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REVIEW
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HCV elimination in Hong Kong – Non-government organisation (NGO) activities

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Abstract: World Health Organization (WHO) calls for global hepatitis strategy to eliminate viral hepatitis by 2030. Yet many high-income countries were unable to achieve HCV elimination by 2030. Apart from the tremendous efforts and resources from the governments, many non-government organizations (NGOs) have been working very hard to contribute to HCV elimination. In Hong Kong, the Center for Liver Health of The Chinese University of Hong Kong (CUHK) has been working very closely with various NGOs to educate and screen subjects who previously use intravenous drugs. In this review article, we discussed in details the New Life New Liver Program, and the barriers to HCV elimination, with special highlight the role of NGOs in overcoming the barriers.

***Keywords*:** DAA, hepatitis elimination, IVDU, treatment uptake

Introduction

Chronic hepatitis C virus (HCV) infection has been one of the leading causes of chronic liver disease worldwide, resulting in various hepatic events, including cirrhosis and hepatocellular carcinoma (HCC), as well as extrahepatic complications (*1*). Its prevalence was 1.0% in 2015, equating 71 million individuals infected with HCV worldwide, with 475,000 deaths as a result (*2,3*). In Hong Kong, 0.3-0.5% of the 7.4 million population were chronically infected with HCV (*4*). Similar to the rest of the world, genotype 1 contributed to around 60% of HCV infection in the locality (*2,5*).

HCV infection is transmitted by direct exposure to blood. Intravenous drug use (IVDU) has remained a continuing reservoir of the HCV epidemic worldwide (*6*). Local data showed that the prevalence of HCV infection was up to 46% in patients with IVDU (*7*); 5% of patients with human immunodeficiency virus (HIV) infection have HCV/HIV co-infection (*8*). World Health Organization (WHO) calls for global hepatitis strategy to eliminate viral hepatitis by 2030, with 90% reduction in incident cases of viral hepatitis B and C, and 65% reduction in mortality. To achieve these, 80% of treatment-eligible patients should be treated (*9*). A recent analysis illustrated that 80% of high-income countries were unable to achieve HCV elimination by 2030, with 67% of them being off track by at least 20 years (*10*). Applying the same analysis model, Hong Kong is not expected to achieve the goal by 2050 due to suboptimal diagnosis and treatment rates (*4*).

Case identification and timely treatment of HCV patients are of paramount importance. Apart from increased effort from the healthcare sector and the government, improving social awareness to the disease is crucial. Non-government organizations (NGOs) set a channel for the general population and the at-risk groups to learn more about HCV infection, and hence may be game-changing to the current situation.

Overview of NGOs which serve HCV patients

Over the years, medical services provided by the government and the healthcare sectors have undoubtedly reduced the local prevalence of chronic HCV infection. Apart from that, there are also a number of NGOs in Hong Kong which put plentiful efforts in sealing the service gap by awareness enhancement and public education on HCV (*11*).

The Center for Liver Health of The Chinese University of Hong Kong (CUHK) is one of the largest centers in Hong Kong which is dedicated against hepatitis including HCV. The Center provides the public updated knowledge and information on liver diseases, as well as a range of tests to identify viral hepatitis and its complications. Caritas Lok Heep Club is another prestigious organization which serves many drug abusers in Hong Kong. Sharing the same goal, CUHK and Caritas Lok Heep Club have launched the New Life New Liver programme in 2009 which targets

the ex-IVDU (the population who is at the highest risk of HCV infection), focusing the effort to prevent the transmission of hepatitis, preserve the patient's liver function by early screening and provide counselling and referral to specialist clinics for timely treatment (see below) (*12,13*).

With the monumental effort of the two pioneer centers, the programme gradually evolves into a collaboration between CUHK and many other NGOs which help ex-IVDUs in rehabilitation. These NGOs provide substance abuse counselling and a variety of rehabilitation treatment programmes. Examples include Operation Daw, The Society of rehabilitation and crime prevention, Hong Kong; and The Society for the aid and Rehabilitation of Drugs abuses. Some of the NGOs also provide religion guidance and support on top of the above mentioned services, for example, Rehabilitation Centres of the Christian Zheng Sheng Association. Evangelical Lutheran Church Social Service, Ling Oi Centre, Pui Hong Self Help Association, Barnabas Charitable Service Association Limited, St Stephen's Society, DACARS Limited and Glorious Praise Fellowship (Hong Kong) Limited (*14-16*).

New Life New Liver Program

Background

People who inject drugs (PWID) are one of the most important special populations in eliminating HCV infection. It is because the prevalence of HCV infection is often high in PWID, and it is often challenging to reach these people out, link them to care, and keep them in the long-term care and complication screening (*7*). Most PWID are not aware of the knowledge of HCV infection and its treatment. As chronic HCV infection is often asymptomatic, HCV-infected PWID rarely seek medical attention or screen for viral hepatitis. PWID may first present to medical care with complication of liver of cirrhosis or hepatocellular carcinoma (HCC). To help this important special population, a joint effort of healthcare professionals and NGOs with experienced social workers is pivotal.

Objectives

The New Life New Liver Programme is a special programme focusing on ex-PWID in Hong Kong. This activity was started in 2009, initially as a collaborative effort of Caritas Lok Heep Club and Center for Liver Health of The Chinese University of Hong Kong (CUHK) (*13*). It subsequently evolves into a collaboration between CUHK and many other NGOs dealing with rehabilitation of ex-PWID. This is a targeted screening and assessment program for ex-PWID. We accepted referrals from social workers who have confirmed abstinence from intravenous drug use for at least one year. After the education talk, point-of-care anti-HCV testing was performed using the HCV Rapid Card (Bio Focus Company, Ui-Wang, Korea). The objectives of this program are listed in Table 1.

Table 1. Objectives of New Life New Liver programme

Icon	Objective
	Provide education on HCV infection and its complications.
	Screen for HCV infection and other liver diseases (*e.g.* HBV, HIV).
	Refer for antiviral treatment for those who are HCV infected.
	Support the social and psychological aspects of patients before, during and after antiviral treatment.
	Promote the avoidance of drug abuse to the public.

HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus.

Workflow

In the New Life New Liver program, different types of personnel are working together in a multidisciplinary team for patients – hepatologists, psychiatrists, psychologists, social workers, project coordinators and laboratory technicians. The program is divided into three parts. First, we provide educational talk on HCV infection, complications and treatments to PWID and their family members. We allow ample time for the participants to raise any questions after the talk. Most of the PWID are concerned about the side effects of treatment, especially in the old days when peginterferon-alpha and ribavirin was the only reimbursed antiviral treatment (*17*). Second, risk assessment of HCV infection including blood tests and transient elastography examination for liver stiffness measurement is arranged within three months from this educational session (*18*). Because of the referral policy of Hospital Authority, Hong Kong, we refer HCV patients to their own regional hospitals (according to residential address) for long-term follow-up and social worker support in the respective NGOs.

Programme in pre-DAA era

From 2009 to 2012, we screened 234 ex-PWID; 130 (56%) subjects were anti-HCV positive. The number needed to screen to detect one patient with positive anti-HCV was 1.8 (95% confidence interval, 1.6-2.0). However, only 69 (53%) HCV patients attended subsequent follow-up at regional hospitals, and 26 (20%) received peginterferon-based antiviral therapy (*17*). Such treatment uptake rate revealed the barriers

at different steps of the care cascade for HCV patients. The most significant dropout occurred after the comprehensive liver assessment to first follow-up visit (dropout rate 37.8%) and treatment uptake (dropout rate 37.7%). The low treatment uptake rate was mainly because of mild liver disease, contraindications to peginterferon and psychosocial reasons (*17*). We learned from this initial phase of programme that further improvements in the referral system and treatment regimens were need to improve treatment uptake,

Programme in DAA era

We performed the second round of analysis in June 2018, by that time a few DAAs had been available in Hong Kong (*4,19*). Up to this analysis, 362 ex-PWID received HCV rapid test; 268 (73.4%) were found to be anti-HCV positive, with 234 (87.3%) attended the assessment session (mean age 52 years, 90.2% male, 45.5% genotype 1b, 41.1% genotype 6a, median liver stiffness 5.9 kPa); 187 (69.8%) attended follow-up visits at regional hospitals. Treatment uptake rates of PegIFN/RBV and DAA treatment in the pre- *vs*. post-DAA era were 22.3% *vs*. 48.5% and 0% *vs*. 15.6% respectively (*7*).

Barriers to eliminate HCV

After serving PWID for more than a decade, we identified a few key barriers at different steps of the care cascade (Figure 1). Education to various parties and stakeholders, including healthcare practitioners, patients and public is the key components in many steps. NGOs are particularly crucial in engaging newly diagnosed patients, *e.g*. from some screening programmes, and linking them to care. Social workers may facilitate the clinic visit by companying them and helping them to register.

Role of NGOs in DAA era

Since the introduction of DAA therapy, global elimination of HCV has been the ultimate goal. NGOs in Hong Kong play an integral role in educating the general public on the advantages of DAA, which has revolutionized the treatment of HCV. Compared to the traditional treatment regimens of weekly subcutaneously injectable peginterferon with oral ribavirin once or twice daily, current DAAs have much fewer side effects, much shorter treatment duration (8 to 12 weeks), higher rates of sustained virological response (SVR) universally to essentially all HCV genotypes, and a higher genetic barrier to resistance (*20*).

In the 9-year screening program done on Ex-PWID we described previously, we had already seen an improvement in treatment uptake rate since Hong

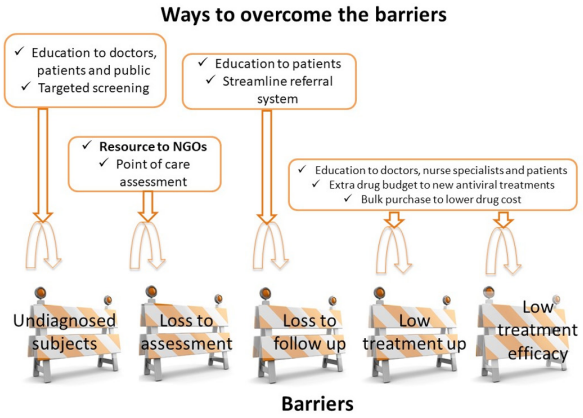

Figure 1. Barriers to HCV elimination, with special highlight the role of non-government organizations (NGOs) in overcoming the barriers (modified from Wong *et al*., *Ref. 7*)

Kong's shift into the DAA era, with a rise in treatment uptake in pre-DAA *vs*. post-DAA era; from 22.3% up to 48.5% in the traditional treatment group (PegIFN/RBV), and from 0% up to 15.6% in the DAA treatment group (*7*). The treatment landscape for HIV and HCV co-infection groups has also changed drastically since the introduction of DAA regimes, with higher rates of SVR and reduced drug-drug interaction observed (*21*).

However, a large percentage of HCV patients in Hong Kong still remain undiagnosed and untreated (*4*). Bridging the treatment gap remains a major challenge. Increasingly, we rely upon the help of NGOs in disseminating the news of these improved and more efficacious antiviral agents to the community, and in raising awareness of the importance of early initiation of HCV treatment. Late presentation for treatment can lead to advanced stages of disease, increased hospital admission and financial burden, and risk of increased viral transmission rates especially in high-risk communities (*22*).

NGO workers reach out to the underprivileged and at-risk groups in the society, by distributing books, brochures and holding educational talks about HCV in the community (*7*). They can support those who have screened positive to attend clinic follow-ups and help improve medication adherence by establishing rapport with vulnerable groups. Striving forward, we must liaise more closely with NGOs to develop a more streamline referral system to hospitals and hepatology units to avoid loss to follow-up. More than ever, NGOs remain the key players in our movement to reduce the disease burden of this now very treatable disease and join the global effort to HCV elimination.

Conclusions and Perspective

HCV infection remains a significant global health threat. Nevertheless, different measures and parties are working hand in hand to fight the battle. Among these, NGO plays an undeniable role in raising social

awareness to the disease and this ultimately leads to improved diagnosis and treatment rates. The New Life New Liver program provides a comprehensive pathway, from education and screening to disease assessment and referral for treatment, for ex-IVDU. The program would be hopefully improving the current inadequacy on control of HCV transmission and treatment, especially in this risk group which accommodates a significant proportion of HCV-infected individuals around the world.

"Treatment as prevention" is an important advocate in tackling HCV transmission. By eradicating HCV infection in patients at risk of transmitting HCV to others, the chain of propagation of HCV transmission would be interrupted. The point-of-care service of the New Life New Liver program, aiming at timely diagnosis and assessment of HCV infection, would likely increase the treatment uptake, serving as prevention for further transmission. With the more available pan-genotypic DAA and the loosening on treatment reimbursement policy in our locality, and the support from different stakeholders, the WHO 2030 viral hepatitis elimination target is not beyond reach.

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