Cascades of Care as Monitoring Tool for Tracking Global Target of Hepatitis C Virus Elimination

Hepatitis C infection is caused by an RNA virus of the family *Flaviviridae and the genus* Hepacivirus, known as hepatitis C virus (HCV).[1] The HCV was first discovered in 1989. HCV is classified into seven phylogenetic clades also known as genotypes (HCV genotype 1,2,3,4,5,6, and 7). HCV is a blood-borne virus predominantly transmitted through parenteral route. However, in about 20% of HCV infections the route of transmission remains unknown.[2] While several studies have isolated HCV RNA from the saliva, semen, urine, sweat, and tears of the HCV infected patients, the risk of transmission associated with exposure to infected body fluids except serum is not clearly defined.[3-5]

Globally, HCV is one of the leading indication for liver transplanation.[6] According to a disease burden modelling study, in 2015, 71.1 million (range 62-79) which corresonds to 1% of global population had HCV infection.[7,8] In 2015, there were an estimated 1.75 million new HCV infections and 399,000 HCV-related deaths, while only 843,000 people with chronic HCV infection were cured.[8] Globally, a wide variation in the prevalence of HCV exists among different countries and regions. Almost half of the global burden of HCV is contributed by only 5 countries (China, Pakistan, India, Egype, Russia).[9] However, western countries account for only a small fraction of the overall disease burden.[10,9]

Some of the major risk factors for hepatitis C infection are; injecting drug use, recipient of blood or blood products transfusion (before 1990 in the developed world, and in the developing countries it may be a recent date depending on the availability of standard screening facilities and regulations for blood screening), received injections for medical treatment, underwent dental procedures or had a shave by barbers in a country with a high prevalence of HCV infection, had a haemodialysis, had a tattoo or body piercing from a poorly regulated facility, having a sexual partner with hepatitis C infection who is also HIV positive, having a mother with HCV infection, have been in prison and those who have had blood-to-blood contact with another person. Healthcare workers in the developing countries where personal protective equipment is not available and adherence to standard precautions is poor, are also at a higher risk of HCV infection.[1,10]

With the development of highly effective, well tolerable, oral direct acting antiviral (DAA) therapy during 2011, HCV is now treatable and curable. In 2016, World Health Assembly (WHA) endorsed global viral hepatitis strategy, setting the targets of 80% reduction in HCV new infections, and 65% reduction in mortality associated with HCV by 2030. More than 194 member countries of the World Health Organization (WHO) adopted this strategy. [11,12] With the availability of highly effective, interferon free DAA therapy, achieving this super ambitious goal is not impossible however, barriers related to screening, treatment access, and patients' retention in care need to be overcome. As of 2015 data, out of 71 million global HCV-infected people, only 20% (14 million) are diagnosed, and 8% (5.4 million) have ever initiated therapy.[8] According to the WHO, 90% of the total infected population has to be diagnosed and 80% of those diagnosed has to be treated so that to facilitate the elimination targets by 2030.[13] Therefore, close monitoring of the existing HCV elimination strategies through measuring the proportion of HCV infected people progressed through different stages from screening to the achievement of SVR is utmost important. Cascades of care or care continuum, first used for the monitoring of the treatment programs of human immunodeficiency virus (HIV) infections, is now adopted for the monitoring of elimination program of chronic HCV infection.[14] In the field of HIV, cascades of care with various stages such as diagnosis, linkage to care, retention in care, prescription of antiretroviral therapy and viral suppression is used as an effective tool in assessment of achieving the public health benefits of antiretroviral therapy.[15,16] Similarly, HCV cascade of care has a potential to assess the progress towards achieving WHO global targets of HCV elimination by 2030. It provides a useful framework for the monitoring of HCV treatment programs and HCV patients passing through different stages of the care continuum.

The HCV care cascades measure the effectiveness of public health response to HCV infection, by estimating the proportion of people with HCV infection in a specific population, measuring the proportion of those who are reached by the public health program and screened positive for HCV, proportion tested for HCV RNA, linked to care, proportion assessed for liver disease, proportion treated for HCV, and the proportion treated who achieve SVR.[17] The following figure (Fig. 1) adopted from WHO Health sector strategy on viral hepatitis 2016-21 clearly depicts the different stages of the HCV care cascades.[12]

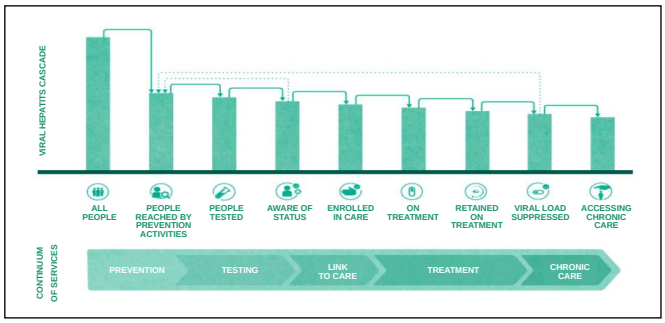

Fig. 1: HCV cascades of care. *Adopted from WHO Global health sector strategy on viral hepatitis 2016-21.*

To conclude, HCV infection is a global public health problem. With the recent development of highly effective DAA therapy,

global elimination of the disease is now possible. However, barriers such as screening, linkage to care and access to the current therapy needs to be addressed. Inequity in screening and treatment needs to be eliminated by giving special attention to the difficult to reach, high risk populations. Using the HCV cascades of care as monitoring tool for the assessment of HCV treatment program and identification of any barriers or facilitators is required.

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