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

***Thesis***

Submitted for Partial Fulfillment of Master Degree in

Internal Medicine

***By***

**Mohamed Abd Allah Mohamed Abu Salama**

**(M.B.B.CH)**

***Supervised by***

**Prof. Dr. Wafaa Kamal El-Din Mohamed**

Professor of Internal Medicine, Gastroenterology and Hepatology

Faculty of Medicine – Ain Shams University

**Prof. Dr. Diaa Marzouk Abd El-Hamid**

Professor of Community, Environmental and Occupational Medicine

Faculty of Medicine – Ain Shams University

**Dr. Zainab Ahmed Ali-Eldin**

ASS. Professor of Internal Medicine, Gastroenterology and Hepatology

Faculty of Medicine – Ain Shams University

Faculty of Medicine

Ain Shams University

2014

# أثر برنامج التثقيف الصحي على المعرفة بالالتهاب الكبدي سي في مجتمع مصري ريفي

*رسالة مقدمة*

*من*

**الطبيب/ محمد عبد الله محمد أبو سلامة**

بكالوريوس الطب و الجراحة

توطئة للحصول على درجة الماجستير في الباطنة العامة

***تحت إشراف***

**أ.د/ وفاء كمال الدين محمد**

أستاذ الباطنة العامة والجهاز الهضمى والكبد
كلية الطب - جامعة عين شمس

**أ.د/ ضياء مرزوق عبد الحميد**

أستاذ طب المجتمع والبيئة وطب الصناعات
كليه الطب - جامعه عين شمس

**د/ زينب احمد على الدين**

أستاذ مساعد الباطنة العامة والجهاز الهضمى والكبد
كلية الطب - جامعة عين شمس

**كلية الطب - جامعة عين شمس**

**2014**

بسم الله الرحمن الرحيم

# قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم

صدق الله العظيم

سورة البقرة الآية: ٣٢

## ACKNOWLEDGEMENT

First and foremost thanks are due to **ALLAH** the beneficent and merciful of all.

I would like to express my deep gratitude and appreciation to ***PROF. DR. Wafaa Kamel El-Din Mohamed, Professor of Internal Medicine, Gastroenterology and Hepatology, Faculty of Medicine, Ain Shams University,*** for her continuous help and unlimited support.

I am greatly indebted and grateful to ***PROF. DR. Diaa Marzouk Abd El-Hamid, Professor of Community, Environmental and Occupational Medicine, Faculty of Medicine, Ain Shams University,*** for her continuous encouragement to bring this work to the attempted goal.

I'm also thankful to ***DR. Zainab Ahmed Ali-Eldin, Assistant Professor of Internal Medicine and Gastroenterology and Hepatology, Faculty of Medicine, Ain Shams University***, for her help and advice.

*Mohamed Abd Allah Mohamed Abu Salama*

***2014***

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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).***

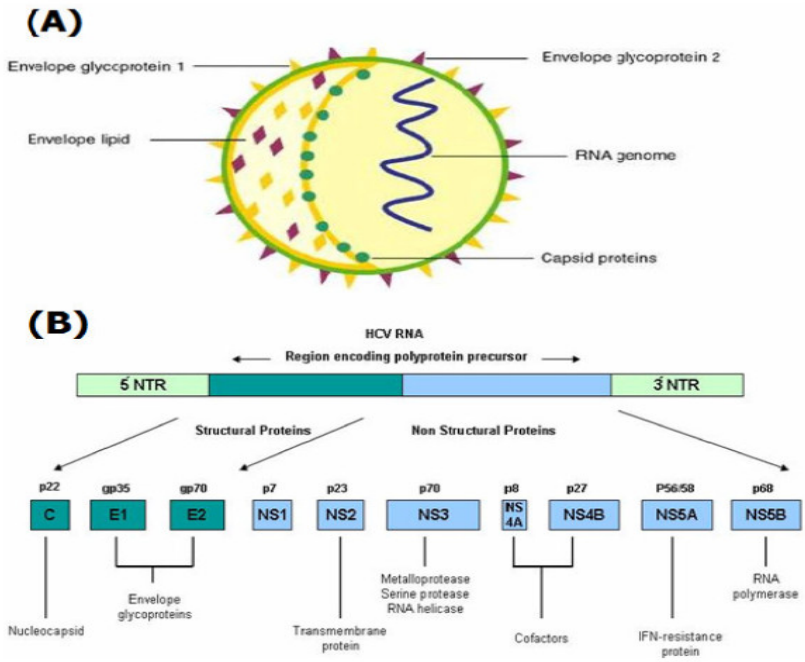


**Fig. (1)** Model Structure of HCV: Section A: Generalized structure of Hepatitis C virus, Section B: Genomic organization of HCV that gets translated into three structural and seven non-structural proteins ***(Parvaiz et al., 2011).***

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).***