

## SEROPREVALENCE OF HEPATITIS C IN PREGNANT FEMALES OF HAZARA DIVISION

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**Background:** Hepatitis C Virus (HCV), the causative agent of Hepatitis C is prevalent in different countries including Pakistan. Studies have been conducted on various aspects of HCV in Pakistan. The present study was planned to see the prevalence of hepatitis C in pregnant females of Hazara Division. **Methods:** Five hundred pregnant females of reproductive age group from Hazara Division selected by non probability convenient sampling technique were studied from 1<sup>st</sup> March 2006 to 28<sup>th</sup> February 2007 at Ayub Teaching Hospital, and District Headquarter Hospitals Abbottabad, Haripur and Mansehra. After initial screening by immunology technique positive cases were confirmed by Enzyme Linked Immunosorbent Assay (ELISA). **Results:** Seroprevalence of HCV in pregnant females of Hazara division was 8.9%. Females aged from 25–35 constituted the largest group among positive cases. HCV was more prevalent in District Abbottabad as compared to the other districts of Hazara division. **Conclusion:** Seroprevalence of HCV in pregnant females of Hazara Division is different from the figures already reported from the other parts of Pakistan.

**Keywords:** Hepatitis C, Chronic liver disease, Seroprevalence

### INTRODUCTION

Hepatitis is defined as an inflammation of liver which results in damage to hepatocytes with subsequent cell death (necrosis). Acute injury is generally followed by complete recovery. Prolonged inflammation may be accompanied by fibrosis and progression to cirrhosis.

Hepatitis C virus (HCV) is one of the causes of hepatitis. It is a single stranded RNA virus of the Flaviviridae family. It infects an estimated 170 million persons world wide, 3% of the world's population (WHO estimates) and 3 to 4 million of newly infected people each year.<sup>1,2</sup> It was discovered in 1989.<sup>3</sup> Despite its large socio-economic impact, there is neither a vaccine nor an efficient side effect free therapy against the virus. HCV infection is a leading cause of chronic hepatitis, liver cirrhosis and hepatocellular carcinoma world wide.<sup>4,5</sup> Co-infection with HCV is found in 30 to 50% of persons infected with HIV, HIV infection leads to more rapid progression of chronic hepatitis C to Cirrhosis.<sup>6</sup>

HCV is transmitted by blood to blood contact. In past, HCV was responsible for over 90% of cases of post transfusion hepatitis.<sup>7</sup> Over 50% cases are transmitted by intravenous drug use. Intranasal cocaine use and body piercing also are risk factors. The risk of sexual and maternal-neonatal transmission is low and may be greater in patient with high circulating levels of HCV RNA. Transmission via breast feeding has not been documented.<sup>8,9</sup>

HCV has become major public health issue and is prevalent in most countries including Pakistan. HCV infection starts frequently without clinical symptoms and progresses in the majority of patients (70–80%) to persistent viremia and chronic

hepatitis including cirrhosis and hepatocellular carcinoma.<sup>10</sup> Present study has been planned to determine the Seroprevalence of hepatitis C in the pregnant females of Hazara Division.

The estimated global prevalence of HCV infection is 2.2%, corresponding to about 130 millions HCV-positive persons worldwide.<sup>11</sup> Because many countries lack data, this estimate is based on weighted averages for regions rather than individual countries. Region-specific estimates range from <1.0% in Northern Europe to >2.9% in Northern Africa. The lowest prevalence (0.01–0.1%) has been reported from countries in the United Kingdom and Scandinavia; the highest prevalence (15–20%) has been reported from Egypt.<sup>12,13</sup> An estimated 27% of cirrhosis and 25% of HCC worldwide occur in HCV-infected people.<sup>14</sup> There are both geographic and temporal differences in the patterns of HCV infection.<sup>15</sup>

### MATERIAL AND METHODS

Pregnant females of all ages, ethnic groups and races belonging to Hazara Division were included in this study, which came in OPD as well as admitted in maternity wards at Ayub Teaching Hospital Abbottabad, DHQ hospitals Abbottabad, Haripur & Mansehra. This study was done from 1<sup>st</sup> March 2006 to 28<sup>th</sup> Feb 2007. Non pregnant females and pregnant females not belonging to Hazara Division were excluded from this study. It was a descriptive study carried out on pregnant females of Hazara Division. The study was conducted at the Department of Microbiology Ayub Medical College in collaboration with the Department of Pathology, Ayub Teaching Hospital, Abbottabad. The pregnant females who came in OPD or admitted in wards of Ayub Teaching Hospital, DHQ

Hospitals, Abbottabad, Haripur and Mansehra from 1<sup>st</sup> March 2006 to 28<sup>th</sup> Feb 2007. Five hundred pregnant females who fulfilled the inclusion and exclusion criteria were included in the study. Non probability convenience sampling technique was used to select the sample.

A detailed history was taken from each subject. History including the general particulars, history of any present or past illnesses, family history, socio-economic status of the individual, any past history of hepatitis or jaundice, history of blood transfusions was recorded. Any history of hepatitis C in other family members was also recorded. A detailed obstetrical history including the present pregnancy and gestational period was recorded. History of any surgical and dental procedures along with history of abortion and miscarriages was also taken in detail. History of ear or nose piercing, tattooing and frequent use of intravenous or intra muscular injections was also taken. Past history of hepatitis C, any previous knowledge about hepatitis C, its modes of transmission and preventive methods was also taken. Previous testing for hepatitis C was also asked. After taking detailed history regarding every aspect of the disease each individual was examined in detail especially for jaundice, anaemia clinical evidence of chronic liver disease (xanthelesma, spider naevi, palmar erythema, clubbing, scratch masses, splenomegaly and ascites), ear and nose piercing, tattooing, scars of any previous surgery, signs of intravenous drug use, gastro intestinal tract, hepatobiliary system, respiratory system, cardio vascular system nervous and haemopoietic system. Antenatal examination regarding the period of gestation, fundal height, foetal movements and ultrasonography for fetal abnormality was undertaken.

After history and examination individuals were subjected to the laboratory tests as follows. Five (5) ml of venous blood sample was collected under strict aseptic conditions from ante cubital vein in a sterile disposable plastic syringe. It was then transferred to a plastic bottle without anticoagulant and allowed to clot at room temperature. It was centrifuged after clotting to extract serum. Serum alanine aminotransferase (ALT) was estimated on each sample before storage by the photometric method based upon the reference method of the International Federation of Clinical Chemistry (IFCC).<sup>16</sup>

Immunochromatographic screening test (ICT)<sup>17</sup> is a rapid, one step test device for the rapid qualitative detection of antibody to Hepatitis C Virus in serum or plasma. Cartez diagnostic kit for Hepatitis C Virus antibodies made by Cartez Laboratories USA was used for screening in this study. ELISA was done by Ortho HCV 3.0 ELISA Test system with Enhanced SAV (Sample Addition Verification) made by. ELISA test was done on a total of 158 samples. This Assay was

considered as confirmatory test for anti-HCV antibodies. Observations on history, examination and laboratory tests were recorded on a structural proforma specially designed for this study.

## RESULTS

Results of the study are shown in Tables 1–7. Out of 500 females 201 (40.2%) were between 15–25 years of age, and 46.4% between 26–35 years and 13.4% females belonged to the age group 36–45 years (Table-1). As much as 70 out of 500 (14%) pregnant females were from Haripur, 210 out of 500 (42%) were residents of Abbottabad. The females belonging to Mansehra were found to be 80 out of 500 (16%) and 60 out of 500(12%) were from Kohistan while remaining 80 (16%) were from Batagram (Table-2). Regarding the socio-economic status of the patients, 50 out of 500 (10%) belonged to well off families, 280 out of 500 (56%) were from satisfactory or fair socio-echnomic group while 170 out of 500 (34%) belonged to poor families (Table-3). As much as 23.4% females were in the 1st trimester, 36% in the 2<sup>nd</sup> trimester and 40.6% were in 3<sup>rd</sup> trimester (Table-4).

**Table-1: Age distribution of patients (n=500)**

Age Group (years)	No. of patients	Percentage
15–25	201	40.2
26–35	232	46.4
37–45	67	13.4

**Table-2: District wise distribution of patients (n=500)**

District	No. of patients	Percentage
Abbottabad	210	42
Haripur	70	14
Mansehra	80	16
Kohistan	60	12
Batagram	80	16

**Table-3: Distribution of patients according to socio-economic status (n=500)**

Status	Number	Percentage
>20000 Good	50	10
10000–20000 Satisfactory	280	56
<10000 Poor	170	34

**Table-4: Distribution according to Gestational period (n=500)**

Trimester	Number	Percentage
1 <sup>st</sup> (0–3 Month)	117	23.4
2 <sup>nd</sup> (4–6 Month)	180	36
3 <sup>rd</sup> (7–9 Month)	203	40.6

The ALT level was found within normal limits in 470 out 500 (94%) and raised in 30 out of 500 (6%) pregnant females (Table-5). The result of initial screening of pregnant females by immunochromatographic technique revealed anti HCV antibodies in 48 (9.6%) (Table-6). The serum ELISA test was performed on 158 samples and 43 were positive for HCV antibodies and 115 negative out of 158 samples. Therefore 43 out of 500 (8.9%) females were ultimately confirmed positive for HCV antibodies (Table-7).

**Table-5: Sample breakdown by frequencies subjected to ALT and ICT**

Category	Number	Percentage
Initial testing	500	100
Discarded after initial testing	327	65.4
Retained every 5 <sup>th</sup> sample	80	16
Repeated after 04 wks	15	3
Positive by ICT	48	9.6
Raised serum ALT	30	6

**Table-6: Results of initial screening by ICT**

Positive		Negative	
Patients	Percentage	Patients	Percentage
48	9.6	452	90.4

**Table-7: Results of ELISA tests for HCV antibodies (n=158)**

Group	Tested	Positive		Negative	
		Patients	%	Patients	%
HCV positive by ICT method	48	43	89.5	05	10.5
Samples with high ALT	30	0	0.0	30	100
Every 5 <sup>th</sup> sample -ve for HCV by ICT	80	0	0.0	80	100
<b>Total</b>	158	43	---	115	---

## DISCUSSION

Hepatitis C infection is a global health problem. As the infection is mostly severe, population based epidemiological studies have been performed in different parts of the world including Pakistan to estimate its prevalence and develop preventive methods. Seroprevalence of HCV infection was found to be 1.8% corresponding to about 3.9 million persons in the USA.<sup>12</sup>

Prevalence of HCV in mothers and children was found to be 9.35% and 4.09% in a study conducted at Lahore.<sup>18</sup> Mother to infant transmission of HCV infection studies at Karachi revealed 16.5% expecting mothers positive for HCV.<sup>19</sup> These results are different from those of present study. A thorough search of literature published in Pakistan did not reveal any study on seroprevalence of HCV in pregnant females. However, several studies have been conducted on other population groups in the past two decades in our country.

A study conducted on thalassaemic children revealed 36.25% seropositivity of anti HCV antibodies<sup>20</sup> which increased with the number of blood transfusions. Anti HCV antibody was detected in 3.5% individuals in a large study conducted at Rawalpindi on a multi ethnic group of individuals. Different seropositivity rates were seen in the different ethnic groups. It was suggested that different modes of infection could be one reason of ethnic difference of HCV seroprevalence.<sup>21</sup> Seroprevalence of HCV was 6.3 % in prisoners.

Seroprevalence of HCV was also studied in healthy looking individuals. Blood donors screened prior to blood donation revealed 1.1% positivity of anti HCV antibodies.<sup>22</sup> A similar study conducted on

growing adults prior to screening in Armed Forces revealed 3.69% seropositivity of anti HCV.<sup>23</sup> Although these studies were conducted on special population groups like the present study, the results of the present study differ from those of the aforementioned ones. Exposure of females to HCV during assisted delivery, caesarean section and blood transfusion could be responsible for this difference.

Seroprevalence of hepatitis C studied in general population in a healthy cohort revealed 3.3% seropositivity of anti HCV antibodies against 3% of HBV, highlighting the increasing trend of HCV infection as a considerable threat to our population.<sup>24</sup> Seroprevalence of HCV in surgical patients was found to be 11.6%.<sup>25</sup> Another similar study conducted on general population in 2000 revealed 12.5% individuals positive for anti HCV antibodies.<sup>26</sup> The importance of effective preventive measures was stressed. These figures are much higher than those in the present study. This difference could be due to the fact that the study under reference was focused exclusively on laboratory based data (involving suspected cases), while the present study was conducted on pregnant females only. Another study conducted on multi transfused thalassaemic children revealed a high prevalence rate of HCV (56%) in children aged 1.5–19 years; such a high prevalence rate is alarming. It necessitates adopting stringent screening procedure before blood transfusion to those who need it. It also conveys the message that transfusion of blood should be considered when it is really required and there is no alternative.<sup>27</sup> Healthy blood donors are also known to harbour HCV, a study conducted on healthy blood donors revealed 2.6% positivity of anti HCV antibodies<sup>28</sup>, and a similar study conducted at another centre revealed a prevalence rate of 4.8%.<sup>29</sup> Number of donations and ethnic differences are other factors that may be responsible for the difference in the seroprevalence of HCV infection among healthy blood donors from two different centres.

Whatever may be the reasons, it is clear from these results once again that adequate screening of blood donors by appropriate method is of utmost importance and is also an important step in cutting down HCV transmission. Seroprevalence of HCV infection in general population was estimated at 5.3 %<sup>30</sup>. This figure is lower than those of the present study. Initial screening by ICT in the present study revealed anti HCV in 48 out of 500 (9.6 %) subjects. However out of these 48 subjects, 5 were found negative & the remaining 43 positive for anti HCV by ELISA. So the rate of false positivity by ICT was 10.41%. More studies on larger samples are required to further evaluate this, as it was beyond the scope of the present study. The exact reason of different seroprevalence of HCV in general population and the present study as mentioned above is not known. However one possibility could be that the

present study was conducted on pregnant females, while the study under reference covered general population. Difference in diagnostic techniques could be another factor. A study conducted in Sialkot revealed a significantly higher prevalence of HCV in diabetics than normal population.<sup>31</sup>

These and many other studies, covering different aspects of HCV in our country, have thrown some light on this important public health problem. In fact what we know today about HCV burden in our country is the tip of the iceberg. Much more has to be done to see this problem in depth. Planning effective preventive measures is not possible while we don't know the actual magnitude of the problem. This needs more elaborate population based studies to be conducted across the entire country.

## CONCLUSION & RECOMMENDATIONS

Seroprevalence of Hepatitis C in the present study is higher than that reported for the general population by other centres and lower than that reported earlier from some centres in Pakistan. Hepatitis C is prevalent in different parts of our country with varying rates of prevalence. Although studies have been conducted on Hepatitis C in Pakistan, much has to be done, especially regarding general population.

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