

Impact of health education program on HCV knowledge in a rural Egyptian community

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ مَوْلَا

سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدقة الله العظيم

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List of Abbreviations

Abb.	Meaning
AFP	Alfa-Fetoprotein
ALT	Alanine aminotransferases
AST	Aspartate aminotransferase
CTP	Child-Turcotte-Pugh
EDHS	Egyptian Demographic Health Survey
EHM	Extrahepatic Manifestations
HBV	Hepatitis B virus
HCC	Hepatocellular Carcinoma
HCV	Hepatitis C virus
HD	Hemodialysis
HIV	Human Immunodeficiency Virus
HVR	Hyper-Variable Region
IP	Inducible Protein
MC	Mixed Cryoglobulinemia
MELD	Model for End-Stage Liver Disease
MOHP	Ministry of Health and Population
NANBH	Non-A, Non-B Hepatitis
NIH	National Institutes of Health
NS	Non Structural Protein
RNA	Ribonucleic acid
ROS	Reactive Oxygen Species
SVR	Sustained Virologic Response

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Introduction

Hepatitis C virus (HCV) infects an estimated 170 million persons worldwide and thus represents a viral pandemic, it is five times as widespread as infection with the human immunodeficiency virus type 1 (*Castera et al., 2006*). Chronic HCV infection is a leading cause of cirrhosis, liver failure and hepatocellular carcinoma in the western world (*Lauer and Walker, 2001*).

Egypt has the largest burden of HCV infection in the world, with a 10% prevalence of chronic HCV infection among persons aged 15-59 years. In response, the Egyptian Ministry of Health and Population in 2001 implemented a program to reduce health-care-associated HCV transmission and in 2008 launched a program to provide care and treatment (*Centers for Disease Control and Prevention, 2012*).

Recent studies indicated that unsafe health facility practices are the main risk factors associated with transmission of HCV infection in Egypt (*Kandeel et al., 2012*). A comprehensive plan is needed to prevent and control hepatitis C in Egypt. This plan should address increasing community awareness and education, prevention of HCV infection in health-care settings, ensuring a safe blood supply, establishing surveillance and monitoring to track the effectiveness of control programs, and providing care and treatment (*Centers for Disease Control and Prevention, 2012*).





HCV education is effective in improving HCV knowledge. Therefore, promoting effective HCV education among vulnerable populations may be an important factor in reducing the burden of HCV disease (*Surjadi et al., 2011*).





AIM OF THE WORK

The present study aims to measure the base line knowledge of the studied population regarding HCV and to reduce burden of HCV infection and to describe the impact of HCV educational program on HCV knowledge in a rural Egyptian community, in Gharbia Governorate.



OVERVIEW

Virology

HCV is a single-stranded RNA virus belonging to the Flaviviridae family (*Lindenbach and Rice, 2005*). The genome size of HCV is about 9.6 kb which gets translated into 10 different structural and non structural proteins. These proteins help virus to replicate and damage host machinery. HCV core protein is involved in the formation of capsid, NS-3 contains helicase and proteolytic activity, NS-5A down regulates interferon stimulated genes and NS-5B is a RNA polymerase (*Miyamoto et al., 2007*).

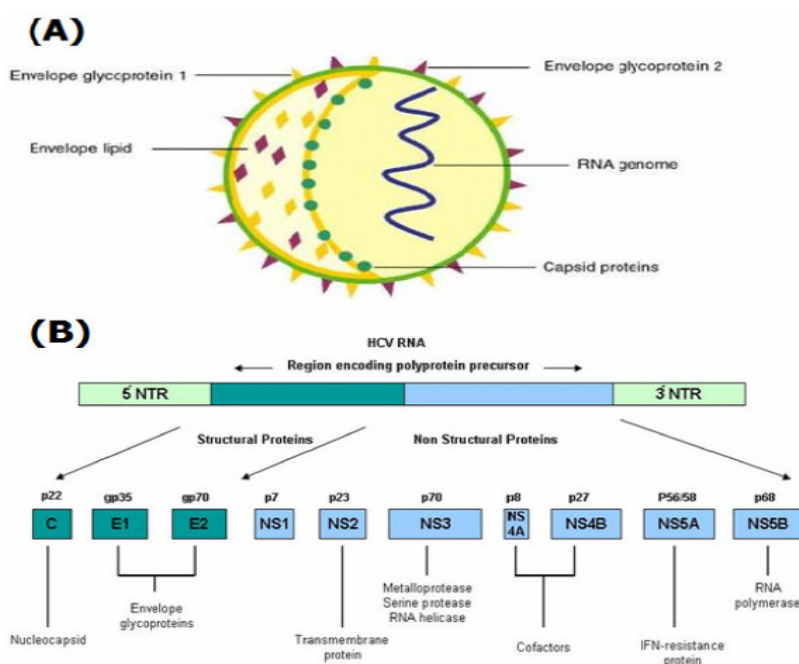


Fig. (1) Model Structure of HCV: Section A: Generalized structure of Hepatitis C virus, Section B: Genomic organization of HCV that gets translated into three structural and seven non-structural proteins (*Parvaiz et al., 2011*).



HCV Core protein is a pathogenic feature of this virus that can induce several metabolic disorders in the host cell. HCV Non structural protein 3 (NS-3) has been shown to induce oxidative stress by the way of reactive oxygen species (ROS). HCV Non Structural protein 5A (NS-5A) co-localizes on the endoplasmic reticulum membrane, promotes lipid accumulation and reactive oxygen species that modulate intracellular signaling involving transcriptional factors like NF-kB, STAT3 and Ca²⁺ ions and promote damage to the hepatocytes (*Parvaiz et al., 2011*).

History

Originally termed NANBH (non-A, non-B hepatitis), hepatitis C was first discovered in post-transfusion hepatitis patients in 1975 (*Feinstone et al., 1975*). The identification of the aetiological agent of NANBH took more than a decade, mainly because of the inability of the virus to propagate efficiently in cell culture. The cloning and characterization of the HCV genome by Michael Houghton's group revealed that HCV is a member of the Flaviviridae family and a hepacivirus genus and permitted molecular characterizations of HCV (*Choo et al., 1989*). The identification of the additional 3'-X sequence (*Kolykhalov et al., 1996*) and the construction of a cDNA clone that is infectious in chimpanzees confirmed the *in vivo* infectivity of the HCV genome (*Yanagi et al., 1997*).

The resolution of the crystal structures of the NS3 protease (*Love et al., 1996*) and NS5B polymerase facilitated the drug-development effort to find HCV-specific inhibitors (*Lesburg et al., 1999*). Studies of HCV replication received a major boost with the development the subgenomic replicon in 1999, another decade after the



cloning of the HCV cDNA. Because of a selectable antibiotic marker gene incorporated into the viral genome, the replicon RNAs, either full-length or subgenomic, can maintain long-term RNA replication in culture cells without producing viral particles (*Lohmann et al., 1999*). Accordingly, tremendous progress in both basic research and drug development of HCV infection has been made in the past decade (*Blight et al., 2000*).

With the advent of a robust cell culture infection system based on a unique isolate from a Japanese fulminant hepatitis patient in 2005, the complete life cycle of HCV infection could be studied in cell culture for the first time (*Zhong et al., 2005*).

Subsequent development of cell-culture-infectious clones of additional genotypes and chimaeric genomes should facilitate the study of genotype-specific differences in the viral life cycle and pathogenesis (*Gottwein et al., 2009*).

Epidemiology

About 170 million people in the world are infected with HCV. Since the discovery of HCV in 1989 (*Alter et al., 1999*), the number of acute HCV cases has fallen by more than 80% (*Wasley and Alter, 2000*). However, hepatitis C is still a major health burden because 60–80% of infected people progress to chronic infection (*Di Bisceglie, 2000*).