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Review

Barriers to access to hepatitis C treatment

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Abstract

Hepatitis C virus (HCV) is a major cause of chronic liver disease worldwide. Only 1%–30% of patients in need of treatment may get it. In recent years, the availability of direct-acting antiviral agents (DAA) has been an important advancement in treating HCV infection. However, due to cost, it is not possible to receive these drugs in many countries where infection is endemic. In these low- and middle-income countries, the main barriers to controlling HCV infection are lack of knowledge about the infection, constraints on diagnostic testing and treatment, and lack of experts. Both national and international support are essential to overcoming these barriers. In low- and middle-income countries, interferon and ribavirin-based therapies still are the first choices due to their availability and to government payment support. In addition, in developed countries, efforts to provide lower-cost DAA drugs continue. Pharmaceutical companies continue to research manufacture of bio-equivalent drugs to reduce treatment costs. Considering the fake drug market, all developments need to be monitored closely by the institutions involved. This review focuses on barriers to hepatitis C treatment and ways to overcome those barriers.

Key words: hepatitis C; treatment; antiviral drugs; viral load; anti-HCV

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Introduction

Approximately 550 million people worldwide (about 9% of the world's population) have chronic hepatitis. Of these, about 170–180 million are infected with the hepatitis C virus (HCV). Endemic areas are mostly in underdeveloped countries where the daily income per capita is less than 2 USD. Each year, HCV causes the deaths of 350,000 people. In countries with low and middle incomes, about two-thirds of hepatocellular carcinoma (HCC) is associated with HBV and/or HCV [1]. Controlling viral replication or effecting viral eradication by antiviral treatment significantly decreases HCC and cirrhosis of the liver and its complications. Recently, the use of antivirals has proven effective against hepatitis C in developed countries, significantly decreasing morbidity and mortality. However, in developing countries, most of which are highly endemic areas, access to hepatitis treatment still is restricted. Low- and middle-income countries vary in terms of their health systems and insurance coverage. In addition, these countries have problems such as absence of local and national political support in fighting the infection, lack of trained personnel (such as infectious disease specialists, clinical microbiologist, epidemiologist, and hepatologists), lack of diagnostics, restricted access to antiviral medications, low-quality medication, lack of medical records, hospital overcrowding, and problems adapting to infection-control measures (Table 1) [2]. Furthermore, famine and scarcity of fresh drinking water are common, compounding problems [3,4]. The purpose of this paper is to review these problems and propose solutions to accessing hepatitis C treatment.

The prevalence of HCV infection in the developing world varies widely both between countries and within individual countries. Consistently high prevalence rates (about 22%) have been reported from Egypt. HCV prevalence in different countries is shown in Table 2 [5-9]. The highly variable prevalence rates among developing countries are, in part, a reflection of different modes of HCV transmission. While intravenous drug-induced infection is prevalent in European countries and Russia, nosocomial infection is prevalent in African countries and India. While the diagnosis rates reached 84% (Luxembourg) in European countries, the rates dropped to 10% in African countries [10].

Screening tests

According to data in a 2010 study conducted by the World Health Organization (WHO) and the World

Hepatitis Alliance (WHA), about two-thirds of the hepatitis C population worldwide lives in countries that cannot provide hepatitis tests [11]. Providing safe blood and blood products is essential, especially to prevent transmission of HCV. Therefore, donor blood must be screened for hepatitis by enzyme-linked immunosorbent assay (ELISA) tests, which are highly sensitive and specific. However, 39 countries cannot perform screening tests for infections transmitted through blood products, such as HIV, HBV, and HCV. In Pakistan, screening for HCV antibodies can be conducted in only 23% of blood banks, while in India, in 2000, HIV screening was performed for 95% of blood donors but HCV screening for only 5% of donors [5,12]. Some countries that do screen use only quick identification tests with low sensitivity and no quality control. In the United States, since 2002, HCV antibody screening has decreased the risk of HCV transmission from 7.7% to 1%. However, there may be problems in assessing the serological status of donors during the window period. During this period, nucleic acid-based tests are required to determine HCV ribonucleic acid (RNA). Furthermore, these tests cannot be implemented in low- or middle-income countries due to the lack of financial resources and experienced personnel. Even in Egypt, where HCV infection is endemic, the government provides support for only 20% of the nucleic-acid tests for donated blood [5,13]. Two HCV antigen tests have been estimated to cost 34 USD [14]. Techniques such as dried-blood spot testing and point-

Table 1. Hepatitis C virus seroprevalence in different countries.

Country	%	Country	%
Algeria	2.0	**Mexico**	0.7
Angola	3.9	**Morocco**	1.6
Argentina	0.6	**Malawi**	2,0
Brazil	1.3	**Mali**	1.9
Burkina Faso	6.1	**Mozambique**	1.3
Burundi	3.1	**Namibia**	1.6
Cameroon	4.9	**Nigeria**	3.1
Chile	0.9	**Pakistan**	5.9
China	2.2	**Philippines**	3.6
DR of the Congo	2.9	**Romania**	4,5
Egypt	14.7	**Rwanda**	3.1
Ethiopia	2.7	**Senegal**	1.0
Gabon	4.9	**Sudan**	3.2
Gambia	2.4	**Somalia**	2.6
Ghana	3.2	**South Africa**	1.1
Georgia	6.7	**Tanzania**	2.7
Guinea	1.5	**Thailand**	2.2
India	1.5	**Tunisia**	1.8
Indonesia	2.1	**Turkey**	0.9
Iran	0.2	**Uganda**	2.7
Ivory Coast	2.2	**Ukraine**	1.2
Kenya	2.8	**Uzbekistan**	6.5
Libya	1.2	**Zambia**	1.1
Madagascar	1.7	**Zimbabwe**	1.6

Sources: [5,9].

Table 2. Populations at increased risk of HCV infection.

At-risk populations	Details
Persons who inject drugs (PWID)	The prevalence of HCV in this group is 67%
Blood transfusion receivers or patients who undergo invasive processes in hospital	In case of not complying with infection control precautions
Infants born to mothers infected with HCV	Infection rate without coinfection with HIV: 4%–8%; infection rate with coinfection with HIV: 17%–25%
Persons who have a sex partner infected with HCV	Especially in the males having sex with males population, risk increases with having unprotected sex
Persons who used intranasal drug (non-injectable drugs)	Example: cocaine
Cosmetic procedure	Example: tattoos or piercings

Source: [15]

of-care testing, developed for HIV virology, should be used in HCV screening. Screening the population to detect patients infected with HCV is easy and inexpensive [1]. Such surveillance studies are critical stages in treating and preventing the disease. In particular, genotyping should be performed to help develop suitable treatment strategies. The WHO recommended that HCV serology testing be offered to individuals who are part of a population with high HCV seroprevalence or who have a history of HCV risk exposure behavior [15]. People in immigrant populations and in some social classes avoid testing because they may face expulsion or exclusion from society. False-positive results also may unnecessarily stress individuals. To reduce these risks, HCV antibody and viral load tests need to be safe, accurate, cost effective, and quick to yield results. To identify infected patients, HIV clinics and inmate services should cooperate with IV/oral substitution treatment programs. Furthermore, strategies should be designed to gather epidemiologic data. HCV tests should be given to groups at high risk for HIV (sex workers, prison inmates, IV drug users, homosexuals), especially IV drug users and inmates (Table 3) [15,16].

Additionally, fear of stigmatization and discrimination and lack of information prevent screening and treatment. Frequently, HCV patients are not aware of their disease, and when they are aware, they have insufficient information about its course and the benefits of treatment. For HCV treatment to succeed, educating the public and preventing stigmatization, especially for IV drug users, must be prioritized [16].

Treatment

HCV follow-up and treatment often use guidelines prepared by international organizations such as the European Association for the Study of the Liver (EASL), the American Association for Study of Liver Diseases (AASLD), and the Asian Pacific Association for study of the Liver (APASL). These guidelines recommend antiviral medication treatment for chronic hepatitis C after HCV RNA level assessment and genotyping. For many years, the only choices for treating hepatitis C was a pegylated interferon alpha (PegIFN-α and ribavirin (RBV) combination. There are six genotypes (GTs) of HCV. While GTs 1, 2, and 3 are common worldwide, GTs 4, 5, and 6 are widespread only in some geographic regions. GT 4 is widespread in Africa and the Middle East, GT 5 is prevalent in South Africa, and GT 6 is common in Southeast Asia, Hong Kong, and Southern China. Follow-up, length of treatment, and response to treatment differ based on GT. Interferon (IFN) treatment is least successful in GT 1 [17].

Developments in hepatitis C treatment gained speed in the last decade. In the 1980s, interferon alpha (IFN-α) had been used as the first hepatitis C treatment; however, cure rates were very low (<10%–20%) [18]. Later, in patients infected with GT 1 HCV, 28%–31% reached sustained virological response rates (SVR) through a 48-week, standard IFN-α+RBV treatment, while 42%–46% reached SVR rates through a 48-week, PegIFN-α+RBV combination treatment [19]. PegIFN/RBV became the traditional treatment regimen worldwide, but many factors limit its use, especially in low- and middle-income countries. Definite or relative contra-indications for this combined therapy include decompensated liver disease, autoimmune thyroid diseases, retinal diseases, cardiovascular diseases, uncontrolled depression, psychosis, epilepsy, or pregnancy. In addition, other problems include those with storing IFN (such as not following the cold chain), managing adverse effects that require medical support, expensive hematopoietic graft factors or blood transfusions, regularly measuring viral load during follow-up, and the necessity for an equipped laboratory for tests such as blood count. The dominance of GTs 1 and 4 in a great many African and Middle Eastern countries and frequent incidence of non-CC IL-28B gene polymorphism contribute to the low response rates for IFN-based treatment.

In 2011, the first protease inhibitors, telaprevir and boceprevir, began to be used. A PegIFN-

Table 3. World Health Organization guidance on prevention of HCV infection in healthcare settings.

- Hand hygiene: surgical hand preparation, hand washing, and use of gloves
- Safe handling and disposal of sharps and waste
- Safe cleaning of equipment
- Testing of donated blood
- Improved access to safe blood
- Training of health personnel

Source: [15]

α+RBV+protease inhibitor regimen obtained 67%–75% SVR rates. In 2014, a combination of a new protease inhibitor, simeprevir (NS3/4A), and a polymerase inhibitor, sofosbuvir, was tried with PegIFN and RBV in various patient populations. Newly approved, DAAs made HCV treatment simpler for and were well tolerated by compensated and decompensated cirrhosis patients, pre-post transplantation patients, and HIV/HCV co-infected patients. Recent approaches include the NS5B nucleotide analogue sofosbuvir, the polymerase inhibitor dasabuvir, and combinations of daclatasvir, ledipasvir, and ombitasvir, which are NS5A inhibitors. One daily dose of sofosbuvir (400 mg)/ledipasvir (90 mg) (Harvoni, Gilead, Foster City, California, USA) can lead to cure in GT 1 HCV in as short a time as 8–12 weeks. Another two-tablet daily combination of paritaprevir (150 mg)/ritonavir (100 mg)/ombitasvir (25 mg) and dasabuvir (250 mg) (Holkira Pak, AbbVie, Foster City, California) can lead to cure in 12–24 weeks for cirrhosis patients with GT 1a. In addition, GT 2 and 3 patients can be cured in 12 and 24 weeks, respectively, with sofosbuvir (Sovaldi, Gilead, Foster City, California, USA) + RBV [20].

Drug supply

To help fight HCV, support is needed from drug companies, international health associations, governmental and nongovernmental organizations (NGOs), and experienced doctors and other experts. Some low- and middle-income countries could provide IFN/RBV with the support of developed countries and international health associations. Another way is for drug companies to subsidize medication production by providing raw materials free of charge and selling the drugs at lower prices in the domestic market.

Since 1995, drug production has been organized by Trade-Related Aspects of Intellectual Property Rights, an affiliate of the World Trade Organization (WTO), and drug manufacturers obtain a patent right of 20 years [1]. In low- and middle-income countries, PegIFN+RBV is still an important treatment option for millions. A great number of countries cannot afford DAA drugs. Both Roche and Merck manufacture PegIFN, yet the cost per cure can reach 30,000 USD. PegIFN has bio-equivalents in Egypt and India and studies are underway to develop them in Brazil and Cuba [16]. Regimens not including IFN give perfect results in hepatitis C, and SVR rates of can reach 100%. With DAA combinations of two or three drugs, a 12-week oral treatment can lead to > 90% SVR in GT 1 patients, treatment-experienced patients, and cirrhosis patients [21]. DAA drugs, which are efficient and well tolerated, should be provided at lower cost in developing countries with resource difficulties.

Recently, studies have concentrated on antiviral drug combinations that will be effective on all genotypes, but mainly GT 1. Sofosbuvir-based combinations have been found to be successful on various patient populations. In India, efforts of local drug companies and patients' rights advocates have produced results, with Gilead producing a generic drug of the sofosbuvir/ledipasvir combination that has been approved and sold in 91 areas [22].

Cost of drugs

The most important barrier to antiviral drugs is the cost of treatment. In many countries worldwide, PegIFN and RBV are the standard treatments for hepatitis C. Not including testing, a 48-week course of PegIFN+RBV costs about 15,000–25,000 EUR in Europe [1,23]. In areas where HCV infection is endemic, national and international enterprise is needed to decrease the drugs' cost. For example, in Egypt, 10%–13% of the population is infected with HCV, and in some areas the infection rate is 50%. Egypt's government negotiates with drug companies to follow low-price policies. The cost of a 48-week course of PegIFN+RBV has decreased to 2,850 USD, and the national production cost of treatment is 20,000 EGP (Egypt pound).

As of 2015, India has access only to PegIFN+RBV. The cost of a 24-week course is 140,000 INR (Indian rupee), as much as three to five times the average annual income [24]. In Asia, the cost of a 48-week course of PegIFN+RBV varies from 12,000 USD in Vietnam and 18,500 USD in Indonesia [15].

In 2011, a report assessing hepatitis C treatment in Eastern Europe and Central Asia (EECA) countries, including Georgia, Kazakhstan, Kyrgyzstan, Lithuania, Russia, and Ukraine, reported insufficient information to determine the prevalence of HCV. In most countries, the costs of viral load testing, genotype testing, and biochemical testing must be paid by patients [25]. However, in Lithuania, where the cost of treatment is covered by a national insurance system, the cost of PegIFN is 10% lower than in Russia and Kazakhstan [25]. To be able to cover the high cost of treatment, Georgia requested funds from Global Fund, and Ukraine requested funding from the World Bank. In addition, local drug companies in Russia have begun to produce a generic form of PegINF. In these countries, the cost of a 48-week course of PegIFN is 14,500 USD,

more than three to five times the average annual income [25].

In Russia, which has 5.8 million hepatitis C patients and a national program for HIV, HBV, and HCV, the government spent 47 million USD for 48-week courses of PegIFN+RBV for 3,700 patients in 2012–2013. However, the state covers testing and treatment only for patients co-infected with HIV/HCV. In addition, the Russian government created a fund of 4.8 million USD to provide telaprevir and boceprevir to 120 patients.

In Kyrgyzstan, a great number of patients cannot receive treatment, since they must pay for it themselves [25]. Ukraine, which has the highest prevalence for HCV (three times higher than the world average) among Eastern European countries, is estimated to have 4.4 million infected patients. However, the government did not fund PegINF until 2013. Thus, patients had to pay for their own treatment. PegIFN prices of 10,000–18,000 USD prevented a great many people from receiving treatment. Due to help from the Global Fund, since September 2013, the cost of a 48-week course of PegIFN+RBV has fallen from 13,200 USD to 5,000 USD, giving hope to a great many patients. However, treatment still is accessible to only 15% of the population [15].

Georgia has an HCV-infected population of 200,000 and has one of the highest costs of treatment. PegIFN+RBV treatment is covered by the government only for prison inmates. In 2013, NGOs supported a campaign to fight hepatitis C in Georgia, the basis of which included forming a national plan and decreasing drug prices to increase access to treatment. In June 2013, the government began participating in a pilot study for prisons in which Roche decreased the price of each vial of PegIFN from 246 USD to 93 USD to treat 1,000 patients. In March 2014, the Georgia Center for Diseases Control and National Public Health Association began negotiating with the US Centers for Disease Control and Prevention (CDC) on a program to eliminate HCV [17].

In Kenya, where the annual per capita income is 860 USD, 40% of the population uses IV drugs, and 0.2%–0.9% of the population is infected with HCV. In Kenya, patients cannot access medication; if they can access it, treatment is not an option because of its cost. The state has a general viral control plan, which is not specific to hepatitis C. Tests for diagnosis and follow-up of HCV are used only in studies. Treatment is possible only for those who are able to pay [15].

In Thailand, where there are 1.5 million HCV-infected people (2.2% of the population) and where 90% of IV-drug users are infected with HCV, its treatment has been covered by a new government policy since 2014. PegIFN+RBV is on a list of essential medicines, and the government will pay 4,800 USD for PegIFN+RBV treatment. For GT 2 and 3 patients, treatment is limited to 24 weeks. Patients must pay the remainder of the cost and the cost of managing any adverse effects of treatment [15].

With the first generation of protease inhibitors (boceprevir and telaprevir) coming into use in 2011, a higher SVR was reached for GT 1 patients as a result of combining protease inhibitors with IFN+RBV. However, 12 weeks of this triple treatment is much more expensive than the standard treatment, exceeding 80,000 USD [26]. In Spain, the cost of a 24-week course of telaprevir+PegIFN+RBV has been reported to cost 111,606 USD, while the cost of a 48-week course of the same triple combination has been reported to cost 143,827 USD [27].

DAAs approved by the US Food and Drug Administration (FDA) and put into use include sofosbuvir, simeprevir, asunaprevir, daclatasvir, ledipasvir, ombitasvir, paritatprevir, and dasabuvir. Sofosbuvir, which was the first polymerase inhibitor, reached the market in 2014 and has been combined with PegIFN+RBV. The cost of a 12-week course of sofosbuvir+PegIFN+RBV is 84,000 USD in the United States and 54,000 USD in the United Kingdom. The cost of a 12-week course is 116,910 USD in Spain, and it varies between 77,087 and 127,929 USD in the US [23,27].

There are obvious discrepancies among the latest market prices of various drugs. For example, while the per dose cost of a 12-week course of sofosbuvir treatment is 68–136 USD, the cost of a 12-week course of simeprevir is 130–326 USD, a remarkable difference [6,11].

In Egypt and other developing countries, the price of sofosbuvir can be as low as 900 USD for 12 weeks [27]. Two generic bio-equivalents of sofosbuvir are being produced in India with the aim of decreasing the price of a tablet of sofosbuvir from 1,000 USD to 10 USD. As with HIV drugs, people travel from the US to other countries to access low-priced HCV drugs. However, they must beware the counterfeit drug market.

According to a 2013 report by Myers *et al*., the lifelong cost of an HCV infection is 64,694 USD, not including cost of treatment [28]. Of the most current DAA combinations, the cost of treatment with Harvoni, Holkira Pak, or Sovaldi varies between 35,000 and 60,000 USD per cure [20]. Predicted minimum costs for

a 12-week course of DAA drugs with the most consistent efficacy results were 122 USD per person for sofosbuvir+daclatasvir, 152 USD for sofosbuvir+RBV, and 192 USD for sofosbuvir+ledipasvir [14].

Follow-up problems

In HCV treatment, follow-up costs constitute a problem. These costs are not paid for by the government or private insurance, except in the case of special patient groups (such as HIV/HCV co-infected patients or inmates). Follow-up costs include those for HCV testing, viral load testing, and genotyping. Biochemical and hormonal tests required for follow-up of adverse effects of PegIFN+RBV treatment must be paid for by patients. Most countries do not have national programs or strategies covering hepatitis. Viral load testing is used primarily to assess response to treatment. While developed countries do not experience problems conducting HCV RNA measurement used in diagnosis and follow-up, developing countries may experience problems due to the lack of resources. The cost of HCV RNA testing varies between 45 and 76 USD [23]. When sofosbuvir/ledipasvir combinations are used, viral load testing is needed less frequently, which can decrease total treatment follow-up costs. In contrast, telaprevir and boceprevir treatments are not suitable in low-income countries because they are expensive and require close follow-up for adverse effects. In addition to viral load testing, HCV treatment requires core antigen assay with ELISA. This is cheaper and easier than viral load testing, and commercial ELISA kits reduce the price further. However, their sensitivity, especially with viral loads of less than 20,000 IU/mL, is lower than that of polymerase chain reaction (PCR) [29].

Skills and training

In countries with limited resources, another important drawback to managing HCV infection is the lack of expert or even experienced health personnel. Low- and middle-income countries lack hepatologists. Educating health personnel in this specialty is an important step to making treatment accessible [1]. Similar problems were experienced with HIV/AIDS treatment. A task-shifting method was used to overcome this problem, and randomized and cohort studies proved this method to be safe and effective. Getting information from a third-step center by teleconference when necessary was also shown to be effective [16]. In addition to experts, experienced health workers who can guide treatment increase patient compliance. Such guidance also eases the load on expert health personnel. To simplify treatment further, it can be given to patients under the supervision of experts in first-step centers, as was done with AIDS treatments. The most important steps in simplifying treatment are decreasing the number of medications, eliminating the need for tests such as HCV RNA in follow-up, using medication with few adverse effects, and shortening the treatment period.

Protection

In resource-limited countries, unsafe medical practices and iatrogenic transmission have both played an important role in the initiation of HCV epidemics. Blood transfusions from unscreened donors and unsafe therapeutic procedures are the major modes of transmission in the developing world [5]. Contaminated injection equipment has been identified as a major risk factor in areas of high prevalence such as Egypt and

Table 4. Problems encountered in access to treatment for hepatitis C.

Risk category	Issues
Treatment related	Perceived complexity of treatment
	Side effects of treatment
	Treatment adherence
	Long treatment duration
	Liver biopsy required for treatment
	Lack of elastography
Expenses related	Insurance plan does not cover treatment
	High out-of-pocket expense for patients
	Government restricts treatment
Healthcare-system related	Inadequate testing
	Inadequate physician knowledge
	Limited specialists (infectious diseases, gastroenterology, hepatology)
	Insufficient funds allocated to management and prevention of HCV
	Insufficient political commitment
	Lack of national hepatitis strategy
	Lack of national guidelines

This table was updated from [2].

India [27,31]. Infection control procedures are known or predicted to be suboptimal in resource-limited settings. Providing safer medical and dental services and using single-use sterile equipment if possible will be effective. Surgical and obstetric conditions should be made optimal, and reusable products should be sterilized. It is also necessary to conduct educational programs in order to raise awareness in society about the danger of infection during practices of hairdressing, tattooing, piercing, acupuncture, and circumcision, and to make periodical checks in order to make sure that these practices are conducted under sterile conditions. Screening risky groups for HCV infection is an important step, especially in areas where prevalence is over 3%. Besides these precautions taken in society, the most important step in protecting from health service-related hospital-induced HCV is hand hygiene. Health personnel should be trained regularly about washing hands and using gloves, and they should be observed for adaptation through periodical controls. Donated blood should be tested for HCV to provide safe blood and blood products. Table 4 summarizes precautions to protect from HCV infection.

Policies

The primary approach in the Global Health Sector Strategy plan specified by the WHO in order to fight viral hepatitis between the years 2016 and 2021 is determining the existing patient population with viral hepatitis, regardless of distinctions between children and adults, the poor and the rich, men and women, and after this, providing access to treatment by using all means. The second stage is the prevention of new infections that may develop, and after this, the elimination of viral hepatitis globally. For HCV infection, the primary targets of this program in 2030 when compared with 2010 are a 70% decrease in new infection incidence and 20% decrease in mortality, diagnosis of 90% of the patients and viral suppression in 90% of the patients through treatment. Zero new infections resulting from unsafe blood transfusion is also among the other targets of the plan [15]. In terms of protection, besides increasing the financial support for vaccination of hepatitis C, developing effective screening programs to determine the existing infected population in risk of hepatitis C is also considered important. Increasing training activities for protection in order to prevent the development of new infections will increase awareness in society to fight the infection.

Georgia is one of the countries that set out with these targets planned by the WHO and began to see successful results. HCV prevalence was reported as 6.7% in Georgia in 2002 [32]. Three major activities have been conducted in Georgia to prevent HCV infection. Following a population-based survey conducted to determine the prevalence of HCV infection, the national elimination program that started in April 2015 will continue until 2020. Patients co-infected by HIV/HCV have been treated in the country since 2011, and 428 patients have been treated so far. The government has started to pay for peg-IFN and RBV since 2014. A total of 406 patients have been treated this way. The National Hepatitis Elimination Program was signed between Gilead-CDC and the Georgian government in 2015. The target of this program was determined as zero new hepatitis C infections. Gilead promised to supply sofosbuvir and ledipasvir/sofosbuvir combination to the Georgian government for free. As for 2015, a 60% discount was made in PegIFN-RBV treatment in order to ease the general population's access to hepatitis C treatment. A total of 851 patients were treated this way. National Hepatitis Elimination was planned in two phases. In phase 1, the target in 2015 is to treat approximately 5,000 patients who have F3-F4 fibrosis, serious extra hepatic manifestations, and HIV/HCV coinfection. Phase 2 is a long-term phase that covers HCV prevention strategies, research, tests, and treatments between the years 2016 and 2020. In accordance with Hepatitis C Elimination Program's phase 1 activities, 3,766 patients have been treated through regimens that include sofosbuvir [33]. Although this program implemented in Georgia is still in its very early stages, it will be a sort of pre-study for planning strategies to be developed in countries where hepatitis C is prevalent if it is carefully followed.

Developing national policies is important to planning and maintaining continuity in prevention and treatment of HCV, an important liver disease. Recently developed antiviral drugs have increased treatment rates for HCV. In regions where the disease is endemic, countries should develop their own policies to supply drugs and disease detection. The present increase in immigration moves hepatitis among geographic locations and is a factor that must be taken into consideration. International financial support is important in developing screening programs.

High treatment cost is not the only factor limiting access to antiviral treatment. Access to treatment is too complex to be solved by decreasing prices alone. Each country should assess infrastructure and financial-resource support for its own people and develop national guidelines based on international guidelines. State policies should include increasing medical

infrastructure and laboratory support and supporting experienced health personnel and diagnostic materials. In addition, hepatitis treatment is not only a global health problem, but also an equality and social justice issue. Irrespective of countries' economic conditions, it is each patient's right as a human to receive correct, effective treatment. It is a state's responsibility to provide this for its people. Health institutions, drug companies, and world financial institutions must correct this unacceptable inequity. Alternative treatments should be available in poor countries. However, any drugs developed specifically for sale to poor countries must be inspected regularly, since decreased active ingredients in lower-priced drugs may cause treatment failure.

Conclusions

HCV infection is a problem worldwide, but mainly in countries with limited resources. International and national policies should prioritize developing diagnostic tests that yield quick results and simplifying treatment follow-up. For countries in areas of high endemicity, international financial support should be provided. Instead of complex practices such as multiple tablets or injections, treatment should be simplified to one tablet a day. International health institutions, NGOs, and drug companies should act together to simplify and reduce the cost of testing, follow-up, and treatment, with the goal of reducing the price of each tablet to less than 1 USD.

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