviors of HIV, HBV and HCV infections among school children and adolescents. Data from a recent study among Thai married couples supported that the life skill education probably reduces risk behaviors among studied Thai married couples due to individuals who had higher levels of life skill scores presenting lower levels of risk behavior [16]. Additionally, awareness of some potential risk behaviors such as tattooing and sharing toothbrushes or razors among family members should be emphasized. Some suggested risk reduction interventions are shown in Table 2.

Conclusion

Data from published articles in the peer-reviewed journals between 1995 and 2016 regarding anti-HCV prevalence, risk factors and suggested risk reduction interventions in selected Thai groups revealed that IDUs had the highest prevalence of anti-HCV positivity. Several risk factors including a history of IDU, receiving unscreened blood or blood screened with the less sensitive anti-HCV kits, and unsafe sex were predominant risk factors for HCV seropositivity. However, having a history of IDU was the leading risk factor for viral transmission. Anti-HCV screening among blood donors and premarital groups, life skill education, 100% condom use and needle and syringe exchange are suggested to reduce risks of HCV infection in some Thai risk groups.

Table 2: Suggested preventive strategies to reduce risk of HCV infection in selected Thai groups.

Groups	Suggested preventive strategies to reduce risk of HCV infection in selected Thai groups [Reference]
Blood donors	Anti-HCV screening in case of having reagent screening kits for anti-HCV [9,11,20]
	Use of risk screening form in case of no reagent kits for anti-HCV screening [11]
Pre-marital and married couples	Pre-marital counseling and HCV screening including use of risk screening form, anti-HCV testing, and life skill education [15,16]
Young men, and middle age and older males	Integrated preventive program including life skill education, 100% condom use policy, mental health support, and health promotion activities [13,18]
Health care workers, and medical first responders	Universal precaution [25,26]
Female sex workers and patients with STDs	Integrated preventive program including life skill education and 100% condom use [27,28]
Male injecting drug users	Integrated preventive program including life skill education, face-to-face education and needle and syringe exchange [32,33]

Remarks: IDU=Injecting drug use; STD=Sexually transmitted diseases.

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