Addressing Access to Hepatitis C Interferon Services in Egypt

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Egypt

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Addressing Access to Hepatitis C Interferon Services in Egypt

A thesis submitted in partial fulfilment of the requirement for the degree of Master of Public Health

By

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Egypt

Declaration:

Where other people's work has been used (either from a printed source, internet or any other source) this has been carefully acknowledged and referenced in accordance with departmental requirements.

The thesis **Addressing Access to Hepatitis C Interferon Services in Egypt** is my own work.

Signature: 

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List of abbreviations

CAM	Complementary and alternative medicine
CCO	Curative Care Organization
DALYs	Disability-Adjusted Life Years
EDHS	Egyptian demographic and health survey
ELPA	European Liver Patients Association
EVR	Early virological response
GDP	Gross domestic product
GGEH	General government expenditure on health
GOTHE	General Organization of Teaching Hospitals and Institutes
HCC	Hepatocellular carcinoma
HCV	Hepatitis C virus
HIO	Health Insurance Organization
HIV	Human Immunodeficiency Virus
IFN	Interferon
MDGs	Millennium Developmental Goals
MHE	Ministry of Higher Education
MOF	Ministry of Finance
MOHP	Ministry of Health and Population
NCCVH	National Committee for Control of Viral Hepatitis
NGOs	Non-governmental organizations
NHTMRI	National Hepatology and Tropical Medicine Research Institute
OOP	Out of pocket
PCR	Polymerase Chain Reaction

PEG/IFN	Pegylated Interferon
PLWHCV	People living with hepatitis C virus
PTES	Program for treatment at the expense of the state
PWID	People who inject drugs
RBV	Ribavirin
RVR	Rapid virological response
STIs	Sexually transmissible infections
SVR	Sustained virological response
TB	Tuberculosis
WHO	World Health Organization

Glossary

Access: Access to health services implies the timely use of service according to need. The scope of access includes four dimensions: availability of adequate services, geographical accessibility, affordability and acceptability by the users.(1) All these dimensions are serving as conceptual elements to achieve the ultimate goal of effective coverage of the intervention.(2)

Early virological response (EVR): Detectable HCV-RNA by polymerase chain reaction (PCR) after 4 weeks of treatment but undetectable or shows two folds decrease at the 12^{th} week and maintained up to the end of treatment course.(3)

Effective coverage: The proportion of the population in need for an intervention who have received an effective intervention. It measures the health system's efforts (performance of health service delivery function) in terms of providing the population with a set of services that are believed to be effective if individuals use them.(2)

Rapid virological response (RVR): Undetectable HCV-RNA (<50 IU/ml) by PCR after 4 weeks of treatment and maintained up to the end of treatment course.(3)

Sustained virological response (SVR): The absence of detectable HCV-RNA by PCR in blood 24 weeks after the completion of antiviral therapy.(3)

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Before and after, I would like to express my gratitude to "Allah" for providing me the blessings to complete this work.

Dedication

"I remember my mother's prayers and they have always followed me, they have clung to me all my life. All that I am or ever hope to be, I owe to my angel mother." Abraham Lincoln (1809-1865).

I dedicate this work to the soul of my mother. She gave me my name, my values and the road map for my life.

Abstract

Background: Egypt possesses the far highest prevalence of hepatitis C virus (HCV) in the world. HCV current and future burden is challenging the Egyptian health system.

Methods: Literature review was done using a two-steps approach: identification of factors at national level, then reviewing the best practices to address them.

Results: Barriers to interferon (IFN) services are: high burden of HCV with budgetary constraints, silent nature of the disease, absence of well-structured and integrated counselling and referral services, negative attitude of people living with HCV (PLWHCV) and their providers, fake remedies and misbeliefs surrounding HCV, stigma, gender vulnerability, narrow scale children services, financial costs affecting the poor, bureaucracy and long administrative procedures, insufficient competencies of providers, lack of proper awareness and preparedness for side effects, and low efficacy of IFN. Enabling factors favouring opportunities are: Egyptian government commitment, well-organized programme, availability of subsidized schemes for IFN, well-established health information system, and relatively high awareness about the presence of HCV among general population.

Conclusion and recommendations: Influencing factors are interacting and closely linked. Concentrating resources on one factor while neglecting the others will never lead to perceptible improvement. Efforts are recommended to focus on comprehensiveness and integration of care, strengthening health information system to provide a national registry for PLWHCV, support adherence and improve quality of care, simplification of administrative procedures, capacity building of providers, enforcement of social and biomedical research, raising awareness among high risk groups, and fighting fake remedies.

Key words: Hepatitis C, HCV, access, barriers, interferon, Egypt.

Word count: 12, 106 words.

Introduction

I am an associate researcher of public health at Theodor Bilharz Research Institute (TBRI), Egypt. TBRI is one of the research institutes affiliated to the Egyptian Academy for Scientific Research (ASRT) which is the main authority of the Egyptian Ministry of State for Scientific Research.

I have been graduated in medicine in 2005 from Faculty of Medicine, Ain-Shams University. The main factor derived me to choose public health was my interest in improving health status of population with special concern to health problems in developing countries. After one year of house officer internship, I started my career of public health in 2007. At this career beginning I continued for postgraduate education and obtained Master's Degree in Public Health and Preventive Community Medicine from Faculty of Medicine, Cairo University in 2011.

I participated in research and health programs concerning prevention and control of endemic liver diseases which represent a major health concern in Egypt and developing countries. Besides, health promotion through the specialized unit in TBRI Hospital and on-going epidemiological research and health education in "Geziret Mohammed Research unit" which is a rural research unit affiliated to our department. I succeeded to conduct a health promotion program targeting viral hepatitis in a preparatory school for girls in "Geziret Mohammed" and TBRI nursing school.

Hepatitis C is a global health problem with 3% prevalence worldwide. Egypt is far higher than the rest of the world with 14.7% prevalence.

Hepatitis C is a major health problem in Egypt gaining great attention from the government, media and general population. The problem took the lead from shistosomiasis which had been the major liver disease concern for decades. Governmental efforts to provide responsive services facing the huge need for IFN are increasing tremendously. However, difficulties to access IFN services have been recognized in spite of all these efforts.

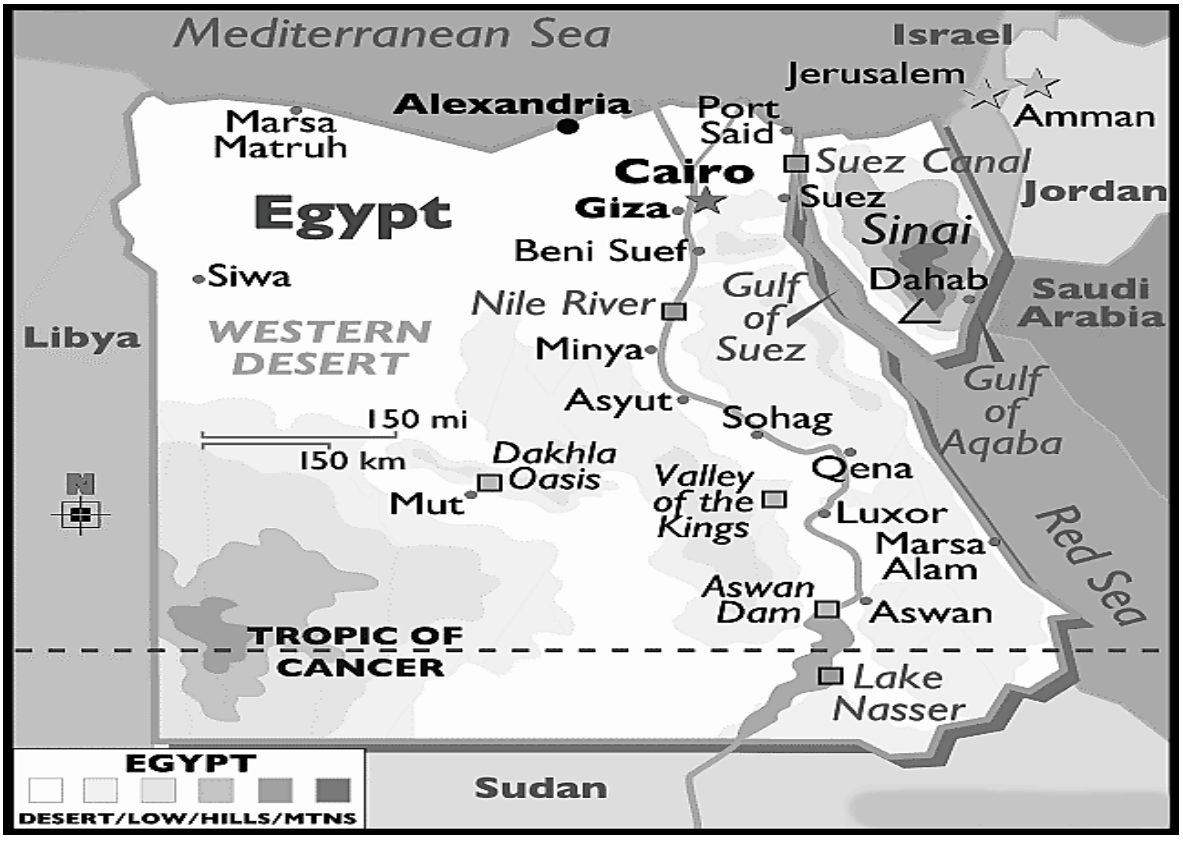
Currently, the Egyptian strategy for control of viral hepatitis 2008-2012 is being reviewed for the next step. This work is an attempt to explore the influencing factors affecting access to IFN services in Egypt followed by reviewing strategies and best practices providing possible clues. Recommendations developed from this study are given to support the next steps in improvement of access to achieve higher levels of IFN services effective coverage.

Chapter 1: Egypt Background

1.1 Geographical location and administrative structure

Arab Republic of Egypt is located in the North-Eastern corner of Africa with total surface area of 1 million km^2. Geographically Egypt is divided into four zones: The Nile Valley (Upper Egypt) in the south and Delta (Lower Egypt) in the north, The Western Desert, The Eastern Desert and Sinai Peninsula. Administratively, Egypt is divided into 27 governorates.(4)

Figure (1): Egypt Map, *Source: World Atlas 2011* (5)



1.2 Population and socioeconomic situation

Egypt possesses the highest population size in the Middle East region with 84.4 million inhabitants. Almost all Egyptians are Arabic native speakers. The Egyptian community has been shaped over more than 7000 years as a result of various cultures melting together. Religion is the main influence for the Egyptian culture and intellectual heritage. The majority of Egyptians are Sunni Muslims, while the minority are Christians (mainly Coptic with smaller in size other diverse Christian groups) estimated at 5.3 million in 2012.(6)

Egypt is a lower middle income country struggling with economic crises since the Arab Spring commenced in 2011. Gross domestic product (GDP) growth slowed down to 2.2% year on year 2012/2013. Unemployment reached 13% by end of 2012 with 3.5 million unemployed Egyptians.(7)

About 25.2% of Egyptians is officially counted as poor (per person spending below $500 per year) in the 2010/2011 financial year. Poverty is more likely in rural residents, illiterates and those with large families. The most disadvantaged population are in rural Upper Egypt, 51% of population living there are poor compared to average 10% in urban governorates.(6)

Illiteracy rate in Egypt is decreasing slowly. About 26.1% of Egyptians in 2011 were estimated to be illiterates. Gender gap is huge where 33.3% of females are illiterates compared to 18.8% of males.(6)

1.3 Health system organization and financing

Within the current governmental budgetary constraints, health expenditure hardly reached 6.9 % of general governmental expenditure in 2011. Social health insurance covers only 51% of population, compromising 18.6% of general government expenditure on health (GGEH). Disadvantaged population out of social health insurance coverage are informal poor workers and unemployed house-wives. Out of pocket (OOP) spending on health services is 71.8% of total financial spending, most of it goes to private sector.(8,9)

Health sector in Egypt is pluralistic in nature with multiple providers. Public (governmental and para-statal) and private providers operate independently and compete together in a relatively free market.(9)

Public sector is funded by Ministry of Finance (MOF). It is operating under the umbrella of Ministry of Health and Population (MOHP) which is the regulator of health care and the major governmental provider of preventive and curative services. The para-statal organizations are affiliated to MOHP and controlled by its administrative rules. They include Health Insurance Organization (HIO), Curative Care Organization (CCO), and General Organization of Teaching Hospitals and Institutes (GOTHE).(9,10)

The University Hospitals affiliated to the Ministry of Higher Education (MHE) are major public providers. Financial support from MOF is provided for their free of charge services meanwhile OOP expenditure finances the fee for service part. Ministries of interior affairs, transport, and defence operate their own facilities for health insurance of their employees.(9)

Private sector includes private insurance moderated by companies and occupational syndicates, for-profit facilities e.g. private clinics, hospitals, and pharmacies, and not-for-profit organizations e.g. non-governmental organizations (NGOs) and faith based organizations.(9)

Health inequities are obvious within the Egyptian health system in terms of income levels, gender, geographical distribution, and health outcomes.(11)

The health sector reform programme aims at provision of best quality, affordable and cost-effective package of basic health services through expanding social health insurance coverage. Family health approach is the backbone for primary health care with great expectation to be improved.(10)

1.4 Health profile and major health problems

Egypt possesses a classical developing country profile; facing dual disease burden with epidemiological transition. The trend from 1990 till 2010 reveals that non-communicable diseases and injuries are steadily rising. Top causes of Disability-Adjusted Life Years (DALYs) are ischemic heart disease, cerebrovascular disease and liver cirrhosis. On the other hand, communicable, maternal, neonatal and nutritional causes of DALYs are declining.(12) Life expectancy has increased in the last two decades from 64 to 71 years.(6)

The previous two decades showed progress in the major health indicators linked to Millennium Developmental Goals (MDGs); under-five mortality target has been achieved. Significant reduction in maternal mortality favours the achievement of its target by 2015. For the sixth goal, human immunodeficiency virus (HIV) and most of infectious diseases are not a major threat; however viral hepatitis is a serious problem through consequent liver cirrhosis and hepatocellular carcinoma (HCC).(13)

Chapter 2: Problem statement, objectives, methodology and conceptual framework

2.1 Problem Statement

Hepatitis C virus (HCV) has been declared by the World Health Organization (WHO) as a global health problem. Approximately 3% of the world's populations (more than 170 million people) are chronically infected with HCV, and more than 350 000 people die every year from its related liver complications. The incidence of HCV on a global scale estimates 4 million people to be infected with HCV annually. Countries with highest prevalence of HCV antibodies are Egypt (14.7%) followed by Pakistan (4.8%).(14)

The World Health Organization 2008 estimates for the major causes of death in Egypt put liver disease in the third rank after ischaemic heart and cerebrovascular diseases. About 26,649 estimated deaths were attributed to liver disease representing 7.34% of total deaths.(15)

The current and future burden of viral hepatitis in Egypt is one of the most pressing public health issues. Morbidity pattern reveals that chronic HCV is the main cause of liver cirrhosis and HCC in Egypt. Though not all infected persons with HCV proceed to develop complications, the medical and economic burden on those who develop these complications is significant. Given the relatively high rates of vaccination against Hepatitis B Virus (HBV) in Egypt, HCV will continue to take the upper hand for liver disease in the coming years.(16)

The socioeconomic burden of HCV is obviously challenging Egypt with affection of national income due to reduced productivity, financial costs of subsidized IFN programme and tertiary health services for complications.(17)

Chronic HCV is to a great extent a curable disease especially for young candidates. The standard treatment is antiviral therapy as combination of Interferon (IFN) and Ribavirin (RBV). WHO puts early and appropriate IFN based therapy in its main recommendations for HCV control.(14)

Efforts targeting HCV primary prevention in Egypt began in early nineties of last century with awareness campaigns and infection control measures in health facilities.(18) Secondary prevention has been addressed through screening of the national blood supply since 1993. In late nineties, sentinel surveillance for acute HCV was established.(16)

The Egyptian government commitment towards viral hepatitis led to establishing the National Committee for Control of Viral Hepatitis (NCCVH) in

2006. NCCVH developed a national control strategy for 2008-2012 based on four components: surveillance, prevention, treatment and research.(16)

The treatment component takes the upper hand in terms of expenditure and interest of the government. MOHP argues that IFN based therapy is a cost effective secondary prevention intervention compared to treating PLWHCV after they develop serious complications. The strategy assumes that successful treatment of PLWHCV will decrease the socioeconomic burden in the near future. (16)

NCCVH supported by the government are working to achieve the IFN related strategy goals inspired by budget limitations. These goals include treatment of 20% of chronic PLWHCV in need for IFN through subsidized schemes and expanding the access to treatment centers to be within 100 km of every Egyptian resident place.(16)

In the first four years of the national control strategy, about 190,000 PLWHCV participated in the IFN programme. However, this is not covering all those in need for IFN and only half of this number showed sustained virological response (SVR) which is the ultimate goal of the treatment.(18)

In spite of all these efforts, barriers to IFN services may arise at multiple levels, starting from disease identification, specialist referral, missed treatment opportunities due to financial expenses and finally receiving appropriate care. The lack of awareness associated with faulty health related practices as well as under detection makes HCV a silent epidemic. Health seeking behaviours represent a challenge for treatment, and stigmatization adds a social burden to the problem. Non-adherence to treatment challenges the efforts done by the government obviously.(19)

Limited research has been conducted till date to analyse and address these barriers. This study represents an important contribution to identify both barriers and enabling factors for accessing IFN services in Egypt followed by review of possible clues to improve access. Building on correlating the study results with the existing situation in Egypt, final recommendations should inform for development of interventions in support of better accessing of IFN services.

2.2 Objectives

General objective

To review strategies and best practices addressing factors influencing access to HCV IFN services in Egypt, in order to provide concrete recommendations and clues for the national control strategy for viral hepatitis in Egypt.

Specific objectives

1. To describe HCV epidemiology and burden of HCV.
2. To describe the national response and control strategies for HCV.
3. To identify influencing factors affecting access to HCV IFN services in Egypt.
4. To review strategies and best practices across different health systems aiming at enhancement of access to HCV IFN services.
5. To develop recommendations applicable to the Egyptian context in order to improve accessibility to HCV IFN services.

2.3 Methodology

Literature search was done systematically using large internet databases: Google, Google Scholar and PubMed. The search strategy was designed to capture all relevant articles including case studies, meta-analyses, reviews, strategies, websites of research projects and reports published by governmental and non-governmental organizations. Grey literature was searched as well for unpublished studies and reports in Egypt. All identified references were reviewed against the objectives using a process of positive exclusion, first considering titles and abstracts and subsequently reviewing full text articles. Bibliographies were reviewed to add relevant articles to the pool.

Collected data was filtered through methodological inclusion criteria using alternatively combined key terms in English and Arabic: Egypt, hepatitis C, strategies, treatment, Interferon and access. Search was limited to knowledge products starting from January 2000 till August 2013.

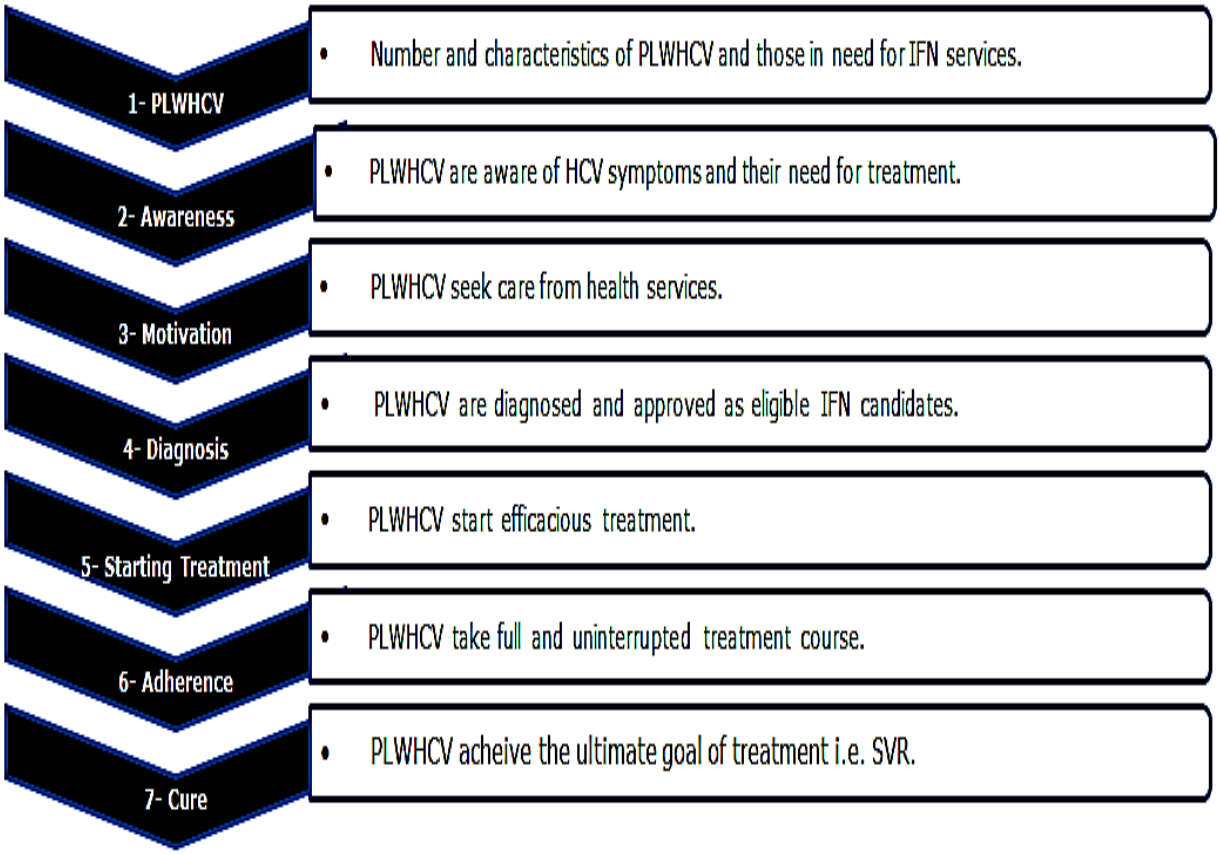
The following chapters are organized as follows; **chapter 3** describes HCV epidemiology, burden, national response and control strategies, **chapter 4** describes the influencing factors affecting access to HCV IFN services in Egypt, **chapter 5** presents the reviewed strategies and best practices relevant to the identified factors, and **chapter 6** includes the discussion of findings and conclusion(s) relevant to each factor followed by study recommendations.

2.4 Conceptual framework

Piot model was used in this study to organize the analysis of influencing factors and their relevant strategies and best practices. This model has been worked out successfully in analysis of access in different disease control programmes: tuberculosis (TB), sexually transmissible infections (STIs) and malaria. The model helped recognize bottlenecks where interventions and enabling factors could be developed to improve access. The model is based on a stepwise approach from the onset of infection till cure.(20)

The model was modified to fit the natural history of HCV. Most PLWHCV pass the acute stage unrecognized with asymptomatic progression for years. Accordingly, discovery of the condition is mostly accidental followed by seeking IFN therapy.(21)

Figure (2): Modified Piot Model for HCV, *adapted from Mumba M et al 2003* (20)



Chapter 3: Epidemiology, burden, national response and control strategies for HCV

3.1 Epidemiology of HCV

Etiological agent

HCV was discovered in 1982 as post blood transfusion non-A/non-B hepatitis. It is classified as a human blood borne enveloped RNA virus of Flaviviridae family. HCV main targets primarily liver cells and secondarily immune cells (B lymphocytes). Viral replication is very high even in chronic cases resulting in rapid evolution of diverse subtypes. This heterogeneity represents challenge to immune-mediated control measures either through drugs or vaccines.(22)

No effective vaccine is available for HCV. Heterogeneity of the virus is the main challenge facing scientists; accordingly anti-envelope antibody vaccine resembling the one used for HBV is not likely to be synthesized.(23)

Six identified genotypes for HCV with multiple sub-types are geographically distributed all over the world. Majority of the Egyptian cases are of genotype 4 meanwhile genotypes 1 is prevalent in the United States and Western Europe followed by 2 and 3. South Africa is affected mainly by the fifth genotype and Southeast Asia is suffering from the sixth one.(23)

Prevalence

Egypt possesses a far high prevalence of HCV compared to other countries; 14.7% of Egyptians carry HCV antibodies indicating contracting the virus at some point of time. Moreover, 9.8% of population has a chronically active infection. Overall, an estimated 6 million Egyptians had chronic HCV infection in 2008.(19)

Incidence

Logistic and methodological obstacles in Egypt challenged development of accurate incidence data about HCV. Besides, HCV infection is asymptomatic with prolonged latent period. A modelled incidence study using the Egyptian demographic and health survey (EDHS) and collective evidence from previous studies resulted in two estimates: 6.9 and 6.6/1000 persons per year respectively. These results give projection of more than 500,000 new HCV infections per year.(24) Lower estimates at 2.4/1000 persons per year were found in a four years cohort study done with a sum of 10,000 participants from rural Egypt residents.(25)

Modes of transmission

Contracting HCV results from exposure to infected blood or body fluids. This implies several modes of transmission including parenteral, sexual and vertical i.e. from mother to child during pregnancy or birth. Large dose of blood or repeated direct percutaneous exposures is required in most cases to introduce an infectious dose to the victim. HCV is not efficiently transmitted from mucosal exposures to blood or body fluids, giving less probability of infection to sexual and vertical transmission.(26)

Origin of HCV epidemic in Egypt

Several studies confirmed the explosion of HCV transmission as a result of the Egyptian mass campaign of parenteral antischistomal therapy (PAT) in the sixties till early eighties of the last century. This campaign represents the largest iatrogenic transmission of a blood-borne pathogen in the known history. Reusable glass syringes used without proper sterilization is claimed for the explosion of HCV epidemic. In 1982 oral Praziquantel replaced PAT, however the intensive prior transmission resulted in a large pool of chronically infected persons sustaining high prevalence rate till date.(27)

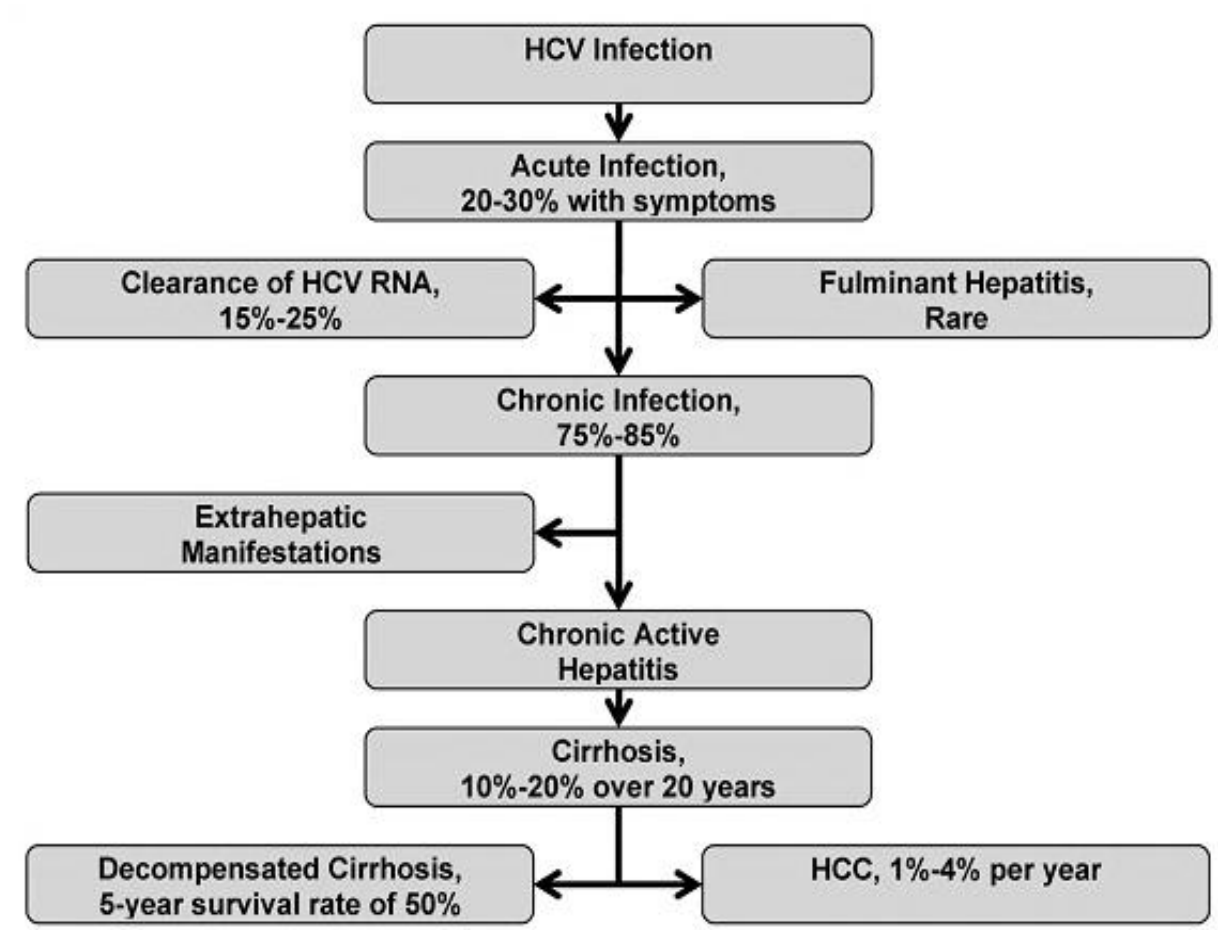
Natural history, course and outcome

The natural history of HCV infection is mysterious due to silent character of the acute phase and early stages of chronic infection.(21)

Acute hepatitis manifestations appear within 12 weeks of exposure, only 20-30% of acute cases develop clinical symptoms. If documented, the symptom consists of jaundice, generalized weakness and nausea in association with elevated liver enzymes. Fulmination ending with death during acute phase is extremely rare.(28)

Acute infection may proceed for one of three outcomes; first is spontaneous resolving in 15-20% where HCV RNA is cleared with no progress to chronic infection. Second is fulmination of the acute condition leading to death in extremely rare cases. Third is chronic HCV in 75-85% of cases without severe complications. About 10-15% of chronic cases progress to cirrhosis within two to three decades. This progression is often asymptomatic and even PLWHCV first presentation may be cirrhosis complications. Decompensated cirrhosis manifestations (50% survival rate in 5 years) include ascites, upper gastrointestinal bleeding, hepatorenal syndrome and hepatic encephalopathy. The risk of HCC with cirrhosis is approximately 1-4% per year and rarely occurs without cirrhosis.(28)

Figure (3) Epidemiological Model of HCV, *Source: Chen SL, Morgan TR 2006* (28)



3.2 Current and future burden of HCV in Egypt

In the last two decades HCV superseded schistosomiasis to be the leading cause of chronic liver disease in Egypt. The morbidity and mortality impact of HCV infection in Egypt is still to come. HCV is the major risk factor for HCC where 75-90% of cases carry the virus antibodies.(29)

HCV-related mortality is increasing annually and expected to increase by more than two folds by 2020 as projected by a 2006 study.(30)

A natural history and prevalence based model predicts 127,821 deaths attributed to HCV associated cirrhosis over the next two decades with 117,556 deaths related to HCC. PLWHCV will spend 750,210 years with cirrhosis and 132,894 years with HCC. Besides, PLWHCV will lose 32.86 million years of their lives in comparison to non-infected age-sex-matches.(31)

3.3 National response and control strategies

Establishment of the national control strategy

In response to the huge burden of viral hepatitis problem, MOHP established NCCVH in 2006. In April 2008, NCCVH developed the national control strategy for viral hepatitis to guide the collective efforts competing HCV and HBV in Egypt. NCCVH formulated the strategy in collaboration with experts from MOHP, MOHE, WHO and researchers from national and international institutes.(16)

Priorities and goals of the national control strategy

The national control strategy is based on four priority areas: surveillance and monitoring, prevention, treatment and research responding to the eight goals of the strategy. For each priority area recommendations were given to guide its interventions and indicators (appendix 1).(16)

Goals formulated for treatment are targeting provision of IFN to 20% of PLWHCV in need by 2012 under subsidized schemes in addition to expansion of geographical accessibility through provision of an IFN center within 100 km of residency of every Egyptian (except in frontier governorates).(16)

The implementation plan of the strategy proposed the following interventions to improve access to treatment: developing information and counselling hotline, monitoring and evaluation of treatment centers, scaling up screening with partners, adding new IFN producers and evaluation of new drugs, health information system establishment for follow up and support and quality assurance of laboratories. Children interventions are focusing on multi-center trials of efficacy and safety of IFN and provision of oral RBV.(16)

Financial costs of IFN based therapy programme

Egypt possesses the largest nationally subsidized viral hepatitis control program in the world. IFN treatment costs the Egyptian government $80 million annually. Almost 20% of total budget dedicated from MOHP for the strategy is devoted for IFN services. This budget covers 40% of the programme, meanwhile the other 60% is paid by public and private health insurance and out of pocket expenditure.(18)

Services provided

IFN therapy is provided through a vertical programme including specialized reference centers distributed all over the country. The Egyptian strategy

argued that this is highly specialized service requiring specially trained providers and special equipment for diagnosis and drug storage.(16)

Administrative and organizational structure of IFN centers

The national headquarter is located in National Hepatology and Tropical Medicine Research Institute (NHTMRI) affiliated to GOTHE.

Each IFN center is operated under joint supervision of two specialized physicians from MOHP and MOHE (a medical faculty of a nearby university). This university may provide equipment for PCR detection or IFN storage to support the center.

On establishment of a new center, four physicians are sent for a two weeks training at the headquarter. Training covers the national treatment guidelines, clinical management and practical rounds with NHTMRI physicians. Administrative personnel are also trained on data entry and financial issues.(16)

Primary prevention

Unavailability of HCV vaccine directs primary prevention to awareness and hygienic precautions to prevent transmission especially infection control measures in health facilities.(3)

Screening and diagnosis methods

Diagnostic tests for HCV infection are divided into serologic assays for antibodies and molecular tests for viral particles. Serological tests are used for screening; they indicate the exposure to the virus. Quantitative Real Time Polymerase Chain Reaction (PCR) is the molecular test used for HCV-RNA detection, which is indicative of active chronic infection. However, HCV-RNA test may not detect the virus in recently infected PLWHCVs (first two weeks of exposure) or low viral loads cases.(22)

Current treatment

The standard therapy worldwide for chronic HCV is the combined treatment including pegylated interferon (PEG-IFN) alpha-2a or 2b injected once weekly plus RBV orally taken twice a day with food. Approved duration of treatment depends on HCV genotype, where genotypes 1 and 4 requires 48 weeks meanwhile for genotypes 2 and 3 only 24 weeks are standardized.(32)

Future treatment

Steady therapeutic advances for HCV are being achieved. In 2011, directly acting antivirals (DAA) were introduced to the international market. They are administrated orally and have shown effective response in 24 weeks for genotype 1 in combination with PEG-IFN/RBV. Cure rate is expected to jump to 90%. However, high costs, lack of sufficient trials on genotype 4 for efficacy and safety defer wider utilization at global level. This makes HCV genotype 4 with its currently used PEG-IFN/RBV standard regimen lagging behind other genotypes regarding effectiveness of treatment.(23,33)

Chapter 4: Influencing factors affecting access to HCV IFN services

Multiple factors are interacting either hindering or enabling access to IFN services. An international study recognized more obvious challenges in the Middle East as compared to other regions. From providers' perspective, only 28% of participants agreed that PLWHCV have adequate access to HCV services. Participants considered demand side barriers more significant than supply side barriers. Identified demand side barriers were fear of side effects, long course of treatment, inability to pay, and trust in effectiveness of IFN. Supply side barriers included unavailability of services, high price of drugs and administrative obstacles.(34)

Modified Piot model will be used in this chapter as a stepwise approach to identify influencing factors on access to IFN based therapy in Egypt.

4.1 Number and characteristics of PLWHCV and those in need for IFN services

Characteristics of PLWHCV in Egypt

The 2008 EDHS revealed that the prevalence of HCV increases with age to reach the highest level in 46.3% of males and 30.8% of females aged from 50-59 years. Males were more affected with 17.4% prevalence compared to 12.2% in females. Rural residents were affected more than urban residents with 18.3% versus 10.3% respectively.(19)

Multivariate analysis of the EDHS results propose that HCV is more likely occurs in older and poor individuals, males, those with history of PAT and blood transfusion as well as residency outside frontier governorates especially in rural areas (areas affected with schistosomiasis and targeted for PAT).(35)

Estimated number of PLWHCV in need for treatment

At the beginning of the national control strategy it was difficult to estimate precisely the potential number of PLWHCV eligible for IFN therapy. The strategy based its estimates on a study proposing that 10% of PLWHCV carrying antibodies are in need for treatment. Applying this to EDHS results which states that 6 million Egyptians carry HCV antibodies, 600,000 PLWHCV require treatment. Prior to the strategy, only 2% of this estimate received treatment.(16,19)

Surveillance

Due to limited resources, MOHP does not provide nationwide laboratory-based surveillance through the public hospital laboratories. Accordingly,

there is no national registry for chronic cases. However, since 1999 MOHP coordinates sentinel surveillance of acute HCV cases through monthly reports from a network of 256 district surveillance units. (16,36)

4.2 Awareness: PLWHCV are aware of HCV symptoms and their need for treatment

General awareness about HCV

Awareness about the presence of HCV problem reference to EDHS revealed that 85% of men and 80% of women stated that they heard about HCV. Information received about the virus within six months prior to the survey was more prevalent among women than men with 67% and 61% of participants respectively. Main sources of information were television for almost 90% of whole participants, personal contact with a relative or friend was found in quarter of females and one third of males. Health services showed a very limited role either through direct contact with a provider or during a facility visit. Direct contact with provider provided 6.2% of males and 4.8% of females with information about HCV. About 79% of men could identify at least one method of HCV transmission, where 70% of females could do so. Identification of methods of transmission increases significantly with urban residence, level of education and wealth.(19)

Awareness of HCV status

Globally, less than half of PLWHCV are aware of their status and less than 30% of those aware of their infection receive treatment. Lack of awareness is the most challenging obstacle to engage PLWHCV in need for IFN therapy leading to missed opportunities for timely treatment.(34)

In a qualitative study done with users of IFN services in Egyptian reference centers, the majority of PLWHCV declared that they were not aware of their status which was discovered by chance through obligatory testing. Only few stated that they were discovered by mobile testing units or on their demand in response to contacting HCV PLWHCV. Unfortunately, advanced liver symptoms are frequently the starting point for discovering the HCV status, at this stage IFN therapy is not applicable.(37)

Screening

Self-awareness is strongly linked to testing rather than symptoms. Only passive screening is done for HCV; testing is obligatory in blood or organ donation, pre-military recruitment, pre-employment in Gulf countries, hemodialysis, occupational exposure e.g. needle stick injuries in healthcare settings.(16)

In 2008 MOHP had 9 mobile and 7 fixed units for rapid testing of blood born infections namely HCV, HBV and HIV. Mobile units target youth groups, tourist areas, microbus stations, universities, and sports clubs. Positive cases are referred to the nearest treatment centers.(16)

Counselling and referral

Linkage between screening and referral of HCV positive cases lacks a national policy. Referral at the discovery point is not well established. Lack of organized referral system and guidance for PLWHCV on the following steps results in delay and missed opportunities for care.(17)

4.3 Motivation: PLWHCV seek care from health services

Delayed response is the first challenge to access IFN services. A qualitative study with Egyptian patients on IFN therapy described the natural history of consequences. On discovery, PLWHCV suffer from a shock phase accompanied by lack of awareness about disease sequel and complications. Unbalance and/or denial wastes a lot of time for PLWHCV and make them defer the decision to seek proper care. Absence of counselling services reassuring the PLWHCVs at the testing center aggravates the problem.(37)

Perception and response to illness in Egypt

Egyptian study showed that majority of PLWHCV had passive attitude towards illness in general. Participants perceived their illness as destiny and command of God which cannot be changed. Accordingly, the response for some was depression and fear of progression to the next IFN services. This perception is a major factor to decide both initiation and adherence to IFN therapy.(37)

In Egypt the first response to illness especially in rural areas and slums is using folk and pain relief remedies. This response may last for years and finally if the previous therapies didn't relief the condition, PLWHCV start to consider accessing specialized formal health services.(37)

Stigma and social support

Social stigma associated with discrimination in health services results in fears to seek proper health care. Stigma makes PLWHCV prefer to keep their HCV status a secret even if they want to start IFN therapy. (37)

A lot of fears bother PLWHCV minds: fear of negative attitude and avoidance in PLWHCV social network and work, transmitting the infection to contacts (even with lack of proper awareness about methods of transmission), failure

to find a partner, divorce, failure to find a job or termination of employment, and finally the pity look of the community.(37)

Lack of social support and proper advice put more obstacles towards services. Participants of previous studies mentioned that personal stories and rumours they heard about failure of IFN made them not in favour of initiating treatment.(37)

Gender role

An Egyptian qualitative study revealed that decision to seek IFN services is beyond females' power. Females suffer from their husbands' domination. Additionally, financial power makes the husband take the decision maker role. He may evaluate the condition and decide whether it requires physician consultation or not. Furthermore, family obligations and responsibilities of mothers towards children make them less able to seek health care.(37)

Acceptability

PLWHCV attitude towards health services

Most Egyptian PLWHCV have fears about seeking public health services. PLWHCV opinions are against public services for being non-responsive, full of long queues and waiting times, absence of experienced staff, lack of trust in effectiveness of drugs provided by health insurance. Private services are more preferred by PLWHCV even if they are more expensive.(37)

Trust and attitude of providers

Trust between PLWHCV and their providers is essential for better interaction, willingness to seek care and adherence to treatment. This trust is affected to great extent by provider's attitude towards clients.(37)

In broader sense, trust is given or lost for the health services as whole. PLWHCV may lose trust in IFN services and shift to low quality services or non-evident fake remedies.(37)

Negative attitude towards HCV clients in public health services was identified by PLWHCV in five IFN centers. The strongest cause behind such attitude is fear of contracting HCV. PLWHCV declared that they feel stigmatized by their physicians. Utilization of other services was affected as well; some PLWHCV had experience of refusal by dentists and surgeons to undergo interventions, the claim given was to avoid transmitting infection to others. Possible consequences suggested by the study were reduction in PLWHCV response to providers' recommendations and in turns non-adherence to treatment.(37)

Evidence from study done outside Egypt refers to the negative attitude of providers toward PLWHCV. Although providers stated that they are willing to deal with PLWHCV without any fear, 12% revealed that they feel uncomfortable due to perceived risk of contracting HCV. Another study showed that 48% of providers self-reported additional unnecessary infection control precautions on dealing with PLWHCV. Dentists also treat PLWHCV with special unnecessary precautions, 30% of study participants declared that PLWHCV should be postponed till the last appointment of the day to prevent transmission.(38)

Media and trust in IFN

Negative media messages about IFN therapy challenges accessing IFN services. Advertisements for non-evident fake remedies make PLWHCV hesitant about the effectiveness of IFN. Moreover, some religious TV channels promote for fake remedies based on debatable religious norms and proverbs.(37)

Availability

Few IFN centers are providing specialized care for children. This special care is challenged by the need for highly trained providers for adjustment and follow up of IFN and oral RBV doses.(16)

Geographical accessibility

Expanding geographic access to IFN centers is a top priority in the Egyptian strategy. Starting from 2006 till February 2008, ten reference centers provided IFN services to 12,089 PLWHCVs. Two of them in the capital, seven in Lower Egypt and only one in Upper Egypt.(16) The national network continued to grow till it reached 23 centers in 2012. Seven mega centers at the moment are providing services to more than 2000 PLWHCV each. The goal of availability of facilities within 100 km for every Egyptian almost has been achieved except for frontiers governorates.(18,39)

Affordability

PLWHCV are classified according to their financial scheme into four categories described in table (1).

Table (1): Financial schemes for PLWHCV receiving IFN therapy, *Source: NCCVH 2012*(16)

Financial scheme	Criteria of PLWHCV	Percentage
1. Program for treatment at the expense of the state (PTES)	Not covered by any insurance scheme and provide proof of low grade monthly salary. On approval they receive subsidized 12 weeks PEG-IFN voucher then revaluated for the need for continuation.	53.1%
2. National health insurance	Socially insured PLWHCV. HIO covers the whole course of treatment	41.3%
3. Private health insurance	Private sector employees whose employers agreed to cover their financial costs at IFN centers.	3.7%
4. OOP	Patients pay the costs from their own pockets.	2.9%
Total		100%

Insurance coverage in Egypt is highest for men, urban residents in Lower Egypt, those aged 5-15 years and those in highest wealth index. This is explained by linkage to obligatory insurance for school children. HIO which covers 89% of the insured Egyptians is working on expansion of its coverage to include the underserved population namely: women, rural residents and the extremely poor.(40)

Continuous efforts from the beginning of the strategy are being done to reduce the IFN costs. At the starting point of the strategy, IFN price was reduced from €20,000 to €12,000 per course for Pegasys® (PEG/IFN alpha 2a) or Peg-Intron® (PEG/IFN alpha-2b). The strategy was successful to challenge this monopoly again through introduction of a locally produced Reiferon Retard® by private Egyptian company Minapharm. In 2011, Minapharm supplied the HIO with the lowest price PEG-IFN. Minapharm overcame the obstacle of patency protection because its product is not quite a bio-similar drug to the imported ones, besides it is used only in domestic market. Along six years, negotiations succeeded to reduce the imported PEG-IFN price by six folds to be at cost of €2,000 per course. Till date still the idea of purchasing generic PEG-IFN from India, China, or possibly Brazil

or Thailand is under exploration for the efficacy and safety of such drugs as cheaper alternatives.(16,18)

4.4 Diagnosis: PLWHCV are diagnosed and approved as eligible IFN candidates

Diagnostic criteria for approval of IFN candidates

Strict inclusion criteria for approval of IFN therapy were formulated by the national control strategy. Treatment is provided to age group from 18-60 years (children are managed in specialized centers on small scale). Liver biopsy which is an invasive technique with possible harm is obligatory except for health care providers, PLWHCV with genotype 2 or 3, presence of extra hepatic manifestations, PLWHCV already started treatment elsewhere and want to join the programme (yet they should show improved virological response). PLWHCV with compensated cirrhosis, mild changes in liver biopsy and lowest grade in fibroscan without varices are accepted. PLWHCV with morbid obesity identified by body mass index above 35 have to reduce their weight before treatment.(16)

Failure of proper diagnosis

Evidence of failure of diagnosis or referral in private clinics was mentioned in previous studies. Lack of physicians' experience about criteria of IFN eligibility results in considering the condition only requires conservative treatment instead of referral to IFN centers.(37)

Administrative and organizational barriers

Bureaucracy and long queues for administrative procedures result in missed opportunities for treatment. Complicated procedures to issue the approval from PTES challenge PLWHCV significantly. These procedures delay or even may hinder the initiation of treatment. Female PLWHCV especially in rural and slum areas may not have a national identity card which adds a new procedure to be able to apply for IFN therapy.(37)

4.5 Starting treatment: PLWHCV start efficacious treatment

Enrolment in IFN programme

Since establishment of the strategy in 2008 till 2011, nearly 190,000 PLWHCV were enrolled in the IFN programme (appendix 2).(18) In 2011, it was estimated that waiting list for initiation of IFN therapy exceeded 150,000 PLWHCV.(17)

Competencies and responsiveness of providers

The WHO Global Hepatitis Programme identified incompetency among HCV services providers as a challenge facing access to care.(41)

Middle East HCV specialists were found the least knowledgeable among different world regions about HCV treatment principles and only third of them stated that their governments provide proper treatment guidelines.(34)

4.6 Adherence: PLWHCV take full and uninterrupted treatment course

Adherence criteria

Adherent patients are those who are maintained on more than 80% of PEG-IFN/RBV and course duration.(42) Drop-outs either due to side effect or non-compliance was reported in 20.3% of Egyptian PLWHCV.(43)

Affordability

Users IFN services pointed out the burden of direct costs out of the subsidized scheme e.g. follow up investigations and remedies for side effects. Diabetic PLWHCV are dismissed from the subsidized treatment of diabetes in case of approval for IFN subsidization.(37)

Indirect costs particularly travel costs were identified by participants as obstacle for adherence to treatment sessions. PLWHCV also suffer from work absenteeism; those working in formal labour sector face the threats of being fired, meanwhile those working in the informal sector with earnings on daily bases may suffer more as a result of opportunity costs losses.(37)

PLWHCV Knowledge

Lack of sufficient knowledge was found significantly associated with depression (attributed to unpreparedness to its manifestations) and non-adherence at earlier stages of treatment (44)

PLWHCV consider counselling and informative discussions with their providers the most important enabling factor for adherence to treatment.(37)

Side effects

Side effects of IFN influence PLWHCV quality of life and are accompanied with dose reduction which may alter effectiveness of therapy. Depression is

the most common neuropsychiatric side effect of IFN therapy.(45) PLWHCV are more likely to develop depression in comparison to normal population. (46)

An Egyptian study revealed that PLWHCV on IFN therapy possessed significant depression criteria with more severe symptoms compared to those not on IFN. Non-adherence to treatment in depressed group was twice as those non-depressed.(45)

Social relations

Negative effect of IFN therapy on social relations represents a potential barrier for adherence. In a follow up study, social relations were negatively affected to a limited extent at the 48th week of treatment, yet this effect disappeared at the 72nd week.(44)

Administrative support and follow up

Health information system currently used in IFN centers includes registration of PLWHCV initial evaluation and follow-up visits. Demographic and morbidity data including clinical, laboratory and radiological findings are registered for all cases. Treatment response and side effects are registered within the clinical data of follow up visits. The headquarter collects these data for analysis in order to support and supervise treatment centers. However, using this system to retrieve defaulters is not emphasized. (16,39)

4.7 Cure: PLWHCV achieve the ultimate goal of treatment i.e. SVR

Predictors of effective response to IFN

Predictors of SVR include HCV genotype, viral load, fibrosis stage, age, genetic predisposition, insulin resistance, body weight and adherence to therapy.(47,48) In addition, failure to achieve early virological response (EVR) gives a negative prediction to achieve effective results by the end of the course. Furthermore, PLWHCV with rapid virological response (RVR) are more likely to achieve SVR.(49)

Approximately 90% of Egyptian PLWHCV carry antibodies to genotype 4 which responds less successfully to interferon therapy than other subtypes.(18)

Type of IFN also showed effect on SVR. A study done on 3718 Egyptian PLWHCV revealed that PEG/IFN alpha 2a showed SVR in 59.6% compared to 53.9% in PEG/IFN alpha 2b group.(50) In a clinical trial, SVR was 64.4% and 53.1% for PEG/IFN alpha 2a and 2b respectively.(51)

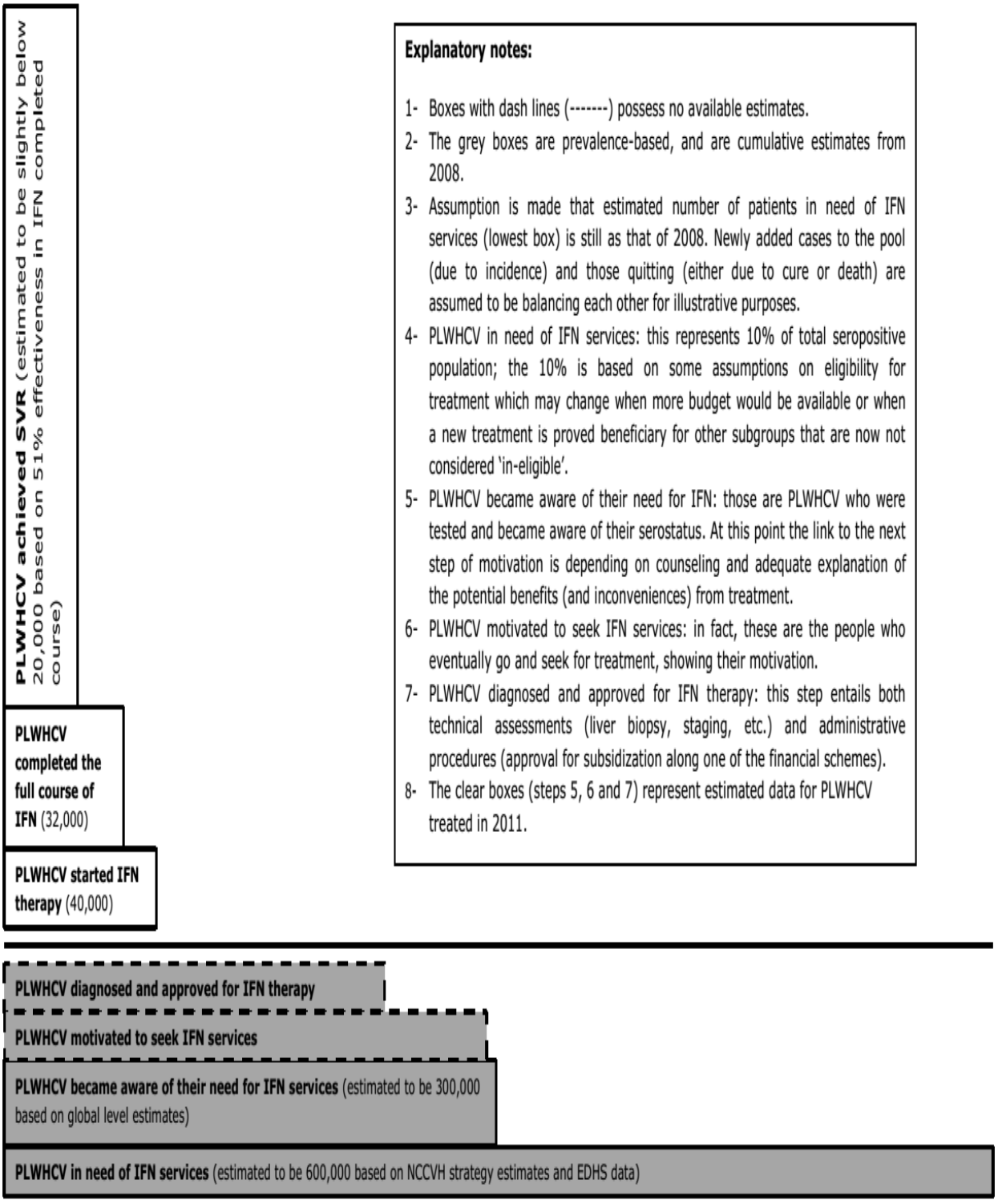
Another study recognised that follow up testing at week 72 is not supported by the IFN programme, accordingly patients may miss the final decision whether they achieved SVR or relapsed.(43)

Adherence to treatment during the first 12 weeks was found significant on the likelihood of achieving SVR. A study results showed that 55.8% of adherent group achieved SVR compared to 25% for the non-adherents.(51)

Effectiveness of IFN

Progress report of the national control strategy revealed that in the period from 2008 till 2011, 51% of PLWHCV who completed their IFN course achieved cure identified by SVR.(18)

Figure (4): Illustrating diagram for estimated PLWHCV achieved SVR starting from those in need for IFN (based on 2011 estimates), *adapted from NCCVH 2012; El Sayed N et al 2012; McGowan CE et al 2013* (16,18,34)



Chapter 5: Strategies and best practices to improve accessibility to HCV IFN services

This chapter will use the previous steps for identification of influencing factors to present the results from reviewed strategies (appendix 3) and best practices. Following this presentation, experiences for strengthening IFN programme are provided.

5.1 Stepwise approach to overcome barriers

5.1.1 PLWHCV in need for IFN services

PLWHCV hard to reach

Effective engagement of hard to reach PLWHCV was realized as a priority in a strategy proposed for British Columbia.(52)

Surveillance and accessing difficult to reach

Strengthening capacities for surveillance and involvement of local health facilities in data collection has been addressed in the United States.(53)

National Hepatitis C Strategy of Ireland stressed on establishment of a national register for PLWHCV based on high quality laboratory notification system. PLWHCV identifiers and clinical data were to be collected and sent to central laboratories.(54)

5.1.2 Awareness: PLWHCV are aware of HCV symptoms and their need for treatment

Awareness about HCV testing and treatment

The progress report of the national control strategy in Egypt recommended increasing community awareness and education in the future plans.(18)

Increasing public awareness about HCV testing and treatment has been called for in Europe. It is recommended to engage all those in position to help: physicians and nurses working in primary health services, pharmacists, PLWHCV associations, civil services and community based organizations (CBOs). Population at risk of contracting HCV has to be identified for intensive efforts.(55)

The CDC identified in its action plan some actions to improve awareness. First to conduct formative research to understand knowledge, attitudes, and behaviours related to testing, care, and treatment. Second action is to implement national pre-test campaigns targeting high risk groups about risk

and the benefits of testing and treatment. Conduction of HCV media events, celebration of world hepatitis day and declaration of May as "Hepatitis Awareness Month". These events aimed at raising awareness among target population and raising funds for viral hepatitis initiatives.(56)

Screening

In response to the evidence of HCV high-prevalence in birth cohort, CDC recommends one-time HCV testing for all United States residents born from 1945 to 1965 (where risky blood born transmission was at its maximum level). Although risk-based screening is recommended, yet birth cohort-based screening was found more cost-effective.(57) Another study in the United States confirmed the cost-effectiveness of birth-cohort screening, however it figured out that better morbidity and mortality outcomes require improvements in referral and treatment.(58)

A study from United States revealed that reminder system for physicians targeting both birth cohort and risk based screening, increased rate of testing from 6% at baseline to 13.1% and 9.9% respectively.(59)

Rapid testing at point-of-care has been approved in the United States to be used resembling the screening done by mobile facilities, yet it is still not widely used in the whole country.(53)

Awareness of providers and emphasizing the importance of screening through health education curriculum was recommended by strategy proposed for New Jersey, United States.(60)

In Egypt, NGO conducted an awareness and screening programme targeting high risk group of garbage collectors exposed to needle stick injuries. Eight thousand participants were tested and 160 identified candidates for IFN were referred for treatment at NHTMRI. Support of this organization was extended to continuous monitoring of PLWHCV till cure.(61)

Counselling

Guidance from the WHO global hepatitis programme emphasizes pre and post-test counselling.(41) Additionally, results of a study done on accessibility to IFN services in Egypt found counselling services at the point of discovery crucial for decision support and positive health seeking behaviour. This study recommended provision of well-structured counselling services at laboratory facilities where obligatory testing is done.(37)

An Australian strategy sets one of it interventions for comprehensive in person pre and post-testing counselling. A pre-referral check list is used by

the provider to guide counselling and ensures its quality. Confidentiality has been emphasized to respect PLWHCV private issues and choices.(62)

A strategy proposed for England addressed counselling through inclusion of educational material in HCV guidelines about pre and post-test counselling for PLWHCV. This material illustrates the nature and purpose of diagnostic procedures and treatment. Confidentiality was strictly recommended.(63)

Referral

Referral is directly linked to screening associated counselling. Egyptian study recommended matching them together.(37)

Improving linkage to care and treatment has been addressed in the United States strategy. Monitoring is recommended to be done through periodic reports on access to viral hepatitis services by high risk populations.(53)

English strategy identified a pathway of referral to geographically accessible facilities. Referral is associated with structured PLWHCV record to ensure quality and continuity of care.(63)

5.1.3 Motivation: PLWHCV seek care from health services

Perception and response to illness

Factors behind PLWHCV decisions were recommended to be considered by providers to improve access and ensure adherence.(37)

Stigma and social support

Peer support group has been recognized as an integrated part of IFN services by different strategies in the United States, Australia, England and Ireland.(54,63–65) Peers-based interventions revealed improvement in engagement to HCV care, adherence and treatment results in PLWHCV who inject drugs.(66)

Australian qualitative study addressed the role of partner support in improvement of treatment outcomes, relationships within the family, removal of isolation and fear, reassurance and preparation for treatment and its side effects.(67)

Acceptability

Attitude of providers

Two Egyptian studies recognized the need to train providers' on proper relationship with PLWHCV emphasizing the rights' approach and stigma.(17,37) Australian study recommended changing the attitude towards PLWHCV in through the training curriculum of providers.(68)

Media and trust in IFN

Qualitative study done with Egyptian HCV clients addressed the urgent need for competing fake remedies. Although these remedies are criminalized by the government, more efforts have to be done for monitoring and prohibition. Awareness through media about available effective drugs could compete these harmful practices.(37)

Strategy proposed for England recommended strict precautions supported by research evidence for complementary and alternative medicine (CAM) to avoid possible harmful effects.(63)

Availability

Egyptian NGO conducted "Virus C Free Child" programme as the first initiative offering support to free high quality IFN services for children. The programme started with 322 children in six IFN centers in collaboration with NCCVH. Beside investigations and treatment offered, training program is being provided for service providers and awareness sessions for parents to avoid transmission to other children.(61)

In England, HCV strategy supports establishment of specialized centers to provide IFN for children.(63)

Geographical accessibility

In Egypt, NGO conducted a collaborative project with NCCVH aiming at enhancing geographical accessibility of IFN PLWHCV in the Eastern part of Egypt. The organization provided financial support to establish new IFN center within Suez Fever Hospital and started service provision in 2012. After finishing the fund the center will be financially supported by NCCVH.(61)

Egyptian study implemented a nursing programme to support IFN clients recommended training PLWHCV on IFN self-administration to overcome the distance barrier to IFN centers.(44)

Affordability

Direct costs of treatment in developing countries have been tackled mainly by two strategies; first by expanding social health insurance to cover the whole country. The second strategy is provision of subsidized price schemes for pro-poor with exemption of those who can't afford any costs.(69)

Expanding social health insurance coverage is one of the objectives of the Egyptian health sector reform strategy. Health insurance is intended to cover all Egyptians with high quality basic package of primary health care. Although IFN services are out of this package, HIO provides services for the whole course through its centers within the national control strategy.(10,16)

Pakistan national strategy targeted reduction of laboratory investigations costs to ensure affordability of IFN services. PCR is subsidized through outsourcing of local laboratories across the country. To reduce the running costs and insure quality, blood samples are collected and transported to sentinel laboratories.(70)

5.1.5 Diagnosis: PLWHCV are diagnosed and approved as eligible IFN candidates

Administrative and organizational barriers

Two Egyptian studies recommended simplifying the administrative model of PTES currently used to issue the approval for IFN therapy subsidization.(17,37)

5.1.6 Starting treatment: PLWHCV start efficacious treatment

Competencies and knowledge of provider

An Egyptian supportive nursing programme for PLWHCV recommended improving nurses' skills in health education, counselling and referral to help improve adherence to HCV treatment.(44) Another study recommended involvement of HCV care in undergraduate and postgraduate medical education.(71)

In the United Kingdom, educational programmes for healthcare professionals targeting viral hepatitis have been developed. In Northern Ireland, specialized e-learning package for viral hepatitis is being used. Training on blood borne viruses including HCV was developed in Wales.(72)

The IOM in the United States recommended integrating an educational curriculum for HCV in the obligatory training of health professionals.(64)

The CDC strategic plan addressed workforce development and capacity building through recruitment approach. This approach ensures that providers are competent to provide services with special concern to cultural sensitive issues.(56)

Action plan against viral hepatitis in the United States included conduction of formal research to explore competencies and attitude of HCV care providers and consequently development of educational curriculum for them. Collaboration with educational institutes to develop HCV curricula for under and postgraduate health professionals was recommended. The plan also included decision aids for providers as a component of electronic medical records of HCV clients.(53)

New Jersey strategic plan for HCV encouraged provision of HCV education in medical and nursing schools, these activities were recommended to be funded through collaboration with community based organizations and pharmaceutical companies.(60)

Australian national control strategy encouraged education and training organizations to include in their curricula viral hepatitis and PLWHCV rights.(65)

In Ontario, continuing medical education for health professionals (especially in primary healthcare settings) focusing on HCV was proposed.(73)

Tele-health technology using videoconferencing was found effective in improving capacities of HCV care providers in the United States. Training and decision support were given from specialists to primary care providers in rural areas working with underserved HCV clients. Outcomes of HCV treatment provided at primary health care level with specialist supervision via videoconference were found to be comparable to care provided at specialized centers.(74) Another intervention added PLWHCV to create transparency and direct support for both primary care providers and clients.(75)

5.1.6 Adherence: PLWHCV take full and uninterrupted treatment course

Affordability

Diabetic PLWHCVs who lose their subsidized diabetes treatment on approval of IFN therapy made a previous study recommend continuation of subsidized diabetes treatment to reduce financial burden on PLWHCVs.(37)

PLWHCV Knowledge

Health education intervention with IFN clients in Egypt revealed significant improvement of knowledge and attitude six months after implementation. The most prominent improvements were in modes of transmission and disease symptoms. (76)

Egyptian study recommended knowledge support for PLWHCV throughout the IFN course. This requires training of all providers including nurses, pharmacists and administrative staff to help PLWHCV and their relatives.(37)

One of the priority actions of the Australian National Control Strategy is involvement of PLWHCV and their potential support network in knowledge based interventions. (65)

Side effects

Egyptian nursing programme showed that knowledge about side effects resulted in significant improvement in PLWHCV clinical status especially psychological aspects. It was recommended to provide awareness about expected side effects and their avoidance measures from the starting point of IFN therapy.(44)

In Spain, Multidisciplinary Support Programme (MSP) based on HIV experience showed significant improvement in adherence to IFN therapy among PLWHCV served by MSP team compared with standard team group. The standard team included two hepatologists and one nurse, while the MSP team added another nurse, pharmacist, psychologist, administrative assistant and when necessary a psychiatrist. Adherence in MSP group was 94.7% compared to 78.9% in control group. For clients with psychiatric disorders, adherence was 90.5% in MSP participants compared to 75.7% in control group participants. SVR among MSP clients was 77.1%, meanwhile the control group showed SVR in 61.9% of clients. Cost-effectiveness analysis revealed that cost per PLWHCV was $13,319 in the MSP group and $16,184 in the control group. Moreover, the quality-adjusted life years (QALYs) achieved by MSP group was 16.317 in comparison to 15.814 QALYs achieved by controls.(47)

Comprehensive care intervention through introduction of psychologist's counselling for PLWHCV who inject drugs showed significant improvement in response to IFN compared to standard care. Besides, eligibility for IFN among people who inject drugs (PWID) who deferred treatment due to psychiatric disorders was increased.(77)

Comprehensiveness package of care involving other specialities is proposed in the action plan for competing viral hepatitis in the United States in order to control HCV complications and prevention of its spread.(53)

Recommendations for Canadian strategy were given for development of a network of comprehensive HCV services offering a multidisciplinary team including HCV focused specialists, nurses, counsellors, dentists, nutritionists and social workers.(78)

Proposed strategy to address HCV in Ontario recommended adoption of comprehensive approach, including multidisciplinary model and support services for HCV clients.(73)

Administrative support and follow up

Electronic monitoring system "Virahep-C" provided effective identification of missed doses and clients at risk of non-adherence in the United States.(42)

5.1.7 Cure: PLWHCV achieve the ultimate goal of treatment i.e. SVR

Response and effectiveness of drugs

Research component of the Egyptian strategy is vital for evaluation of effectiveness and safety of new drugs. DAA are still under clinical trials waiting for favourable results in HCV genotype 4. However, the price represents another challenge within the available limited resources.(16)

Support for clinical research was addressed in the United States Department of Health & Human Services action plan through development of more effective and well tolerated HCV treatment.(53)

5.2 Strengthening the IFN programme

The WHO global hepatitis programme realized that much effort has to be done to ensure access to HCV treatment especially in low resources settings. Health system approach has been chosen by the programme to tackle the hepatitis problem. The approach includes scaling up interventions and mobilization of resources. Comprehensive frame work of action has been formulated based on four axes. The first axes is raising awareness, promoting partnerships and mobilizing resources. The second one is evidence-based policy and data for action. The third is targeting prevention of transmission. The fourth includes screening and treatment.(41)

Advocacy and partnerships

A call from hepatitis expert encouraged countries to make better use of lessons learned from HIV treatment access campaigns. The suggested stakeholders who should participate in such advocacy action included policy makers, service providers, researchers in addition to PLWHCV and community representatives.(39)

The Centers for Disease Control and Prevention (CDC) strategic plan addressed strategies for partnership. These strategies included identification of possible partners interested in HCV and engagement of new or non-traditional ones. Effective partnership was encouraged with media and community leaders for awareness activities.(56)

Community engagement

Lessons from HIV experiences for HCV control are recommending community engagement in testing and screening to scale up access to HCV care.(79)

Partnership with CBOs was recommended in New Jersey strategy for raising awareness.(60)

In Australia, community based treatment support was considered a success story in HCV care with better outcomes of treatment.(80)

Recommendations for the HCV Canadian strategy recognized the cost-effectiveness of HCV health promotion activities provided by CBOs.(78)

Community development based model was proposed in British Columbia to engage and support vulnerable HCV groups.(52)

Service integration

Action plan for competing viral hepatitis in the United States formulated strategies to emphasize the role of integration of care. First, involving primary care providers was promoted for being more effective than standard care. However, capabilities of those primary care providers should be improved to achieve the aimed outcome.(53)

Another strategy for New York State addressed the complexity of people living with HCV needs through coordination of care between different medical specialities and health facilities.(81)

In the United States a sum of 29 projects has been funded to integrate HCV care into HIV primary care, the aim was to benefit from HIV services model experience.(82)

Another experience from the United States was the Program Collaboration and Service Integration project. This project established linkages among different health programs to enhance integrated services delivery for blood borne and sexually transmissible diseases.(56)

Strategies in the United States, Australia and Canada integrated HCV care within primary health services. Linkage with tertiary level has been introduced for supervision and decision support.(53,65,83)

In England, strategy was proposed to formulate local protocols between primary and secondary care centres benefiting HCV clients. Specialized HCV centers were encouraged to establish formal links with primary, secondary and tertiary care.(63)

Recommendations for the Canadian Strategy encouraged collaboration between HCV services and other relevant services including harm reduction for PWID, HIV, and mental health. Additionally, engagement of PLWHCV in program development, delivery and evaluation (78)

Monitoring and evaluation of the programme

Performance indicators of access to IFN services in the Egyptian control strategy included: number of patients receiving treatment for HCV per every financial scheme, number of private companies providing IFN to their employees through health insurance, number of treatment centers nationwide, and percentage of general population having access to a treatment center within 100 km of residency. Number of children provided with HCV treatment services was formulated as indicator for high quality clinical care of specialized groups.(16)

The European Liver Patients Association (ELPA) developed a monitoring and evaluation programme for the capacities of 30 European countries in HCV care. Euro Hepatitis Care Index is the fundamental tool used in this programme; it provides a list of 27 indicators grouped in five sub-disciplines of HCV control activities. The third discipline is access to treatment/process and is composed of 8 indicators: treatment fund, waiting time for services, specialised children services, adherence of services to guidelines, presence of genotyping investigations, availability of DAA for clients, presence of HCV specialised nurse, and presence of HCC registry. (55)

Chapter 6: Discussion, conclusions and recommendations

6.1 Epidemiology and burden of HCV in Egypt

HCV control is challenged by unavailability of effective vaccine due to virus mutations and multiple subtypes.(23) Egypt has a unique high prevalence compared to other countries.(19) Incidence is controversy with no accurate estimates.(24,25) Methods of transmission are clearly identified yet the national history of disease is an obstacle for control efforts.(26,28) Massive iatrogenic transmission of infection caused by PAT campaign in the last century introduced a huge pool of infected persons.(27) Silent nature of the disease with long latent period makes its discovery difficult and mostly at the complication stage where IFN is useless.(21) HCV problem is growing with high burden on the Egyptian health system at least in the near future.(29–31)

Conclusion (a): Current and future burden of HCV requires urgent action and more efforts.

6.2 National response and control strategies

The Egyptian efforts against HCV were leveraged by establishment of NCCVH which launched the national control strategy in 2008. Goals of the strategy are obviously prioritizing treatment of PLWHCV through improving geographical accessibility and increasing utilization of IFN therapy. Subsidized treatment schemes are stressing financially on the MOHP limited budget. IFN programme is well-organized and vertical in nature. MOHE with its infrastructure and human resources represents a major partner supporting MOHP.(16)

Standardized screening, diagnosis and treatment tools are well-established. IFN in combination with RBV is the worldwide approved regimen.(22,32) The hope for better treatment outcomes with DAA depends on research results on genotype 4 and financial constrains related to high price.(23,33)

Conclusion (b): IFN services are highly prioritized in the Egyptian strategy enabling support for future improvements.

Conclusion (c): DAA represent an opportunity to improve effectiveness of current standard treatment.

6.3 Influencing factors affecting access and their relevant strategies and best practices (following the modified Piot model)

6.3.1 PLWHCV in need for IFN services

Egyptians more likely to be infected with HCV are: males, people older than age of 50, rural residents, those exposed to PAT, and blood transfusion and the poor.(19,35) These characteristics are consistent with the results accusing the PAT campaign for transmission of the infection.(27)

Estimated number for PLWHCV in need for IFN is 600,000 (based on 2008 estimates). This huge number adds to the challenge of reaching such population.(16,19)

Sentinel surveillance of acute cases without national registry for chronic HCV PLWHCV is the currently available measure. This adds to the problem of difficult estimation of actual number of PLWHCV in need for IFN.(16,36)

Accessing difficult to reach PLWHCV was addressed by international strategies through prioritizing the mostly affected population and establishment of national registry for PLWHCV.(52–54) Egypt possesses enabling capacities through well-established sentinel surveillance and health information system for the IFN programme.(16) However, nationwide intervention requires financial support and enhancing capacities of lower level facilities to insure success.

Conclusion (d): Although the more likely group to carry HCV has been identified, there is a huge number of PLWHCV in need for treatment not recognized.

6.3.2 Awareness about HCV symptoms and need for IFN services

Awareness about presence of HCV and transmission methods is relatively high among general population.(19) In contrast, awareness about HCV status is challenged by the silent nature of the disease.(21,34,37)

Awareness campaigns for general population and at risk groups were recommended in Egypt and Europe.(18,55) Engagement of HCV services providers, PLWHCV associations and civil society is suggested for help.(55) Stepwise action plan providing guidance for awareness includes formative research, pre-test campaigns targeting at risk groups, and media events.(56)

Conclusion (e): High level of awareness among general population about HCV is opposed by low number of PLWHCV aware of their status.

Active screening either for general population or population at risk has not been established in Egypt. Discovery is mostly through passive screening done by obligatory testing or campaigns for voluntary counselling and testing conducted on small scale.(16)

Cost-effective screening is evident for birth cohorts of intense transmission period followed by risk based screening.(57,58) Active screening experience in Egypt was done by NGO for high risk population and the crucial point of success was linkage to IFN treatment and follow up.(61)

In the Egyptian context, active screening may be financially and practically infeasible within the limited resources and capacities of primary services. Furthermore, once PLWHCV are unmasked they should be met with responsive IFN services. Accordingly, another financial strategy to deal with discovered candidates for IFN is mandatory before deciding on active screening.

Conclusion (f): Active screening in Egypt is not feasible in the near future due to limited resources.

Counselling and referral at HCV testing point is not well established in the Egyptian HCV control programme.(17)

Recommendations of Egyptian study are consistent with those proposed by the WHO, Australian and English strategies for effective pre and post-test counselling at points of testing. In addition, counselling is supportive for proper decisions for initiation of IFN.(37,41,62,63)

Linking referral to counselling with administrative support was recommended in Egypt and implemented in the United States and England. Well-structured referral system, linkage with IFN centers and monitoring are suggested to ensure success.(37,53,63)

Obligatory testing laboratories are the facilities where counselling and referral proposed activities could be implemented.(37)

Conclusion (g): Counselling and referral should be integrated at HCV testing points to support PLWHCV decisions and ensure continuity of care.

6.3.3 Motivation: PLWHCV seek care from health services

Proper health seeking behaviour is threatened by **perception and response to illness** characterized by carelessness, depression, passive attitude towards IFN services, and use of inappropriate remedies.(37)

Exploring the factors behind PLWHCV decisions could be integrated within formative research done prior to awareness activities.(37)

Conclusion (h): Improper perceptions and responses to HCV negatively influence motivations to seek IFN services.

Stigma adds to the silent character of the condition and may make PLWHCV prefer unmasking of their HCV status rather than interacting with IFN services to avoid social harms and isolation. Social network mostly hinder initiation of IFN therapy.(37)

Peer support groups and partner support interventions are the main social interventions succeeded to fight HCV related stigma.(54,63,65–67)

Resources and capacities needed for supervision and training of the support groups should be considered for implementation in Egypt.

Conclusion (i): Stigma and negative influence of social networks are barriers to IFN services that require support from peers and partners.

Lack of female empowerment for IFN related decisions had been recognized due to domination by males, financial constraints and social responsibilities.(37)

Addressing these factors needs more operational research.

Conclusion (j): Females encounter more difficulties and constrains in initiation and adherence to IFN due to gender role and financial factors in the household.

Acceptability

PLWHCV in Egypt showed negative **attitude towards public services** including IFN ones.(37) On the other hand, negative **attitude of providers** extends to other health services and mostly attributed to providers' fear of HCV transmission.(37,38) **Trust in IFN** effectiveness is threatened by negative media messages and promotion for alternative fake remedies.(37)

Changing the attitude of providers through training is a recommended clue with high potential success. Strict monitoring and counter awareness messages against fake remedies are mandatory within the improper perceptions and responses to illness.(17,37,68)

Conclusion (k): Acceptance of IFN services is threatened by the hammer of fake remedies and the anvil of negative attitude of providers.

Availability

Children are disadvantaged as they don't have widely available specialized services.(16)

Comprehensive intervention including family awareness, financial support and capacity building of providers is promising if widely implemented.(61) Specialized centers proposed in England are not quiet feasible within the current limited resources.(63)

Conclusion (l): Efforts targeting children by NCCVH and NGOs require enhancement to increase number of centers providing children specialized services.

Great efforts are being done to increase **geographical accessibility** through continuous establishment of new centers to cover the whole country and serve remote areas.(16,18)

Support from NGOs in establishing new centers is promising if advocacy will be done effectively.(61) Capacities of trainers and follow up considerations may not favour self-administration of IFN in the current situation.(44)

Conclusion (m): Continuous increase in number of IFN centers with NGO support is promising to ensure availability.

Financial support through subsidized schemes, reduction of imported IFN prices and locally produced IFN at lower costs are obviously enabling **affordable** services.(16,18)

Opportunity is found with the current efforts to increase social health insurance coverage.(10,16) Outsourcing of laboratory services seems to be a feasible idea yet difficulties in coordination with the network of private laboratories are may not favour this clue.(70)

Conclusion (n): Subsidization schemes, reducing IFN prices, and increasing social health insurance coverage are the key enabling factors to sustain affordability of IFN services.

6.3.4 Diagnosis: PLWHCV are diagnosed and approved as eligible IFN candidates

Proper diagnosis is threatened by strict criteria and competencies of private providers. Long queues and complicated procedures to issue subsidized IFN therapy approval are major obstacles before initiation of IFN therapy.(17,37)

Recommendations to simplify subsidization procedures are mandatory with decentralization from the MOHP headquarter.

Conclusion (o): Clinical and administrative barriers for diagnosis and issuing the subsidization approval are the most challenging factors against initiation of IFN.

6.3.5 Starting treatment: PLWHCV start efficacious treatment

A huge gap is still obvious between PLWHCV in need for treatment and those actually using IFN services in spite of the efforts done.(16,18)

Conclusion (p): Long waiting lists of PLWHCV and those unmasked are challenging the efforts done and current enrolment rate.

Competencies of providers are insufficient; this is inferred from low knowledge levels of Middle East providers.(34)

Training of providers has been prioritized by all strategies and interventions tackling HCV. Involvement of HCV issues in undergraduate, postgraduate and continued medical education was proposed by different strategies. Collaboration with NGOs and pharmaceutical companies was recommended for funding.(44,53,56,60,64,65,71–73)

Tele-health and videoconferencing to support providers with less capacity in remote areas has been established in the United States with promising results but costs and capacities of lower level services are not supporting the idea in Egypt.(74,75) E-learning packages could be used for clinical decisions support within the already established health information system.(72)

Conclusion (q): Capacity building of IFN providers through training is mandatory to ensure high quality of care.

6.3.6 Adherence: PLWHCV take full and uninterrupted treatment course

Direct, indirect and opportunity costs are negatively influencing adherence to treatment. Diabetic PLWHCV challenge the costs of their diabetes medications after subsidization of IFN.(37)

Recommendations were given to continue both subsidization schemes to ensure adherence and equity.(37)

Conclusion (r): Although IFN costs are subsidized, there are other direct, indirect and opportunity costs which challenges adherence.

Insufficient **PLWHCV knowledge** about the condition, treatment and side effects is threatening adherence to IFN obviously.(37,44)

Knowledge based activities within IFN services showed sufficient results especially with addressing PLWHCV social networks.(37,65,76)

Conclusion (s): PLWHCV knowledge throughout the treatment course is an important factor influencing adherence and tolerance to side effects.

Depression is the most significant **side effect** causing missed opportunities to initiate IFN and non-adherence.(45,46)

Awareness and preparedness for depression manifestations showed significant clinical improvement, tolerability to treatment and subsequent adherence.(44)

Comprehensiveness of care through involvement of other specialities (particularly psychology) in the IFN team has been established within different models of care. Comprehensiveness showed significant improvement in adherence, quality of life, effectiveness of IFN and cost-effectiveness of services.(47,53,73,77,78)

Conclusion (t): Depression is a major obstacle for adherence to IFN yet it could be controlled by psychological preparedness and support.

Social relations represent a potential barrier for adherence.(44) Knowledge based interventions involving social networks of PLWHCV are applicable here as well.

Conclusion (u): Social network could be an asset for adherence if addressed in IFN services.

Egypt has a well-established **health information system** for clinical follow up of PLWHCV and supervision from the headquarter.(16)

Monitoring of missed doses to retrieve defaulters could help support adherence or prevent dropouts.(42)

Conclusion (v): Health information system is well-established and could support adherence through retrieval of defaulters.

6.3.7 Cure: PLWHCV achieve the ultimate goal of treatment i.e. SVR

Cure rate for Egyptian PLWHCVs is relatively non-sufficient, about half of the IFN programme participants achieve SVR. Several factors contribute to IFN

response; prevalent genotype 4 and associated comorbidities are the main obstacles in Egypt.(16,18)

Research on DAA is applicable here as well to improve effectiveness of treatment.

Conclusion (w): Opportunity for better effectiveness of IFN therapy is based on DAA clinical trials on genotype 4.

6.4 Modified Piot model

After adaptation of Piot model to the natural history of HCV, comprehensive analysis was smoothly done for influencing factors and best practices. However, quantification of the model steps (figure 4) was challenged by unavailability of accurate data and rough estimates were made for illustrative purpose only.

Assumptions were made for the first four steps (PLWHCV in need for IFN, PLWHCV aware of their need, PLWHCV motivated to seek care and those accurately diagnosed) due to unavailability of accurate data. The starting point (600,000 PLWHCV estimated to be in need for treatment) is a cumulative estimate affected by the dynamics of incidence, death and cure. However this was used to give an idea about the magnitude of need.

The backlog of the whole process is those PLWHCV stuck before starting treatment (fifth step). They have been identified in need (being eligible) for treatment yet cannot be served due to capacity problems of the programme (capacity was 40,000 with 150,000 in the waiting list in 2011). Accordingly if we unmask those in the first four steps most probably they will be added to the waiting list.

The real backlog could be much bigger, because the assumptions made about eligibility depend on current technical part e.g. in-eligible cirrhotic patients, and probably partly based on budgetary constraints.

Expanding capacity would mean we can treat the backlog in fewer years. However, this expansion depends mainly on available resources and treatment unitary costs when new treatments become available. Modelling for expansion is a challenge as many of these variables are estimates, and may change over time (eligibility, choice of treatment, etc.).

6.5 Strengthening the IFN programme

Advocacy and partnership activities could benefit from the long experience of HIV projects. Identified possible partners to ensure success are: policy makers, media, service providers, researchers, PLWHCV support groups, NGOs and civil society.(39,56)

Community engagement has been proved effective in several countries. The two main areas evident for success are awareness and social support.(52,60,78–80)

Integration of services is complementary to comprehensiveness of care. Integration of IFN services with other primary and secondary health services of possible benefit to PLWHCV. Protocols of collaboration and strong linkage could help sustainability and ensure success.(53,56,63,65,78,81–83)

Monitoring and evaluation of the programme

NCCVH developed performance indicators to monitor access to IFN services; however two indicators could be benchmarked from Euro Hepatitis Care Index project. The first indicator is for monitoring treatment fund; it could help visualize the added resources and possible opportunities for fund raising. Second one is waiting time for services; it could help monitor and improve quality of care.(55)

Conclusion (x): Strengthening of IFN programme could achieved through more efforts in advocacy and partnership, community engagement, service integration, and monitoring and evaluation of the programme.

6.6 Recommendations

To improve access to IFN services in Egypt the following recommendations are proposed to the policy makers in the MOHP and NCCVH. To enact these recommendations, governmental and public responses should be harmonized to achieve the best outcomes. Detailed operationalized table for these recommendations is provided in appendix (4) with the prioritization, feasibility, requirements, level of action and target actors.

1. Comprehensiveness of care through involvement of psychologists, peer support groups and children specialized services in all IFN centers as well as integration with other types of services.

2. Strengthening health information system through establishment of national registry for PLWHCV, introducing new indicators for fund monitoring and waiting time in IFN centers, retrieval of defaulters and e-learning packages supporting clinical decisions.

3. Simplifications and decentralization of the procedures for issuing subsidized treatment approval.

4. Conduction of obligatory HCV focused training in undergraduate, post graduate and continued medical education.

5. Enforcement of research with prioritization of formative social research with both PLWHCV and IFN providers as well as encouraging and speeding up research done on DAA.

6. Intensifying current awareness efforts encouraging testing among high risk groups.

7. Fighting misbeliefs and fake remedies through monitoring television channels and private facilities especially in slums and remote areas as well as conduction of counter awareness media campaigns promoting for IFN services.

6.7 Study limitations

Limitations of this study have to be acknowledged. Limited literature especially for evaluation of Egypt national strategy and health system research done on HCV in Egypt were obstacles for more comprehensive review.

Magnitude of HCV problem and characteristics of Egyptian PLWHCV are unique as compared to other contexts where HCV is linked to PWID and comorbidity with HIV. Literature search and review of strategies and best practices from outside Egypt were investigated with great consideration of the context to ensure relevancy.

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Appendices

Appendix (1): Priority areas, recommendations and related goals of national control strategy for viral hepatitis, *adapted from NCCVH 2008* (16)

Priority area	Recommendations	Related goals*
1. Surveillance and monitoring	- Population-level surveys to ascertain national prevalence rates; - Regular sentinel surveillance to follow HCV trends from year to year; - Monitoring of death rolls with mathematical modelling of the future morbidity and mortality impact. **	➢ Accurate tracking for prevalence and incidence of viral hepatitis according to WHO-approved surveillance standards.
2. Prevention	- Enhancing infection control in public and private health facilities under MOHP guidelines; - Improving injection safety in non-medical settings; - HBV vaccination of high risk group and full coverage rate for children; - Awareness campaigns about viral hepatitis transmission and primary preventive measures among general population and high risk groups. ***	➢ Reduction of HBV and HCV prevalence in the 15-30 age group by 20% by 2012 compared to 2008 estimates

*Three goals were targeting strengthening the strategy:

- ➢ To institutionalize the NCCVH within the organizational structure of the government;
- ➢ To sustain the strategy efforts through fund raising;
- ➢ To implement effective monitoring and evaluation to ensure accountability.

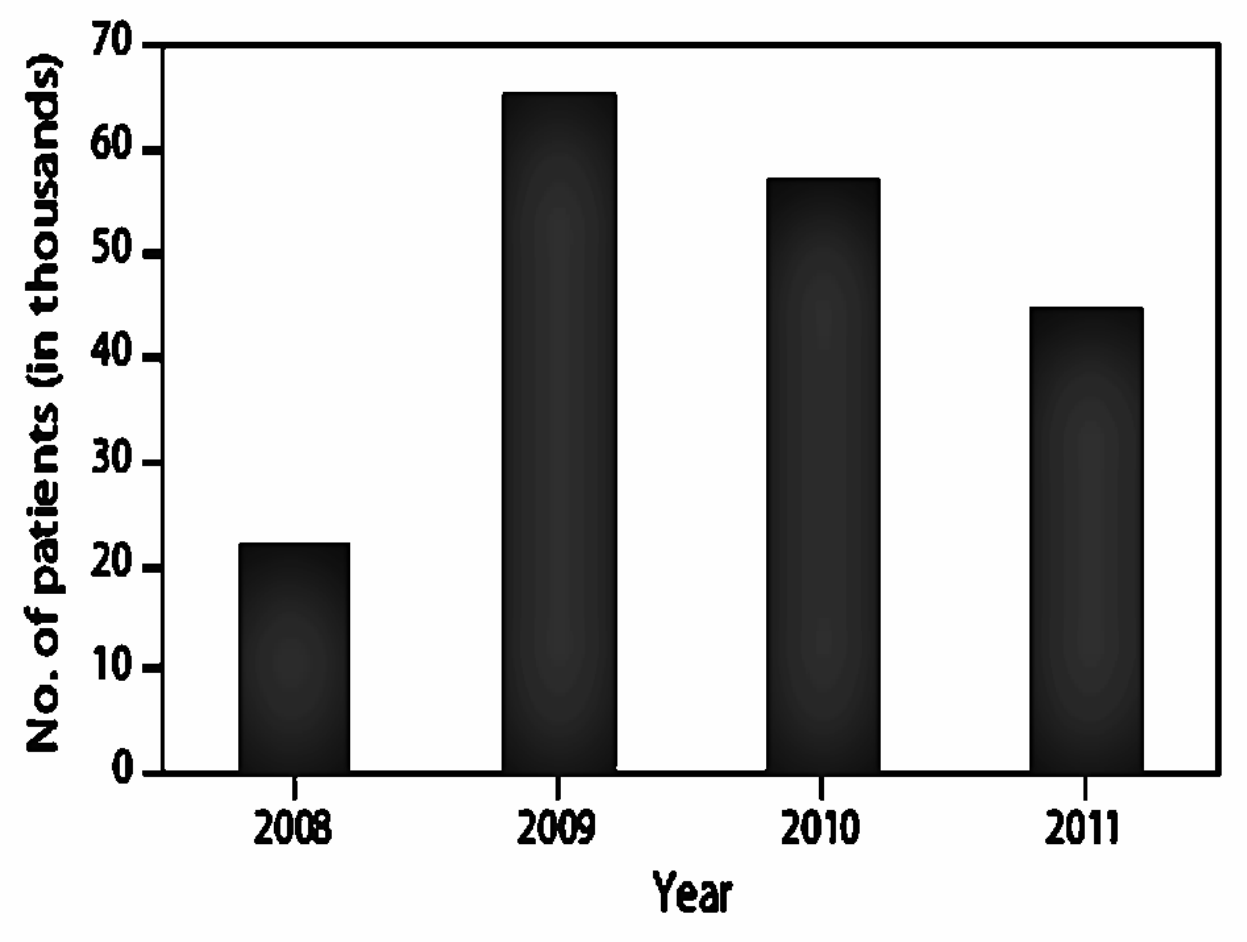
**Sentinel surveillance for acute HCV was introduced step by step since late nineties of the last century.

***These interventions are working in line with the efforts started in 1993 for HCV screening of national blood supply.

Appendix (1): Priority areas, recommendations and related goals of national control strategy for viral hepatitis (continued), *adapted from NCCVH 2008* (16)

Priority area	Recommendations	Related goals
3. Treatment	- Scaling up case detection efforts in health facilities in addition to voluntary counselling and testing; - Improving access to treatment via establishment of specialized hepatitis centers particularly in underserved areas. In addition to reduction of IFN prices as well as expanding and sustaining its subsidized costs; - Optimizing clinical care for all PLWHCV with special concern to children and advanced cases.	➢ Treatment of 20% of PLWHCV in need for IFN by 2012 under subsidized schemes; ➢ Expand access to treatment through establishing treatment centers available within 100 km of residency of every Egyptian (except in frontier governorates)
4. Research	- Continuation of basic medical research e.g. virology, epidemiology and immunology ; - Enhancing the contribution of social sciences; - Conduction of clinical trials for new drugs and vaccines.	➢ High-quality scientific research on viral hepatitis.

Appendix (2): Estimated number of PLWHCV (patients) participated in IFN programme from 2008 to 2011, *Source: El Sayed N et al 2012* (18)



Appendix (3): List of reviewed control strategies for HCV

Strategy	Institution	Country	Year
1. A proposed strategy to address hepatitis C in Ontario 2009-2014	Ontario Hepatitis C Task Force	Canada	2009
2. A Renewed Public Health Response to Address Hepatitis C	Public Health Agency of Canada	Canada	2009
3. Competing The Silent Epidemic of Viral Hepatitis: Action Plan for the Prevention, Care & Treatment of Viral Hepatitis	The United States Department of Health and Human Services	United States	2011
4. Healthy pathways forward: a strategic integrated approach to viral hepatitis in British Columbia	Ministry of Health, British Columbia	Canada	2007
5. Hepatitis and HCC: A National Strategy for Prevention and Control of Hepatitis B and C	Committee on the Prevention and Control of Viral Hepatitis Infections, Institute of Medicine	United States	2010
6. Hepatitis C in the UK Report	Health Protection Agency	United Kingdom	2011
7. Hepatitis C Strategy for England	National Health Service	United Kingdom	2002

Appendix (3): List of reviewed control strategies for HCV (continued)

Strategy	Institution	Country	Year
8. HIV/AIDS, Hepatitis C, Sexually Transmissible Infections Strategic Framework for the ACT 2007-2012	Australian Capital Territory Health Directorate	Australia	2007
9. National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention: Strategic Plan 2010–2015	The United States Department of Health and Human Services, The Centers for Disease Control and Prevention.	United States	2010
10. National Hepatitis C Strategy 2011-2014	Health Service Executive	Ireland	2011
11. New Jersey Strategic Plan for Hepatitis C Prevention and Control	New Jersey Hepatitis C Advisory Board	United States	2005
12. New York State Viral Hepatitis Strategic Plan 2010-2015	New York State Department of Health	United States	2010
13. Prevention & Control of Viral Hepatitis Infection: Framework for Global Action	Global Hepatitis Programme	World Health Organization	2012
14. Prime Minister Program For Prevention and Control of Hepatitis 2010-2015	Ministry of Health, Government of Pakistan	Pakistan	2010

Appendix (3): List of reviewed control strategies for HCV (continued)

Strategy	Institution	Country	Year
15. Responding to the Epidemic: Recommendations for a Canadian Hepatitis C Strategy	Canadian Hepatitis C Information Centre	Canada	2005
16. Third National Hepatitis C Strategy 2010–2013	Department of Health and Ageing, The Australian Government	Australia	2010

Appendix (4): Operational table for study recommendations

Recommendation	Priority	Feasibility/Requirements	Level	Target Actor
1- Comprehensiveness of care and integration with other services.				
• Involvement of psychologist in the IFN team		- Capacity building and training of psychologists	Intervention	➢ NCCVH ➢ IFN centers
• Pilot peer support intervention.	High	- Capacity building and training of support groups. - Results are to be evaluated in order to identify possible areas of improvement and feasibility of implementation in other centers.	Intervention	➢ NCCVH ➢ IFN centers ➢ CBOs
• Integration of children services in all centers.		- Improvement of capacities and resources of IFN centers.	Intervention	➢ NCCVH ➢ IFN centers
• Integration of IFN services with other secondary and primary services of benefit for PLWHCV		- Policy support from MOHP	Policy	➢ MOHP ➢ NCCVH
2- Strengthening health information system				
• Establishment of national registry for PLWHCV.	High	- Policy support, financial and human resources, and capacity building of laboratories.	Policy	➢ MOHP ➢ NCCVH
			Intervention	➢ NCCVH ➢ Obligatory testing laboratories ➢ Sentinel surveillance units
• Introducing two indicators: treatment fund and waiting time.		- Treatment fund should be added at the headquarter meanwhile waiting time should be added at IFN centers.	Intervention	➢ NCCVH ➢ IFN centers

Appendix (4): Operational table for study recommendations (continued)

Recommendation	Priority	Feasibility/Requirements	Level	Target Actor
• Retrieval of defaulters		- Technical support and training of providers	Intervention	➢ NCCVH ➢ IFN centers
• E-learning packages for clinical decisions support.		- Use of tailored package responsive to needs and capacities of providers.	Intervention	➢ NCCVH ➢ IFN centers
3- Simplifications and decentralization of the procedures for issuing subsidized treatment approval.	High	Policy and procedures should be changed for PTES.	Policy	➢ MOHP ➢ NCCVH
4- Conduction of obligatory HCV focused training in undergraduate, post graduate and continued medical education	Moderate	- Advocacy for technical support and collaboration from MOHE as well as financial support from NGOs and pharmaceutical companies - Training should address: ✓ Counselling and referral; ✓ knowledge support for IFN clients; ✓ Provider-user relationship including PLWHCV rights.	Policy	➢ MOHP ➢ MOHE ➢ NCCVH
			Intervention	➢ MOHP ➢ MOHE ➢ NGOs ➢ Pharmaceutical companies
5- Enforcement of research				
• Prioritizing formative research to explore: - PLWHCV Knowledge, perceptions and responses to illness, needs, attitude and behaviour regarding HCV testing and IFN services. - IFN providers: competencies, training needs and attitude towards PLWHCV.	High	Special consideration should be given to gender issues hindering the access to IFN services.	Research	➢ NCCVH ➢ IFN centers

Appendix (4): Operational table for study recommendations (continued)

Recommendation	Priority	Feasibility/Requirements	Level	Target Actor
• Encouraging and speeding up research done on DAA including: - Clinical trials to assess efficacy and safety on genotype 4. - Cost-effectiveness to justify for financial issues.		- Fund and support from MOHP and pharmaceutical companies. - Negotiations to reduce prices	Research	➢ MOHP ➢ MOHE ➢ NCCVH ➢ Pharmaceutical companies
6- Intensifying current awareness efforts encouraging testing among high risk groups.	Moderate	More efforts for advocacy, community engagement and partnership.	Intervention	➢ NCCVH ➢ Obligatory testing laboratories ➢ PLWHCV associations ➢ CBOs ➢ Media
7- Fighting misbeliefs and fake remedies	Moderate	- Monitoring television channels and private facilities especially in slums and remote areas - Conduction of counter awareness media campaigns promoting for IFN services.	Intervention	➢ MOHP (regulatory role on drugs) ➢ NCCVH ➢ CBOs ➢ Media