

PATTERN OF HCV GENOTYPES PREVALENCE IN DIFFERENT DISTRICTS OF PUNJAB, PAKISTAN



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PATTERN OF HCV GENOTYPES PREVALENCE IN DIFFERENT DISTRICTS OF PUNJAB, PAKISTAN

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In partial fulfilment of the requirements

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MS Biotechnology

BY

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DECLARATION

I Muhammad Imran Student of MS Biotechnology, ID 15001254004 aware of and understand the university's policy on plagiarism and I certify that this thesis titled "**Pattern of HCV Genotypes Prevalence in Different Districts of Punjab, Pakistan**" is my own work, except where indicated by referencing, and the work presented in it has not been submitted in support of another degree or qualification from this or any other university or institute of learning. All experimental work belong to me; the collaborative contributions have been indicated clearly and acknowledged. Due references have been provided on all supporting literatures and resources.

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DEDICATION

*I dedicate
my work to
My parents and siblings
for their endless support during my whole educational career.*

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LIST OF ABBREVIATIONS

DAAAs	Direct acting antivirals
HA	Hepatitis A virus
HCV	Hepatitis C virus
HCC	Hepatocellular carcinoma
HBV	Hepatitis B virus
HIV	Human immune deficiency virus
NANBH	non A non B hepatitis
NGS	Next-generation sequencing
ORF	Open reading frame
PIs	Protease inhibitors
RdRp	RNA dependent RNA polymerase
RT PCR	Reverse transcriptase PCR
SVR	Sustained virological response
UTR	Untranslated region
VLDL	Very low density lipoprotein
WHO	World Health Organization

Abstract

Hepatitis C is generally defined as a disease in which the inflammation of liver takes place. This situation is caused by RNA virus of the family Flaviviridae. It's a worldwide problem and in Pakistan its ratio is 4% in general population. The problem of Hepatitis is also considered as one of the major problems by WHO.

During 1980s the hepatitis were known to be a A or B but soon after the discovery of Hepatitis C takes place in 1989 at CDC and the experiments was done on the sera of chimpanzee. After that several patients were diagnosed for that virus which is NANB in nature.

Till date there are no vaccines discovered for Hepatitis C hence the disease progression in some areas and some groups of people are high. On the other hand the available drugs for this disease are either costly or not that much efficient, generally a combination of interferon and ribavirin are given to the patients suffering from that virus. Recently a newly a newly discovered drug DAA show a high efficiency in order to cure the disease and to improve SVR. That is also proved by a case study from our patients.

Hence hepatitis is blood borne disease so there are some groups who have risk to get infected that include barbers, dentists, sex workers, drug users, piercing of nose ear etc. Some evidences of transfusion through house hold contact also be witnessed.

If not diagnosed and treated on time this viral infection can be lethal and may cause liver cirrhosis that can cause to death of person. At acute or minor phase if diagnosed this can be easily curable with no side effects. Some individuals show no physical signs of Hepatitis infection while some show dizziness, loss in appetite, loss in weight and change in mood.

Hepatitis C is a virus that keeps on mutating and due to its nature there are several types and subtypes of HCV. There are some methods that can predict the type of HCV , but the most

exact and widely used method is typing through nested PCR. This technique involves the extraction and amplification of RNA from serum of infected individual and then amplifying it with type specific primers which is then observed under U.V light. The specific type give specific position band which is then compared with key to predict results of specific type of HCV.

The prevalence of different genotypes is different in different parts of the world. In Pakistan the most prevalent genotype is 3a followed by 1a and that is also proved by our study , in our study we include 8864 patients out of which 7161(80.77%) were 3a. That pattern of dominancy over other subtypes in Pakistan is also supported by several studies.

Chapter # 1

Introduction and Review of Literature

1.1 HEPATITIS

Hepatitis C is defined as the swelling of liver generally referred as ‘‘Liver Inflammation’’ and considered as the most common liver-related and lethal disease. This disease is caused due to RNA virus of family Flaviviridae, that further undergo a Hepatitis that may be chronic and may be proceed to the liver cirrhosis or sometime the hepatocellular carcinoma. Its considered as major problem for health by World Health Organization (WHO) and estimated a 4.8% of the population to be infected with Hepatitis C (Afzal and Iqbal, 2017) and in Pakistan this ratio is 3.13% for general population, hence declared by WHO as a ‘cirrhotic state’.

After Egypt Pakistan is the 2nd country to have such huge amount of Hepatitis C infected patients. Almost 15% to 45% of the Hepatitis C patients naturally clear the HCV with out any medicine through their natural immunity with in a time period of six months. But the remaining 55% to 85% of the patients will develop a chronic Hepatitis C, out of which the liver cirrhosis is developed by 15% to 30% with in a period 20 years, which lead to great tension for community both socially and economically (Afzal *et al.*, 2014).

No vaccines are available in order to immune the body against Hepatitis C .The treatment activities have been improved after the invention of modern drug i.e Direct Antiviral Agents (DAAs) as compared to combination of low potent ribavirin and interferon. But ,a large number of patients still have liver cirrhosis or Hepato Cellular Carcinoma (HCC) . There is need for early diagnostics and efficient medication in order to treat the patient having HCV

1.1.1 Discovery and Structure.

At the beginning of 1980, patients were been screened for Hepatitis virus that was A or B the only known cause of viral Hepatitis that time and people were only treat and diagnosed for A or B virus that time. At National Institutes of Health (NIH) Harvey Alter & colleagues then